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GENERAL INFORMATIONS

INTRODUCTION

The **ORIX-70** x-ray medical equipment is designed for radiographic diagnosis in the dentistry field

ARDET Dental & Medical Devices s.r.l. declines all responsibilities for damages caused by an improper use.

Read carefully the following instruction manual before using the equipment.

The equipment conforms with the safety codes in force.

The electrical security of the unit is granted only if it is connected to a regular grounding conductor

Any servicing should be carried out by ARDET's Dental & Medical Devices s.r.l. qualified personnel.

Disconnect the equipment, releasing the main switch, during maintenance service.

ARDET Dental & Medical Devices s.r.l. in order to continually develop its equipments reserves the right to make changes without.

GENERAL CONDITIONS OF WARRANTY

ARDET Dental & Medical Devices s.r.l. guarantees its dental equipments against possible defects of production for a period of twenty-four (24) months from date of shipment and/or invoice

The x-ray tube installed follows the warranty conditions issued by the manufacturer.

During this period, in case of defects, the client must return back to ARDET Dental & Medical Devices s.r.l. the material, adequately packed, at his own expense. ARDET Dental & Medical Devices s.r.l. qualified personnel will check and replace the damaged parts.

All the forwarding of goods in guarantee charged to ARDET Dental & Medical Devices s.r.l. , if they have not been previously agreed and confirmed in writing, will be returned to the sender.

Guarantee expires in case of:

- **Accidental breakage**
- **Carelessness**
- **The electrical wiring does not conform with the standards in force**
- **Incorrect installation**
- **Incorrect use or observation of the conditions specified in the present manual**
- **Bad maintenance**
- **Use of no original components**
- **Modifications and/or repairs which have not been authorized or which have been carried out by unqualified personnel**

Any probable disputes do not allow customers to withhold payments and do not allow extension to what previously agreed upon.

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Our customers are recommended not to use parcel post, especially for the x-ray tube head. We will not accept any parcel which will reach us damaged or in bad conditions.

Any controversies comes under the jurisdiction of the **Court of Milan**

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LAWS TO FALLOW (FOR ITALY ONLY)

OGGETTO: **POSSESSO E/O IMPIEGO DI GENERATORI DI RADIAZIONI IONIZZANTI**

1) Inviare entro 10 giorni denuncia di detenzione dell'apparecchio ai sensi dell'art. 92 DPR 185/64 alla **ASSL** territorialmente competente e, nel caso di presenza di lavoratori dipendenti, come specificato dall'art. 60 DPR 185/64 anche **all'Ispettorato Provinciale del Lavoro.** Alla denuncia di detenzione dovrà essere allegata una planimetria in scala 1:50 dei locali nel quale l'apparecchio è installato con l'indicazione della destinazione dei locali adiacenti e della consistenza delle opere murarie unitamente alla relazione tecnica redatta da parte dell'**E.Q.** (Esperto Qualificato) che contenga la descrizione dell'apparecchio e dei mezzi di radioprotezione posti in atto.

2) Predisporre le misure necessarie per evitare che la popolazione sia esposta al rischio di Radiazioni Ionizzanti superiori alle dosi massime ammissibili (art. 95 DPR 185/64).

3) Assicurare la sorveglianza fisica della protezione a mezzo di un **E.Q.** che ha il compito di effettuare la delimitazione della zona controllata con l'applicazione dei relativi contrassegni; l'esame preventivo e periodico del progetto d'impianto; il controllo periodico dell'efficacia dei dispositivi tecnici di radioprotezione; la valutazione periodica delle esposizioni e delle dosi individuali assorbite dagli eventuali lavoratori e il rilascio del benestare radioprotezionistico che dovrà essere rinnovato con periodicità **annuale** (art. 70 e 72 DPR 185/64).

4) Pagare la **Tassa Regionale** annuale a mezzo C/C. intestato alla **Tesoreria** della **Regione.**

5) Denunciare entro **30 giorni** dalla data di installazione l'impiego dell'apparecchio all' **I.N.A.I.L.**

L'assicurazione **I.N.A.I.L.** per i Medici è **obbligatoria** per Legge e l'omissione o la tardata presentazione della denuncia è punibile con ammende di importi elevati.

WARNINGS

Certain instructions are preceded by **"WARNING"** with a triangle at the side. Whenever this symbol appears, carefully read the relevant paragraph before performing any operations

	Type of protection against direct and indirect contacts: class II Degree of protection against direct and indirect contacts: unit with applied part type B.
	**CAUTION!** Consult the technical documentation provided
	Earth connection
	Alternating currents
	ON
	OFF
	Ionizing radiations
	Source of radiation
	X-ray control
	Equipment which conforms with the EEC Directive 93/42 standards.

IONISING RADIATIONS

X-rays are harmful, if improperly used. Therefore, the instructions contained herein must be strictly observed.

ARDET Dental & Medical Devices s.r.l. produces x-ray equipments which conform with the most restrictive worldwide rules of radio protection in force.

Aim of an **x-ray** equipment is the emission of x-rays for medical diagnosis by means of a film or an **"Imaging"** system.

In any case, independently from the safety of our equipments, we suggest you to protect yourself and your patient from the spread radiations **(secondary radiations)**.

GENERAL PROTECTION AGAINST X-RAYS

a) Control x-ray emission at a distance of at least 2 meters from the focal spot and the x-ray beam.

b) Reduce, as most as possible, the radiation level to which the patients and operating personnel are exposed.

c) During x-ray emissions, only the operating personnel and the patient must be present.

d) In case it should be necessary to help patient to hold the film in position, the operating personnel must use appropriate tools and wear anti radiation gloves and apron to protect hands and body. In any case, the patient must always be protected with a lead apron 0,25 mm. min.

Operations which produce x-ray emission are preceded by symbol **"Ionizing Radiation"** as to remember all the conditions to observe in compliance with the **rules in force in your Country.**

AMBIENT AND USE CONDITIONS

The room where the x-ray equipment is to be used should satisfy the following conditions:

1) Temperature between 10 and 40° C.

2) Relative humidity from 30 to 75%

3) Atmospheric pressure from 700 to 1060 hPa.

4) The electrical wiring must conform with CEI 64-8 (the regulations concerning the electrical wiring to be used in surgery)

5) Concerning the protection against radiation, the room must conform with the regulations in force in the country where the equipment is used.

6) Before leaving the surgery, turn the main switch to the OFF position.

CAUTION! 

7) The equipment is not liquid-proof (traditional equipment)

8) The equipment is not suitable for use in presence of flammable anesthetic gas based on oxygen and nitrogen protoxide

9) If an electric bistoury or other electrical equipments which do not conform with CEI EN 60601-1-2 specifications are used in surgeries or nearby, interferences or disturbances may arise thus causing the x-ray equipment to malfunction. In this case, disconnect the x-ray equipment before using any other instruments or device.

10) The ORIX-70 x-ray generator contains mineral oil, which is classified as a special by-product. Therefore, when the generator is to be put out of service it should be sent back to the manufacturer or given to a company authorized to dispose of mineral oil and the special by-products.

REFERENCE RULES

The ORIX 70 dental x-ray equipments conform with the following rules:

CEI EN 60601-1 (2007) Third edition + Corr. IEC:2007+IS IEC:2008 – Medical electrical equipment - Part 1: General requirements for basic safety and essential performance

CEI EN 60601-2-7 (1999)- Medical electrical equipment - Part 2: Particular requirements for the safety of high-voltage generators of diagnostic X-ray generators

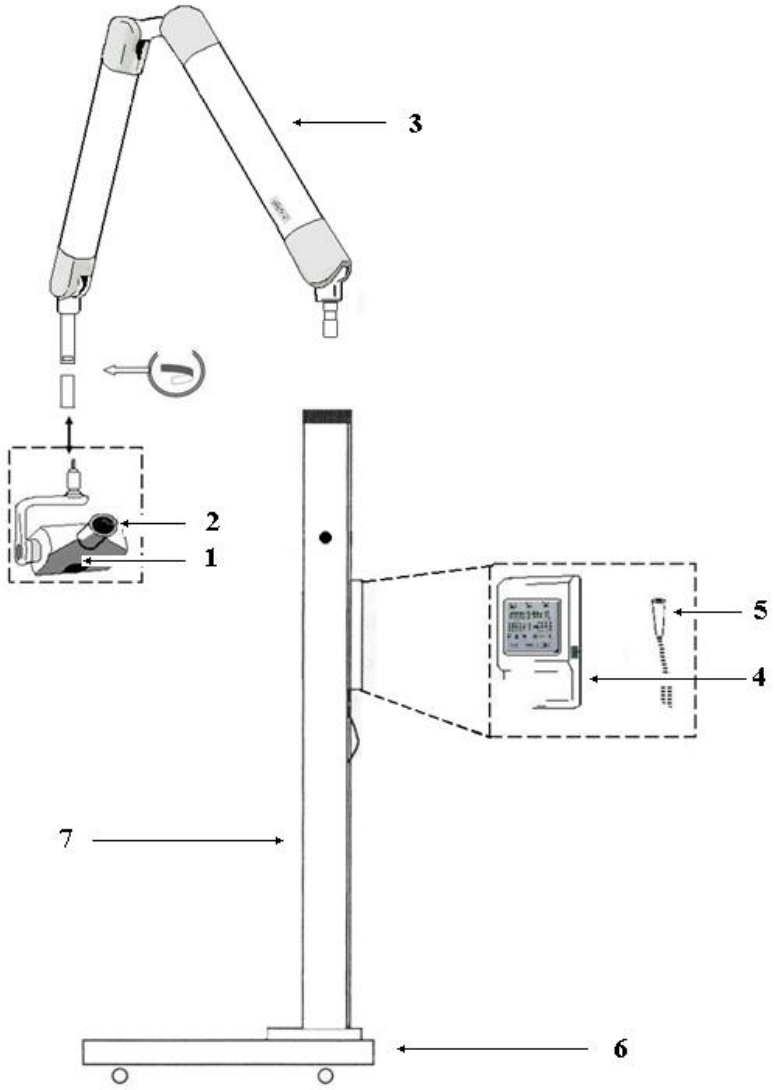
CEI EN 60601-1-2 (2007) Medical electrical equipment - Part 1: General requirements for basic safety and essential performance - Collateral standard: Electromagnetic compatibility - Requirements and tests

CEI EN 60601-1-3 (1998) Medical electrical equipment. Part 1: General requirements for safety. 3: Collateral standard: General requirements for radiation protection in diagnostic x-ray equipment.

CEI EN 60601-2-28 (1998) Medical electrical equipment - Part 2: Particular requirements for the safety of X-ray source assemblies and X-ray tube assemblies for medical diagnosis

Directive EMC 2004/108/CE Electromagnetic compatibility

DESCRIPTION OF THE X-RAY EQUIPMENT



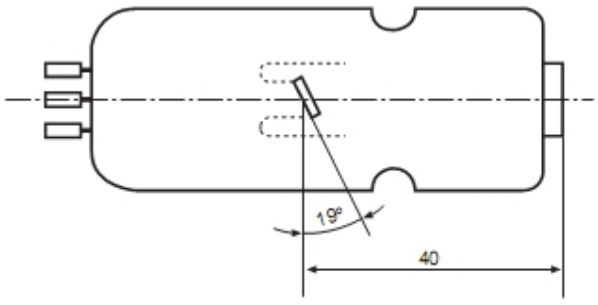
DESCRIPTION

1 X-RAY GENERATOR (TUBE HEAD)
2 CENTERING CONE FSD 20 CM.
3 COUNTER BALANCED ARM
4 X-RAY CONTROL
5 REMOTE CONTROL
6 BASE WITH WHEELS
7 COLOUMN

TECHNICAL DATA ORIX-70

Main 230 VAC +/- 10% - 50 Hz.
Primary consumption 6 A. max at 230 VAC
Total consumption 1380 VA. - 230 VAC
Line impedance 0.8 Ohm
Rated high voltage 70 KVP
Power rating 0,414 KW - 230 VAC
Actual power rating 0,450 KW - 230 VAC
X-ray tube: type and manufacturer OCX 65 G grid type - CEI srl, Bologna
Anode Tungsten (W)
Anodic inclination 19° in relation to the reference axis
X-ray tube current 8mA.
Focal spot mm. 0,8 x 0,8 (I.E.C.)
Tolerance on the reference axis of focal spot position +/- 1°
Inherent filtration Equivalent to mm. 0,5 AL
Total filtration = or > at mm. 2,5 AL.
Limiting device cylindrical type
Irradiated field diam. mm. 55 (when it reaches the skin)
Internal protection in Pb. - 0,3 mm. equivalent.
Focus-Film distance mm. 200
Transformer insulation oil bath
Cooling ambient
Use x-ray equipment for continuous operating with intermittent load
Load (Duty cycle) 1 at 30
Radiation leakage < 28 mR/h. at 50 cm. distance
Technical factors for x-ray leakage 70 Kv. - 8 mA. - 1 cycle
Current reference - time factor 0,1 s x 8 mA. 0.8 mA/s.

X-ray tube OCX 65 G
Datum line and anode inclination angle



TECHNICAL DATA SELEMATIC

Power	230 VAC
Frequency	50 Hz
Minimum selectable time	0.03 seconds
Maximum selectable time	1,32 seconds
Exposure switch	On "DEAD MAN"
RESET to the last exposure value	Automatic
Error signal	In the case of immediate or anticipated release of the x-ray key
"Sleeping mode" – Duty cycle	1:30
Precision	+/- 1 digit
Calculation of exposure time	On reaching 60% of the cycle The exposure time is calculated by measuring the radiation time counting the number of cycles and half-cycles where a significant quantity of radiation is emitted. (CEI 60601-2-7).

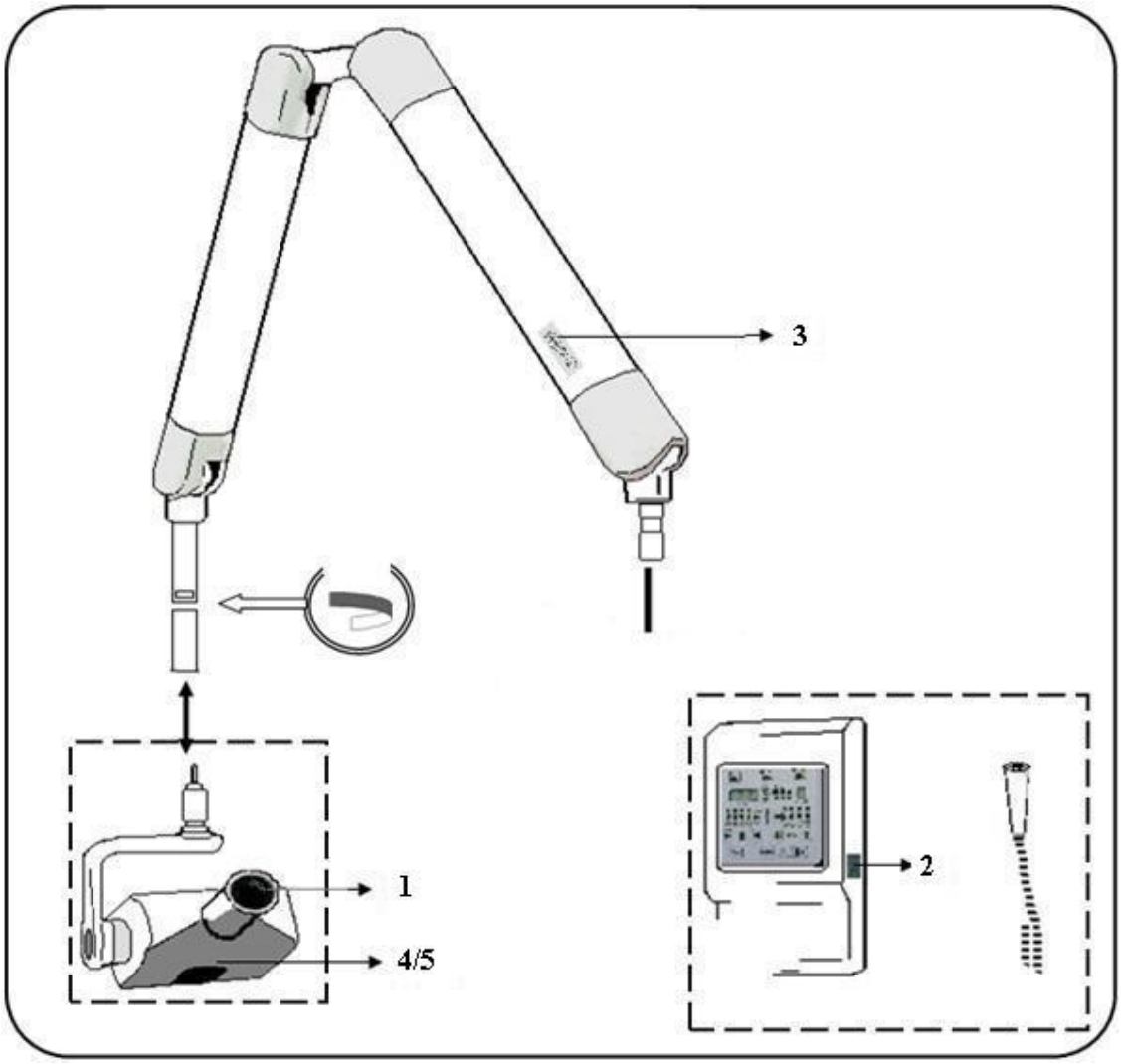
FUSE TABLE SELEMATIC

ID	VALUE	PROTECTION	POSITION
FU1	T.6.3 A	230 VAC line	Power card
FU2	F.0.16 A	Primary transformer line	Power card
FU3	0,40 A	Secondary transformer timer	Power card
FU4	0,25A	Secondary transformer timer	Power card
FU5	¼ A	Pico fuse time	Power card

Fuse abbreviations T. = delayed fuse F. = quick fuse

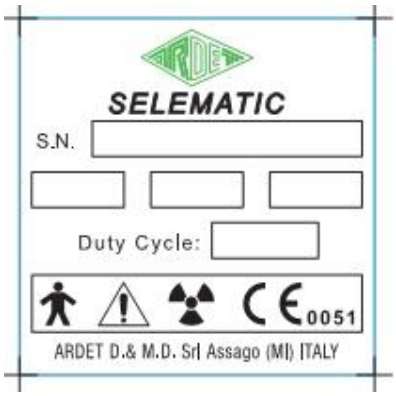
IDENTIFICATION LABES AND THEIR POSITIONS

1) **Collimator:** data are engraved on the collimator, indicating: identification number, specifications, manufacturer name
2) **X-ray control plate:** located above the covering carter. It indicates: name of equipment, serial number, manufacturer
3) **Balanced spring arm plate (Pantograph arm):** located in the back side of the holding hub of the generator. It indicates: serial number, manufacturer
4) **X-ray generator plate:** located above the upper side of the ABS coverings of the generator. It indicates: manufacturer, name of equipment, serial number, x-ray tube number, year of manufacture.
5) **Warning plate:** located above the lower side of the ABS coverings of the generator, evidencing the warning concerning the improper use of the equipment.



1

2



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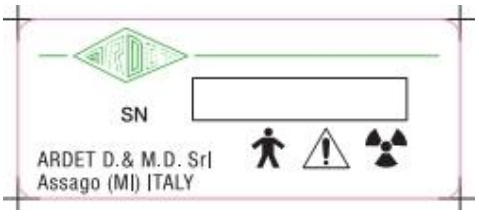
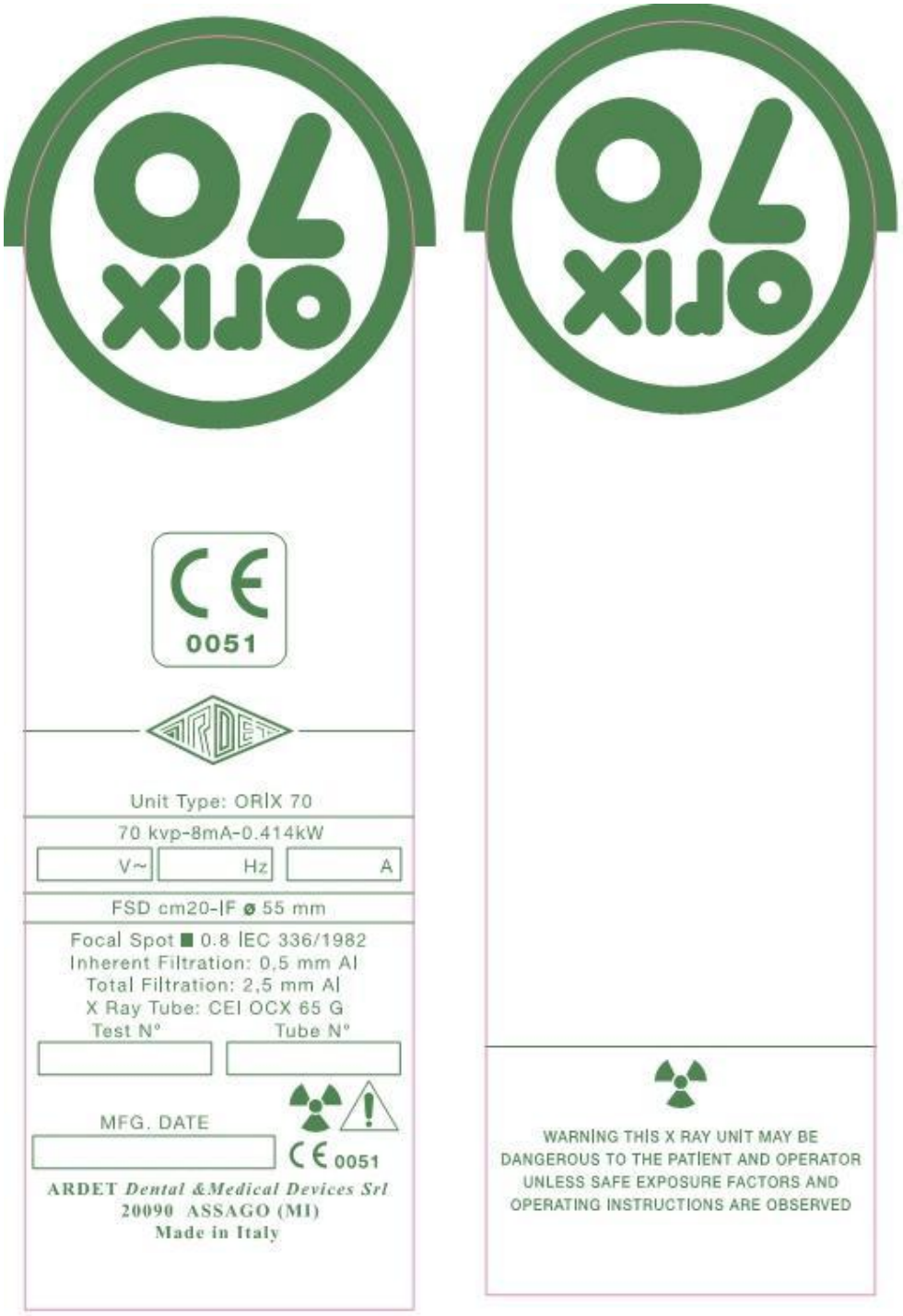
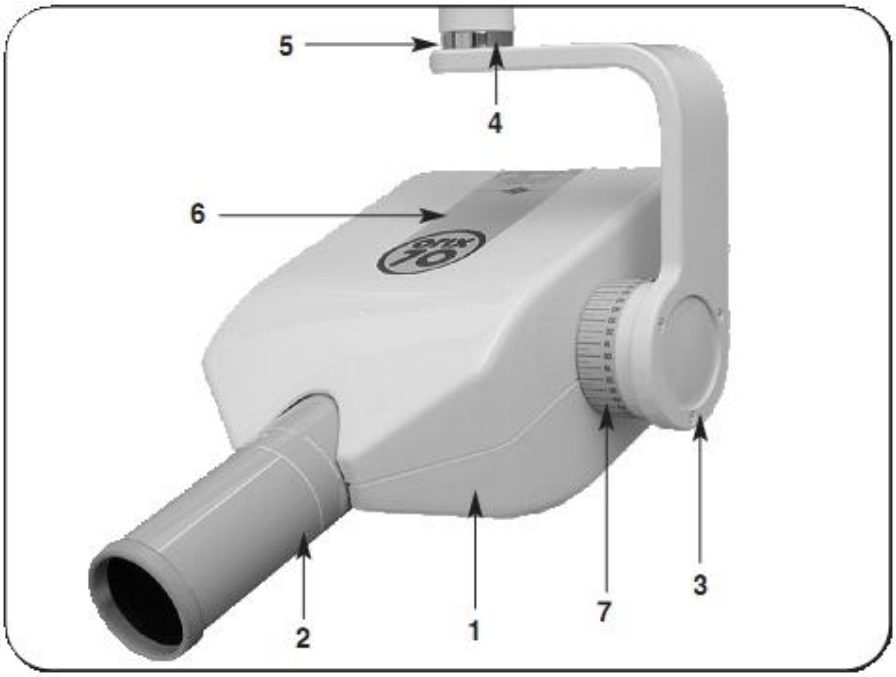


4/5



X-RAY TUBE HEAD



1) X-ray tube head
2) Collimator
3) Fork and support
4) Coaxial male connector
5) Coaxial female connector
6) Identification plate
7) Angular scale

DIGITAL X-RAY CONTROL BOARD SELEMATIC

X-ray control controlled by a microprocessor for the setting, management and activation of the exposure times for dental x-ray systems.

CAUTION! ⚠

Carefully read the instructions for use in chapter “INSTRUCTIONS FOR USE ”

GENERAL INFORMATIONS

- automatic exposure time selection according to the technical data selected, such as:
- sensitivity of the film
- type of patient

- type of tooth
- possibility to automatically adjust the exposure time programmed
- pre-heatig time of the x-ray tube filament controlled by quartz digital system.
- ZVS static switch for x-ray generator start
- The static switch guarantees the opening and closing of the power circuit without transitory or RFI disturbances.
- Safety relay in case of a 1° fault of the static switch.
- Safety circuit with time fuse and complete block of operation in case of 1° fault or anomalous functioning of the microprocessor.
- 3-digit (green light) alphanumeric display to :
  a) display of the pre-heating time set (maximum display time is 3 seconds) and following
  b) display of the set exposure time (by default: Film sensitivity d/0,05 seconds - patient medium - incisor/maxillary arcade)
- 1 digit alphanumeric display to display the film sensibility

IMPORTANT! 

The display of the pre-heating time is displayed every time the main switch of the x-ray control is switched on "ON".

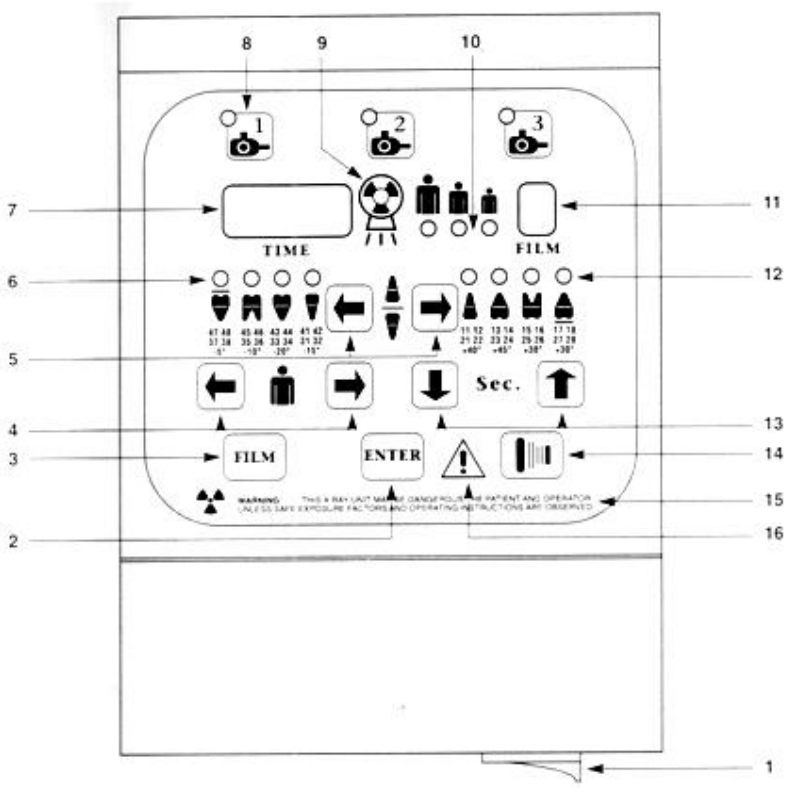
Switching on the x-ray control, the pre-heating time of the x-ray tube is displayed for approximately 500 ms and then the unit will set on the following factors:

1. X-ray generator nr. 1
2. Medium patient
3. Incisor
4. Last type of FILM memorized

Furthermore:

- Acoustic and luminous warning signal both for the technical data set and the x-rays emitted.
- "DEAD MAN" push button either fixed or remote (optional).
- Ready to manage a maximum of 3 generators.
- Suitable for use with radiovideographic digital systems (RVG)

CONTROL PANEL



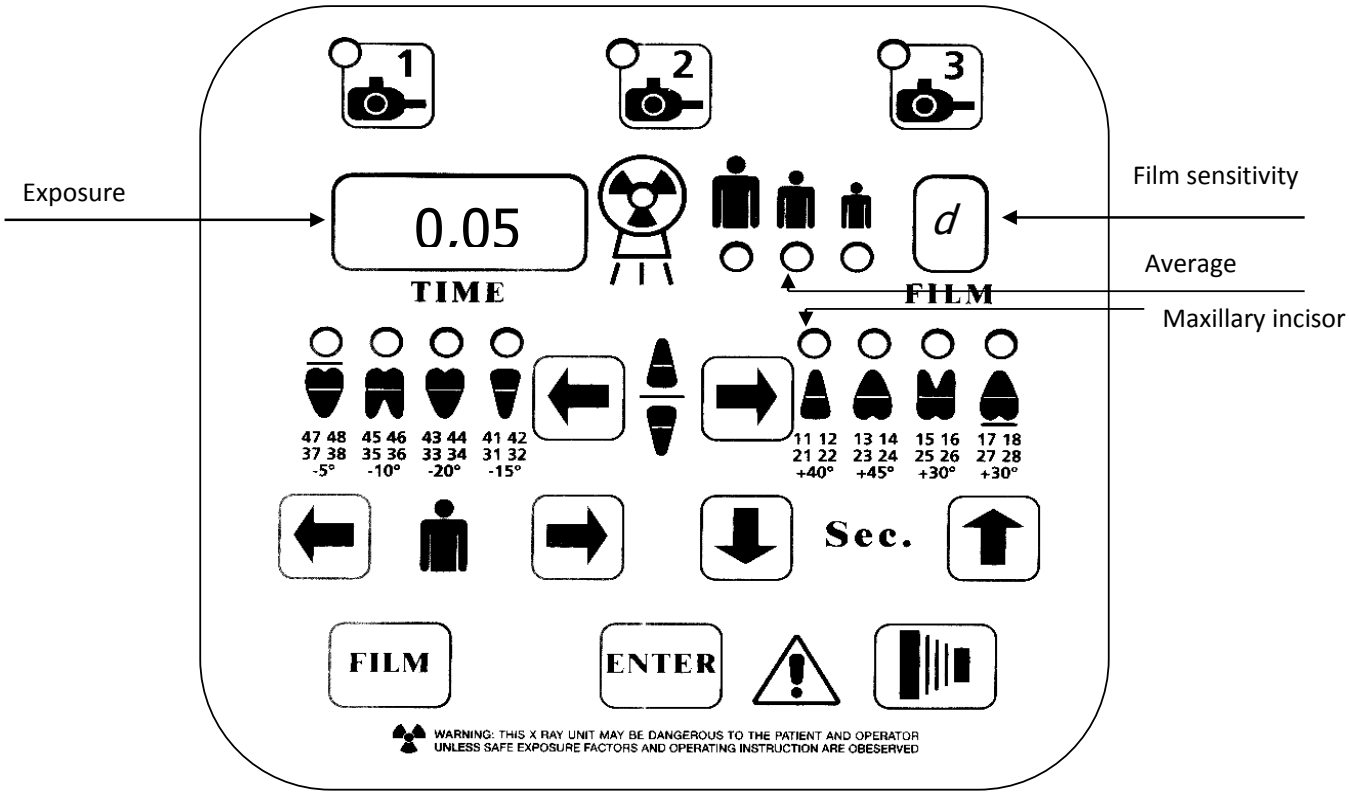
1. Bipolar ON/OFF main switch
2. Enter key - confirms the set technical data
3. Film sensitivity selection key
4. PATIENT selection key
5. TEETH selection key – each tooth is displayed with the relative international number
6. /12 Luminous display of the chosen tooth
7. 3 digit display showing pre-heating TIME / exposure TIME selected
8. selector key and luminous display of the selected GENERATOR
9. Symbol and luminous display for X-ray start
10. luminous display of the selected PATIENT
11. Display showing the sensitivity of the FILM used
13. Adjustment keys + and – for the automatically set exposure time
14. DEAD MAN x-ray key
15. WARNING signal
16. Warning symbol of dangerous x-rays.

USER'S MANUAL

INSTRUCTIONS FOR USE - SELEMATIC

1) Switch on the main switch (green light) placed on the bottom of the x-ray control (right side) ref. n.1

2) Select the sensitivity of the radiographic film by pushing the button sequentially (ref. n. 3) until the sensitivity of the film being used is visible (1/2/3/4/d)



CAUTION! ⚠

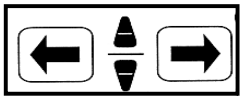
The SELEMATIC x-ray control is programmed by default on D film sensitivity which corresponds to DIGITAL - Film D - 0,05 secs-patiente medium-incisor-maxillary arcade. When the main switch is activated (green light - ref. n.7) the following data, memorised by the microprocessor, are displayed on the symbols relative to patient and tooth

Changing the sensitivity of the film with the relative key (ref. n.3) the exposure time is automatically modified whilst the other two technical factors relative to the size of the patient (red. n. 10) and the tooth (ref. n. 12) remain the same. The exposure time values displayed are as follows:

MEDIUM PATIENT – MAXILLARY INCISOR

FILM	GROUP D (RVG)	0,05 s
S	GROUP 1	0,51 s
D	GROUP 2	0,35 s
E	GROUP 3	0,24 s
F	GROUP 4	0,14 s

a) Select the work station pushing the relative key (ref. n.8)
b) Select the type of tooth (ref. n. 6 for mandibular arcade and ref. n. 12 for maxillary arcade) using the left and right arrows (ref. n. 5)



c) Select the type of patient (large/medium/small) using the left and right arrows (ref. n.4)

d) Press "ENTER" (ref. n. 2), automatically the LED of all the selected technical data (patient/tooth/generator) will start to blink. This means that the microprocessor has confirmed the chosen factors and therefore the x-ray control is ready to activate the x-ray generator.
e) press the x-ray key (ref. n. 14) and keep it pressed for the whole count-down time until the display reaches zero. During this phase, the x-ray LED will lighten (ref. n.9) and a BEEPER will give an acoustic warning for the whole time of radiation.
f) At the end of the exposure time (zero setting of the display and stop of the BEEPER) the x-ray control goes into sleeping mode (pause) and will remain inoperative for a minimum time which is 30 times the exposure time previously executed.

Example:
Exposure time 0.4 seconds
Pause time 12 seconds

The inactivity time is shown by the blinking of all the leds on the control panel. At the end of the pause time, the microprocessor will reset the parameters of the last exposure which may be maintained or modified according to the new x-ray which have to be taken.

CAUTION ! 

A the end of the duty cycle, all the technical data regarding the last x-ray remain selected (generator/patient/tooth).

CAUTION ! 

In case that after an exposure the x-ray control is intentionally or accidentally disconnected by means of the main switch (ref. n.1), on its re-start the memory of the microprocessor will reset the default technical parameters.

CAUTION ! 

g) The accidental release of the 'DEAD MAN' key (ref. n. 14) during an exposure, immediately arrest the x-ray control timer, automatically stopping the x-ray emission and on the display (ref. n.7) the following error codes are displayed:

E01 when for the almost immediate release of the x-ray key the exposure time is equal or less than the minimum time requested by the filament of the x-ray tube to reach its temperature of emission.In this case no significant radiation has been emitted and therefore the x-ray will have to be repeated. To reset the functions press "**ENTER**".

E02 when releasing of the x-ray key the exposure time has been partially completed and, in any case, it has exceeded the minimum time requested by the filament of the x-ray tube to reach its temperature of emission. In this case a sufficient radiation has been emitted. Before taking a new x-ray develop the x-ray already made in order to verify its quality. To re-start the x-ray control repeat the procedure showed for error **E01**.

h) In compliance with the relative standards, linearity and repeatability are guaranteed from a minimum time of **0,03 seconds** (with manual adjustment) to a maximum time of **1,32 seconds** (with manual adjustment) if all the technical factors are correctly set.

PROGRAMMED EXPOSURE TIMES

SENSITIVITY 1

0,34	0,29	0,29	0,29	SMALL PATIENT	0,34	0,29	0,39	0,58
0,51	0,44	0,44	0,44	MEDIUM PATIENT	0,51	0,44	0,59	0,88
0,68	0,59	0,59	0,59	LARGE PATIENT	0,68	0,59	0,79	1,18

SENSITIVITY 2

0,23	0,20	0,20	0,20	SMALL PATIENT	0,23	0,20	0,26	0,40
0,35	0,30	0,30	0,30	MEDIUM PATIENT	0,35	0,30	0,40	0,60
0,47	0,40	0,40	0,40	LARGE PATIENT	0,47	0,40	0,54	0,80

SENSITIVITY 3

0,16	0,13	0,13	0,13	SMALL PATIENT	0,16	0,13	0,18	0,27
0,24	0,20	0,20	0,20	MEDIUM PATIENT	0,24	0,20	0,27	0,41
0,32	0,27	0,27	0,27	LARGE PATIENT	0,32	0,27	0,36	0,55

SENSITIVITY 4

0,10	0,08	0,08	0,06	SMALL PATIENT	0,10	0,08	0,12	0,14
0,14	0,12	0,12	0,11	MEDIUM PATIENT	0,14	0,12	0,16	0,22
0,16	0,14	0,14	0,14	LARGE PATIENT	0,16	0,14	0,18	0,27

DIGITAL (d)

0,05	0,03	0,03	0,03	SMALL PATIENT	0,05	0,03	0,05	0,07
0,05	0,03	0,03	0,03	MEDIUM PATIENT	0,05	0,03	0,07	0,09
0,07	0,05	0,05	0,05	LARGE PATIENT	0,07	0,05	0,07	0,12

RADIOGRAPHIC TECHNIQUES: BISECTOR TECHNIQUE

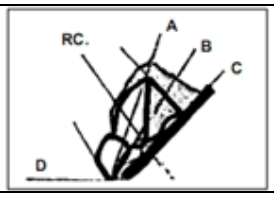
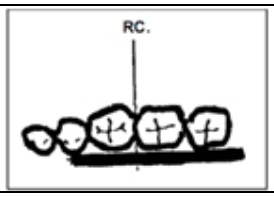
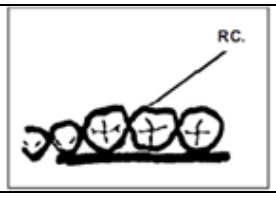
Vertical incidence angle of the main beam

In order to obtain a precise image if the tooth, the main beam must be perpendicular to the bisector of the angle created between the longitudinal axis of the tooth and of the film. Having positioned the tube head and the film an average incidence angle can be used for each area.

The incidence angle of the main beam can be determined by using the graduated scale located on the bracket of the x-ray tube **(Ref. A)**

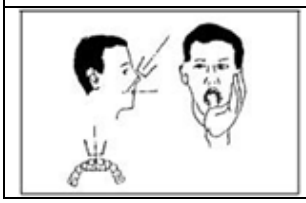
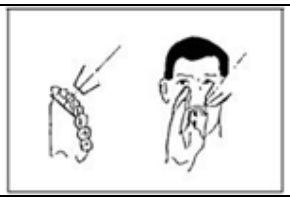
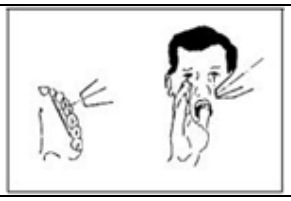
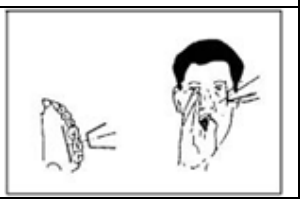
Direction of the horizontal incidence angle of the main beam.

As far as the interproximal spaces are concerned, the main beam should be horizontal (in an orthoradial direction). This helps prevent different parts from overlapping **(Ref. B) – (Ref. C)**

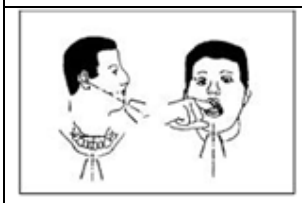
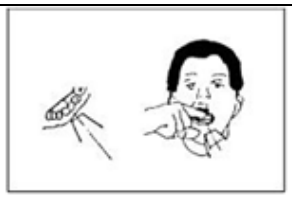
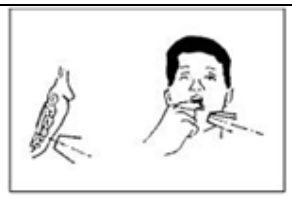
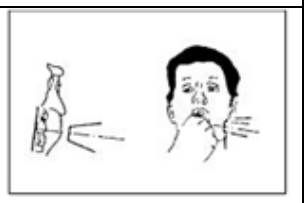
Ref. A	Ref. B	Ref. C
		

DESCRIPTION:
A longitudinal axis of the tooth
B bisector
C x-ray film plane
D occlusive plane
RC main beam

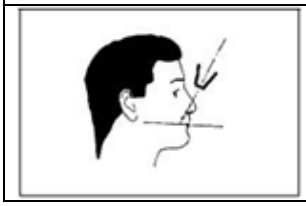
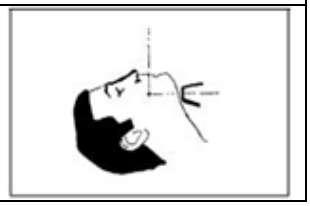
BISECTOR TECHNIQUE –JAW

INCISORS +40°	CANINES +40°	PEMOLARS +30°	MOLARS +20°
			

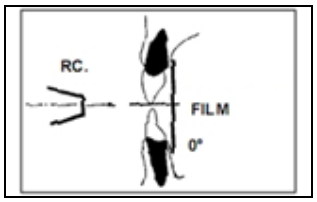
BISECTOR TECHNIQUE – MANDIBLE

INCISORS -15°	CANINES -15°	PEMOLARS -10°	MOLARS -5°
			

BISECTOR TECHNIQUE – OCCLUSIVE

JAW +65°	PREMOLARS -10°
	

INTERPROXIMAL POSITION – BITE WING



RADIOGRAPHIC TECHNIQUES: LONG CONE TECHNIQUE

With the long cone technique, the film surface is set parallel to the axis of the teeth.

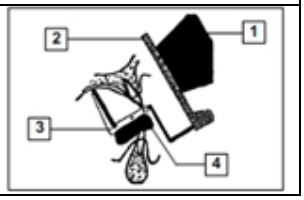
The film is normally placed away from the portion of teeth that comes in contact with tongue with the exception of the lower molars. The film is put on a holder, in order to prevent it from being bended when it is placed in the mouth. Various holders are available on the market.

The advantages of this technique are:

- No problems to position the x-ray generator
- Less mistakes and more accurate radiographs
- Negligible deformations and enlargements
- Occlusive axis parallel to the side of the film
- Reduction of x-ray dose for a smaller divergence of the x-ray beam
- Using the holder, the x-ray film is correctly and firmly positioned

The disadvantages are:

- Need to use the holder
- Need to use a generator of at least 56 KVP

Section horizontal axis	Section vertical axis
	

DESCRIPTION:
1 collimator
2 centering devices bisector
3 holder
4 cotton

PROJECTION

Upper incisors

a) Place the centre of the film in correspondence with the median line of the dental arch. The film will cover the lateral and central incisors (right/left) and the part of the adjacent teeth.
b) Place the film at a sufficient distance from the tongue as to obtain the full reproduction of the teeth
c) Place the film parallel to the labial borders of the crown of the central incisors

Upper canines

a) Place the anterior side of the film on the median line of the lateral incisors. The contact point of the canine must be visible on the x-ray image.
b) Place the film at a sufficient distance from the tongue as to reproduce the whole tooth.
c) Place the film parallel to the longitudinal axis of the canine. The plane of the film must be parallel to the labial surface of the canine and to the oral surface of the first premolar

Upper premolars

a) Place the anterior side of the film on the median line of the canine. The film must cover the distant side of the canine; the first molar and the mesial side of the second molar.
b) Place the x-ray film at a sufficient distance from the tongue. The film plane crosses the median line of the palate but it's not parallel to the medium sagittal plane.
c) Place the x-ray film parallel to the axis of the premolars ant to the oral plane of the crowns of the premolars.

Upper molars

a) Place the anterior side of the film in level with the interproximal space of the first molar and second premolar. The film must cover the first, second and third molar.
b) Place the film at a sufficient distance from the tongue near or beyond the median line of the palate. He plane of the film does not be parallel to median sagittal plane.
c) Place the film parallel to the major axis of the molars and parallel to the oral surfaces.

Third upper molar

a) Place the film diagonally through the palate in such as way as to have its back side between the counter lateral tuberosity and the one to be x-rayed.
b) Place the film very far from the lingual surface of the third molar
c) The vertical incidence of the film should normally not exceed 30° on the occlusive plane as to reduce to the minimum the over exposure of the zygomatic process on the picture of the third molar.

Lower incisors

a) Place the film in correspondence with the median line of the dental arch. The film will cover the lateral and central incisors (right/left) and part of the adjacent teeth.
b) Place the film at a sufficient distance from the lingual surface ad to have the whole tooth.
c) Place the film parallel to the major axis of the central incisors and parallel to the labial surface of the crowns of the central incisors.

Lower canines

a) Let the median line of the film coincide with the long axis of the canine. The film should cover the canine and the teeth nearby.
b) Place the film at sufficient distance from the lingual surface of the canine.
c) Place the film parallel to the longitudinal axis of the canine.

Lower premolars

a) Place the anterior side of the film on the median line of the canine. The film should cover the canine and the teeth nearby.

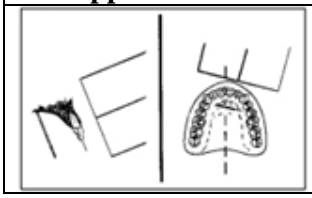
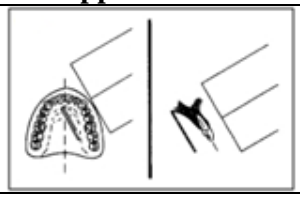
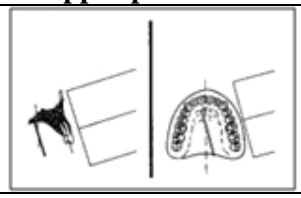
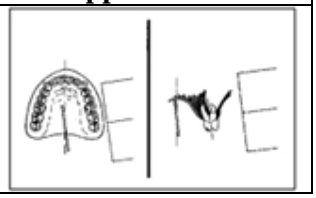
b) Place the film in the deepest area of the mouth and at a sufficient distance from the tongue.
c) Place the film parallel to the longitudinal axis of the premolars and parallel to the oral surfaces of the crowns.

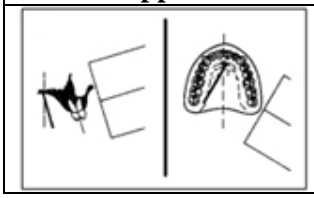
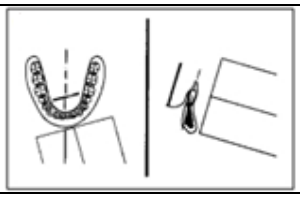
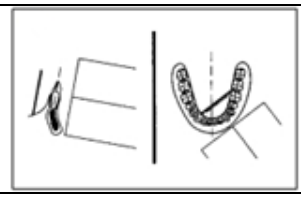
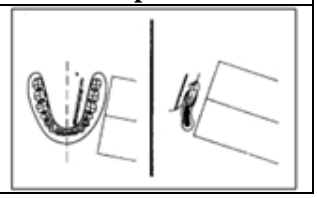
Lower molars

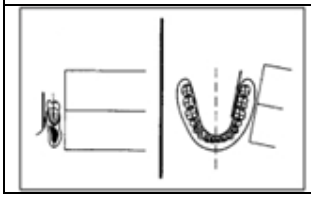
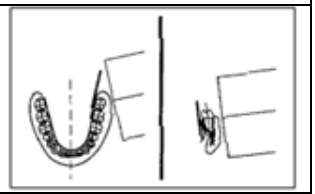
a) Place the anterior side of the film in level with the interpoximal space from the first molar and the second premolar. Place the film in such as way as to have the bigger size horizontally and the reference sign turned toward the occlusive plane. The film should cover the first, second and third molar.
b) Place the film near the tooth or near the soft tissue of the lingual surface with the upper margin at approx. 3 mm. above and parallel to the occlusive plane.
c) With the film in contact with the soft tissue, place the film parallel to the long axis of the molars.

Third lower moral

a) The anterior side of the film must be placed in level with the interproximal contact between the first and the second molar or more backwards according to the included orientation. The bigger side of the film must be placed horizontally with the reference sign towards the occlusive plane
b) Place the film near the lingual surface of the teeth and the soft tissues.
c) Place the film parallel to the longitudinal axis of the first and the second molar. The plane of the film remains parallel and touches the lingual surface of the mandible in the area of the third molar.

Upper incisors	Upper canines	Upper premolars	Upper molars
			

Third upper molar	Lower incisors	Lower canines	Lower premolars
			

Lower molars	Third lower molar
	

TYPICAL INCONVENIENCES OF INTRA ORAL FILMS

1) **FILM TOO LIGHT**
No evident structure – short contrast
cause: under exposure
exposure time too short - insufficient developing time - cold developing bath - too much diluted solution - developing bath exhausted.

2) **LIGHT AND TRANSPARENT AREAS**
cause: excessive fixing
the film has been forgotten for quite long time in the fixing solution.

3) **DARK FILM**
very dark and excessive blackening and lack of contrast
cause: over exposure
excessive dose (mA/sec) - excessive developing - bath too hot - incorrect bath dilution.

4) **SHORT TRANSPARENCY**
cause: insufficient fixing period
bath exhausted

5) **LIGHT ARCHED PORTION**
cause: film partially exposed
primary beam badly centered on the patient

6) **STRAIGHT TRANSPARENT BAND ON THE BORDER**
cause: wrong development
part of the film has not been developed.

7) **BLACK BAND FROM THE BORDER**
cause: wrong fixing
part of the film has not been fixed.

8) **DARK X-RAY WITH DOUBLE IMAGE**
cause: film used for more than one picture

9) **LIGHT X-RAY WITH DRAWING OF LEAD METAL PLATE**
cause: x-ray film placed in the opposite way

10) **LIGHT AND INDINSTINCT IMAGE**
cause: movement
patient moved during exposure.

11) **TEETH SHORTENED**
cause: wrong set
incidence angle of central beam too vertical.

12) **TEETH ELONGATED AND UNCLEAR**
cause: wrong set

incidence angle of central beam too horizontal.

13) X-RAY WITH ANATOMICAL STRUCTURES OVER EXPOSED
cause: wrong x-ray technique

14) BLURRED AND CROOKED IMAGES
cause: film bent during x-ray emission

15) LIGHT AND TRANSPARENT SPOTS
cause: wrong manipulation
fixing drops have been sprayed before putting in bath - grease or oil on the x-ray film.

16) LIGHT SPOTS
cause: wrong manipulation
x-ray films in contact with each other during development - air bubbles

17) FINGER PRINTS
cause: wrong manipulation
finger prints left by oil fingers or fixing lotions.

18) LIGHT SPOTS HALF MOON SHAPED
cause: wrong manipulation
scratches - claws - bending of x-ray film before exposure.

19) DOUBLE IMAGE
cause: movement
the patient has moved.

20) OVER EXPOSED PROXIMAL AREAS
cause: wrong set
main beam not orthogonal - incidence not perpendicular to the tangential plane of the examined sector.

21) DARK SPOTS
cause: wrong manipulation
drops of developing liquid before the procedure - drops of water on the x-ray film before development

22) DARK AREAS OR BANDS
cause: wrong manipulation
more x-ray films go in contact with each other - x-ray film go in contact with the edges of the developer - fixing not occurred.

23) BLACK RAMIFICATIONS OR POINTS
cause: electrostatic discharges
loading plane not suitable - humidity. - air too dry.

24) VEILING AND SHORT CONTRAST
cause: wrong preservation
decayed film - x-ray film badly stored and preserved.

25) VEILING ON WIDE SURFACE AND ON MORE X-RAY FILMS WITH THE SAME SIZE
cause: wrong preservation
the packing has been accidentally exposed to x-rays

26) BROWN COLOUR ON X-RAY FILM
cause: wrong manipulation
insufficient fixing - final washing too quick

27) X-RAY FILM WITH IRREGULAR SURFACE
cause: baths temperature
swelling of emulsion due to a very hot bath.

28) BIG LIGHT SPOTS
cause: baths temperature
temperature very high - (developing/washing/fixing) detachment of the emulsion from the holder.

STORAGE OF THE FILMS

It is suggested to keep a minimum stock sufficient for a period of 30 days max.

When using the films, favour the older ones.

Packing must be kept far from x-ray sources or other radiations (high voltage electrical equipments) and in well aerated rooms having a temperature between +4°C and +23°C and relative humidity between 45% and 65% max.

Packing must be put back as to avoid the possibility to flatten or compress the films.

A no correct storage leads to the premature ageing of the film and alters the quality of the x-ray images.

To storage the films follow the instruction/suggestion of the manufacturer.

DARK ROOM

A suitable preparation of the dark room and the organization of its work is fundamental in order to obtain goods results.

The light does not filter inside the room turned into dark room.

Any infiltration of white light must be eliminated by means of suitable collisions.

To verify if the dark room is perfectly sealed from the external light, it is sufficient to stay in the room, in the dark, for a period of time sufficient to notice even the smallest infiltration.

The room must have a window to allow the periodical change of the air. Otherwise, it will be necessary to install a proper ventilator with a device against the light.

The dark room must be provided with a wash basin with running water.

The developer, vertical type, must be placed near the washbasin and ergonomically located for the operator.

CAUTION! ⚠

IN ORDER TO OBTAIN GOOD QUALITY IMAGES, THE DEVELOPER MUST BE PERIODICALLY CLEANED ANY TIME THE CHEMICALS ARE CHANGED AS TO NOT POLLUTE THE QUALITY OF THE NEW ONES.

The floor and the walls next to the developer must be protected with material against acid (pottery, PVC, linoleum etc).

The safe light must be suitable for the sensitivity of the film normally used:

PANCHROMATIC (BLUE SENSIBLE)
RED FILTER

ORTHOCROMATIC (GREEN SENSIBLE)
ORANGE/GREEN FILTER

CAUTION! ⚠

ABSOLUTELY, INCANDESCENCE LIGHTS, PHOTOGRAPHIC TYPE, ARE NOT SUITABLE

The safe light must work with an incandescence bulb of 15 W. max., 1 meter far from the working station, and oriented as to not directly lights the working station.

The working station must be divided in two different areas:

A) Dry AREA

The following operations are executed:
Loading/unloading of x-ray cassettes.
Manipulation of virgin films.
Manipulation of films impressed but not developed.

CAUTION! 

THIS AREA MUST ALWAYS BE KEPT PERFECTLY CLEANED.

B) Damp AREA

This area is relative to the developer and the washing of the film.

Chemicals solution (developer/fixer) must be substituted approximately every two weeks.

CAUTION! 

CHEMICALS MUST BE RECOVERED IN PROPER CONTAINERS AND GOT OVER IN COMPLIANCE WITH THE CURRENT STANDARDS AND REGULATIONS FOR SPECIAL BY-PRODUCTS.

When using chemicals follow carefully the instructions given by the manufacturer.

When the developer is not being used, it should always be kept covered to prevent oxidation of the developing baths.

If necessary, restore chemicals level by introducing marble made of glass.

Frequently, check chemicals temperature which must always remain constant and uniform.

During developing phases, use exclusively film holders and pincers in stainless steel resistant to acid.

Films should only be handled at the edge and with perfectly dried and clean hands.

Carefully, wash and dry the holders and the pincers. Possible residues can damage the following baths.

Immerse the film in the developer and shake it for 30” so that: **No air bubbles are formed on the film. Developing starts uniformly on the whole surface. Temperature remains equal in the whole bath.**

Avoid that more x-ray films get in touch between themselves

Withdraw the film and check the procedure by using the safe light.

Obtained the result requested, dip the film in the intermediate washing tank.

Rinse very well to stop the developing process and pass the film in the fixing bath.

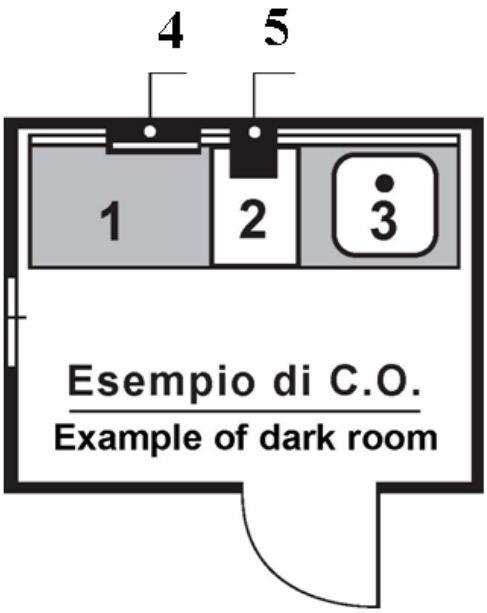
Generally, the fixing bath is approximately twice the time necessary for film transparency.

When fixing is over, wash the film in running water for about **10'** and let it dry very well before filing it.

EXAMPLE OF MANUAL TREATMENT

DEVELOPING	WASHING	FIXING	WASHING
Temperature 18°C/26°C 3 minutes	Immediate without dripping in current water approx. 15 secs.	About twice the period of developing.	Ten minutes for legal filing. Three minutes for 6 months filing

1 Working station
2 Developer
3 Washbasin
4 Safe light
5 Film viewer



ORDINARY AND SPECIAL MAINTENANCE

Periodically and at least once every year, clean the coaxial electric contacts of connection between the pivot of the generator and the supporting bush by qualified personnel.

It is essential to carefully remove any possible formation of brass powder due to the use of the equipment.

Every year, or when it is necessary, verify the lubrication of the moving components and of the joints by qualified personnel.

If the movement of setting should be too much hard, do not insist to avoid any problem of damaging.

Any servicing should be carried out by qualified personnel authorized by ARDET Dental & Medical Devices s.r.l.

Every twelve months check:

a) That the nameplates are complete and legible
b) That the ABS coverings are upright
c) That the x-ray control board is upright.
d) The integrity of the coiled cord of the x-ray remote control (if installed)
e) The setting of the balancing spring
f) Check the insulation of the feeding cable

Every year check the parameters of operation (high tension, exposure time, tube current).

CLEANING AND DISINFECTION

Products like polish or car-wax, normally available on the market, are suitable for a normal cleaning of finished surfaces.

Any oil residue can be wiped off by using alcohol and passed again with a light layer of polish or car-wax.

Do not insist on passing alcohol on nameplates and plastic parts.

For any disinfection (The rubber protection of the collimator, which is in contact with the skin, etc.), use a cold system of disinfection normally used in surgery such as a solution of quaternary ammonium / glutamate aldehyde with a maximum concentration of **2%,** or any other cooling disinfection systems registered by the Ministry of Health. .

CAUTION! ⚠ **CLEANING PRODUCTS**

Test the products on small parts not visible.

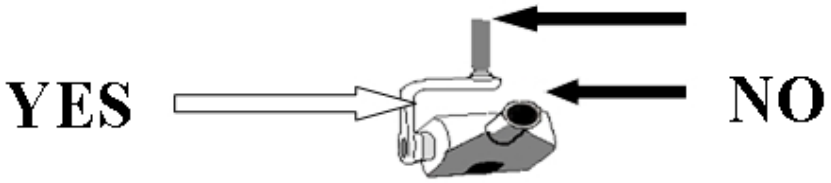
INSTRUCTIONS FOR USE - E-ARM

Remove, from the 'REST' position the horizontal arm and turn it towards of the dental unit.

Hold the fork of the generator and open the pantograph arm till reaching the side of the face to be radiographed

CAUTION ⚠

Never use the holding bush for the pantograph arm nor the collimator to place the arm !



If necessary, to carry out small movements, till reach a correct position in order to carry out the x-ray exposure

CAUTION ⚠

When it is not used, the E-ARM system must be placed with the two counterbalanced arms closed and parallels.

Once you finished the x-ray exposure, close the pantograph arm in the 'REST' position.

.

A 'REST' position guarantees a longer life for all the system.

INSTALLATION MANUAL

INSTALLATION PROCEDURE

The equipment described in this manual refers to the mobile stand type.

ARDET Dental & Medical Devices s.r.l. provides the equipment **ORIX-70** with a digital x-ray control model **SELEMATIC.**

The equipment, disassembled in different parts, is normally forwarded in an one card box packing.

CAUTATION!

The counter-balanced arm has the balanced spring already loaded.

The safety tie band must NOT be removed till the x-ray generator is mounted.

Pay attention to avoid to injure persons or to damage the arm.

PACKING (CARD BOX PACKING, AMERICAN TYPE)

Packing container dimensions **mm. W1145 x D605 x H265**
Unit with double arm **gross weight Kg 60,000**

CAUTION! 

Compressed springs

SHIPMENT AND STORAGE

Instruction concerning shipment and storage are found on the outside of the box.

These must be strictly observed.

1 TRANSPORT AND STORAGE
Only move and handle in the direction indicated by the arrows..

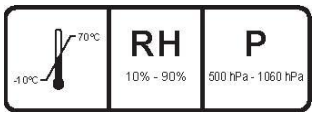
2 FRAGILE
avoid shocks.

3 PROTECT FROM HUMIDITY

4 DO NOT USE HOOKS to handle.

5 REQUIRED AMBIENT CONDITIONS FOR STORAGE:

a) temperature: between -10°C a +70°C
b) relative humidity: from 10% to 90%
c) atmospheric pressure: from 500 to 1060 hPa



DESCRIPTION OF THE EQUIPMENT

Model stand mobile, double arm net weight Kg. 50,000

N° 1 X-RAY GENERATOR **Kg. 9,500**

N° 1 CYLINDRICAL COLLIMATOR FSD 20 cm. **Kg. 0,500**

N° 1 COUNTERBALANCED SPRING ARM **Kg. 10,000**

N° 1 COLUMN **Kg. 10,000**

N° 1 BASE WITH WHEELS **Kg. 17,000**

N° 1 DIGITAL X-RAY CONTROL ORIX-70 -SELEMATIC + REMOTE CONTROL **Kg. 3,000**

Basic tools (to keep carefully)

N° 1 TUBE KEY 13 mm. diameter **M.8** (for spring adjustments)

TOOLS NEEDED FOR INSTALLATION

Tools not included in tool kit:

- n.1 digital or analogical multi-meter (VAC – A. –mA. dc – Ohm)
- n.1 small screwdriver for electrical connections..
- n.1 medium-seized screwdriver.
- n.1 cross screwdriver.
- n.1 clamping pincers.
- n.1 series of halon wrench.
- Terminals which match the size of the wires. (1mm. – 1,5 mm. – 2 mm. – 4 mm. – 6 mm.)
- Approvated cable ties
- Series of straight exagonal wrench

MOUNTING PROCEDURE

1) Place the base on the floor with the holes facing upward.

2) Screw the wheels and tighten the nut

3) Mount the column on the central base, ensuring that the control unit is facing the opposite side to the two legs of the base.

4) Block the column on the central base, tightening the nuts with the wrench

5) Place the assembled column/plate on the wheels and connect the three wires with the female FASTONs coming from the column with the correspondent three wires with male FASTONs coming from the double counterbalanced arm.

CAUTION! 

Carefully observe the color connections:

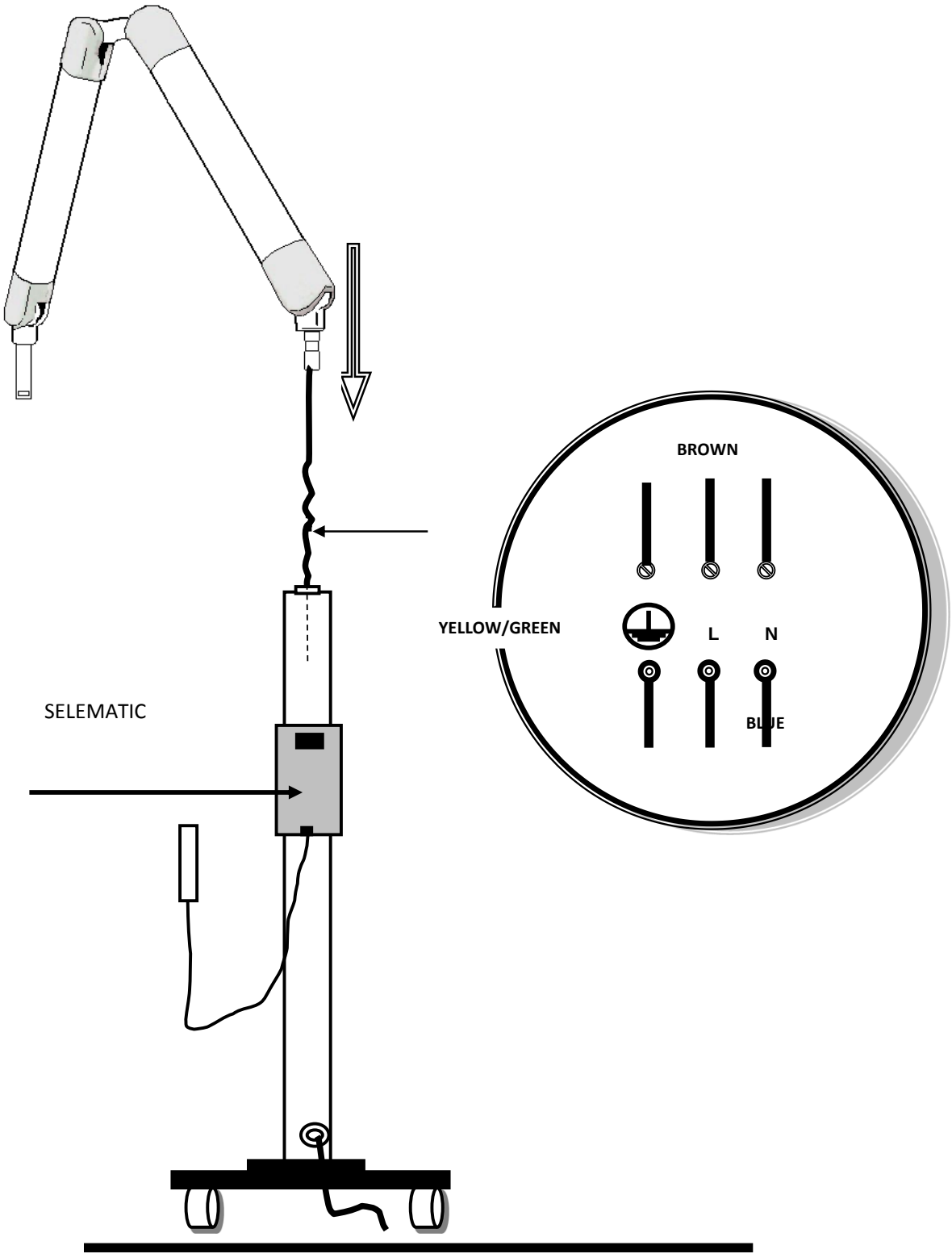
⇨ green/yellow (earth protection) with the correspondent green yellow wire
⇨ blue wire (line) with the correspondent blue wire
⇨ brown wire (neutral) with the correspondent brown wire

6) Insert the hub of the spring balanced arm on the pivot of the column by letting the connection cable run into the pivot.

7) Check the lubrication of the pivot and if the case may be, pass a slight layer of grease.

8) Insert the threaded bar into the appropriate holes placed laterally on the column. Proceed with the assembling and tighten strongly the two black bakelite handles

9) Go ahead with the tubehead mountig



ELECTRICAL REQUIREMENTS

The wiring and the electrical installation of the system, must respect the enforced international norms as far as the isolation degree, section of the feeding conductors, coloration of the same ones and it must have an adequate connection of earth protection.
All as reported in the following tables.

CONDUCTOR OF FEEDING LINE

- Feeding cable : **3 x 1,5 mm²**
- Line protection: BIPOLAR MAGNETO THERMAL SWITCH of 250V. 10A. with interruption ability of at least 6000 mA. and with a distance between the conductors of at least 3 mm. as requested by the norms

The colours of the three wires (line, neutral, earth) must comply with the current standards.

LINE wire = Brown = **L**

NEUTRAL wire = Blue = **N**

EARTH PROTECTION wire = Yellow/Green

PROTECTION EARTH WIRE

CAUTION! 

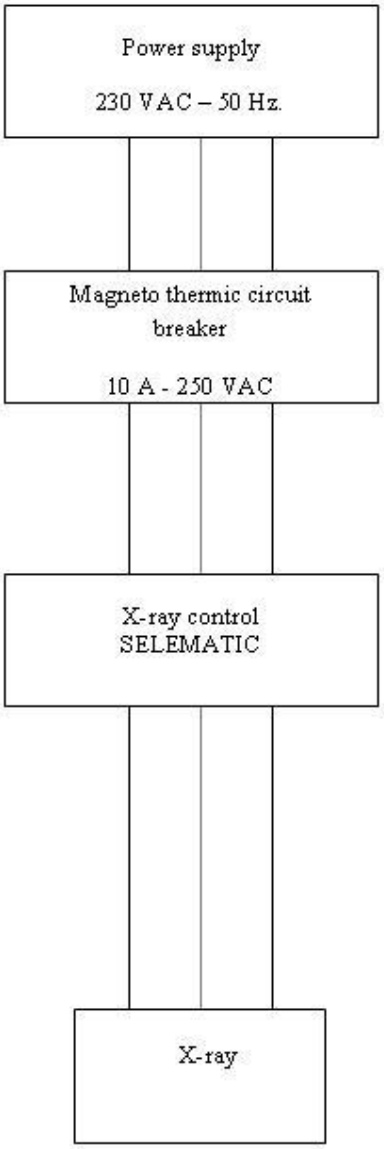
The section in mm² of the earth protection cable must correspond to the following chart:

Maximum connection length in meters	Minimum earth wire section in mm²
Up to 2 m	1 mm²
Up to 3 m	1,5 mm²
Up to 5 m	2,5 mm²
Up to 8 m	4 mm²
Up to 12 m (*)	6 mm²

(*)in this case contact the manufacturer.

GENERAL DIAGRAM

ELECTRICAL CONNECTIONS



This connection allows the ignition of the "**ready**" warning light in a remote position from the x-ray equipment when the main switch of the x-ray control is switched ON.

The external "**ready**" light, if connected, lights on, showing the presetting of the equipment to take the x-ray.

The "**ready**" light is not furnished while are already preset on the power cards the electric links.

TECHNICAL CONTROL DURING INSTALLATION

- Check that power supply is 230 VAC +/- 10%
- Check that all the functions relative to the setting of technical data are operating correctly:

a) generator setting
b) film sensitivity setting
c) patient setting
d) tooth setting
e) "ENTER" setting
f) Pause time

CAUTION! 

This operation must be done before connecting the x-ray equipment.

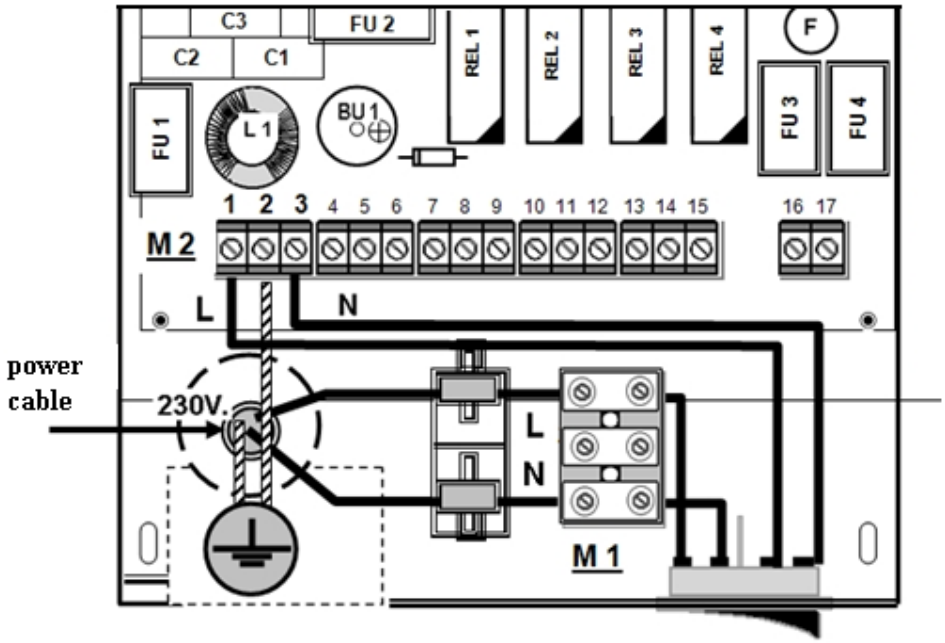
To test it is necessary to use a sufficient power output supply

E.g. 300 W – 230 VAC halogen lamp.

Only if this test is positive the x-ray equipment can be connected according to the foreseen safety rules.

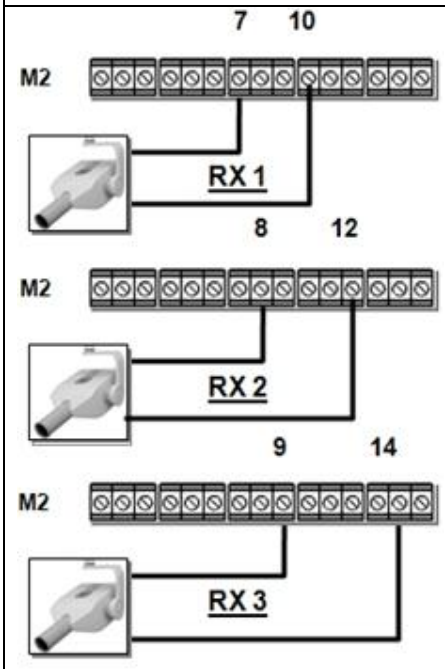
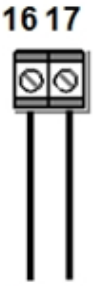
For connection, refer to **Diagram C2**

DIAGRAM C2 – CONNECTIONS

POWER CONNECTION	CAUTION!
	The L/N conductors from the bipolar switch are already connected to the terminals N. 1/3 of the M2 terminal board The terminals of the power cable are connected with the M1 terminal board and locked with security bands. The earth wires are fixed to earth.

POWER

CABLE	COLOUR	TERMINAL N.
L	BROWN	**1**
N	BLUE	**3**
EARTH	YELLOW/GREEN	**2**

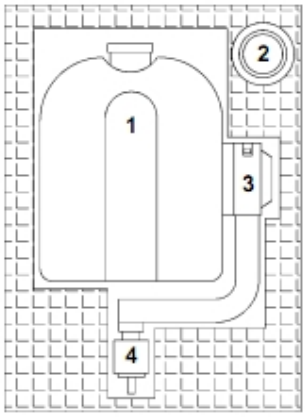
RX TUBEHEADS CONNECTION	CONNECTION
	 External x-ray control

GENERATOR

GENERATOR N°.	TERMINAL N°		
RX 1	7	⇔	10
RX 2	8	⇔	12
RX 3	9	⇔	14

ASSEMBLY X-RAY GENERATOR AND PANTOGRAPH ARM

Withdraw the x-ray generator from its packing and check the integrity of the coaxial electrical contact. Eliminate any probable remains of packing material

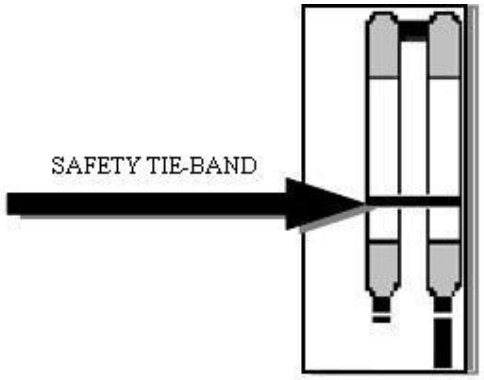


DESCRIPTION

1) X-ray generator
2) Cylindrical centering device
3) Lateral bracket
4) Pivot with contact

Check if the clutching pivot located on the lateral bracket, is lubricated, otherwise, put a slight layer of metallic parts of the contact.

Mount, screwing clockwise, the cylindrical centering on the brass pipe of x-ray exit and block it by using the suitable grain M5.



CAUTION! ⚠

1) The safety tie-band must NOT be removed until the x-ray generator is aassembled.

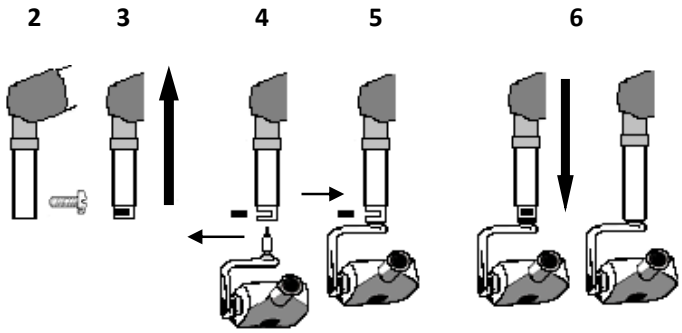
2) Loosen the fixing screw of covering tube using an appropriate screwdriver.

3) Push upwards the covering tube till the brass half-moon holding the pivot of the tube head is discovered

4) Remove the brass wedge from its holding.

5) Holding the x-ray generator, insert the pivot inside the bush of the spring arm. Push upwards. Replace the wedge in its place and check the perfect anchorage of the x-ray generator.Abbassare il canotto di copertura e bloccare la vite di fissaggio.

6) Lower the covering bush and lock the fixing screw.
No particular connection is required because both the x-ray generator and the holding bush are provided with special coaxial electrical contacts.



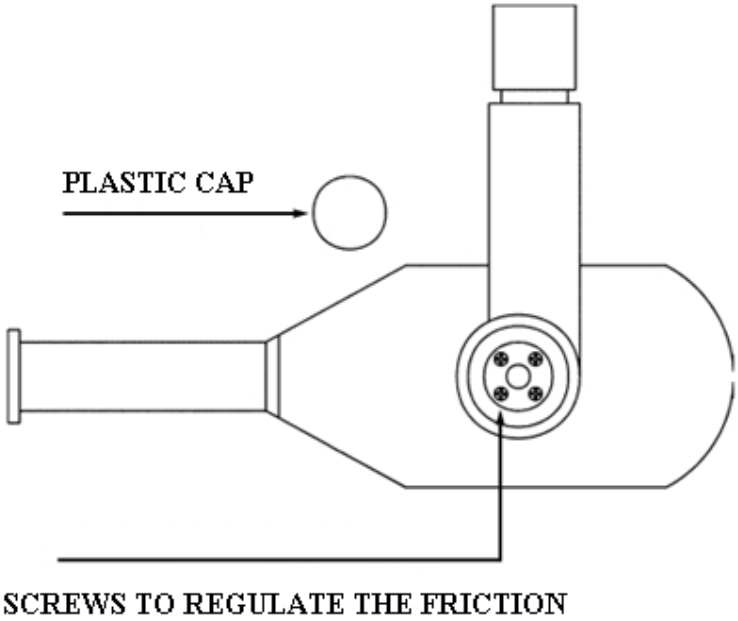
FRICTION ADJUSTAMENT

If it's necessary, regulate the fiction of the x-ray generator rotation on its fork, removing the lateral plastic cap by means of a 5 mm. screwdriver, levering between the plastic cap and the fork and act on the 4 fixing screws of the brass ring

Harden **Turn RIGHT**

Loosen **Turn LEFT**

Act on each screw checking at any adjustment the degree of friction obtained.



DOUBLE JOINTED SPRING ARM

SETTING

Ref. A

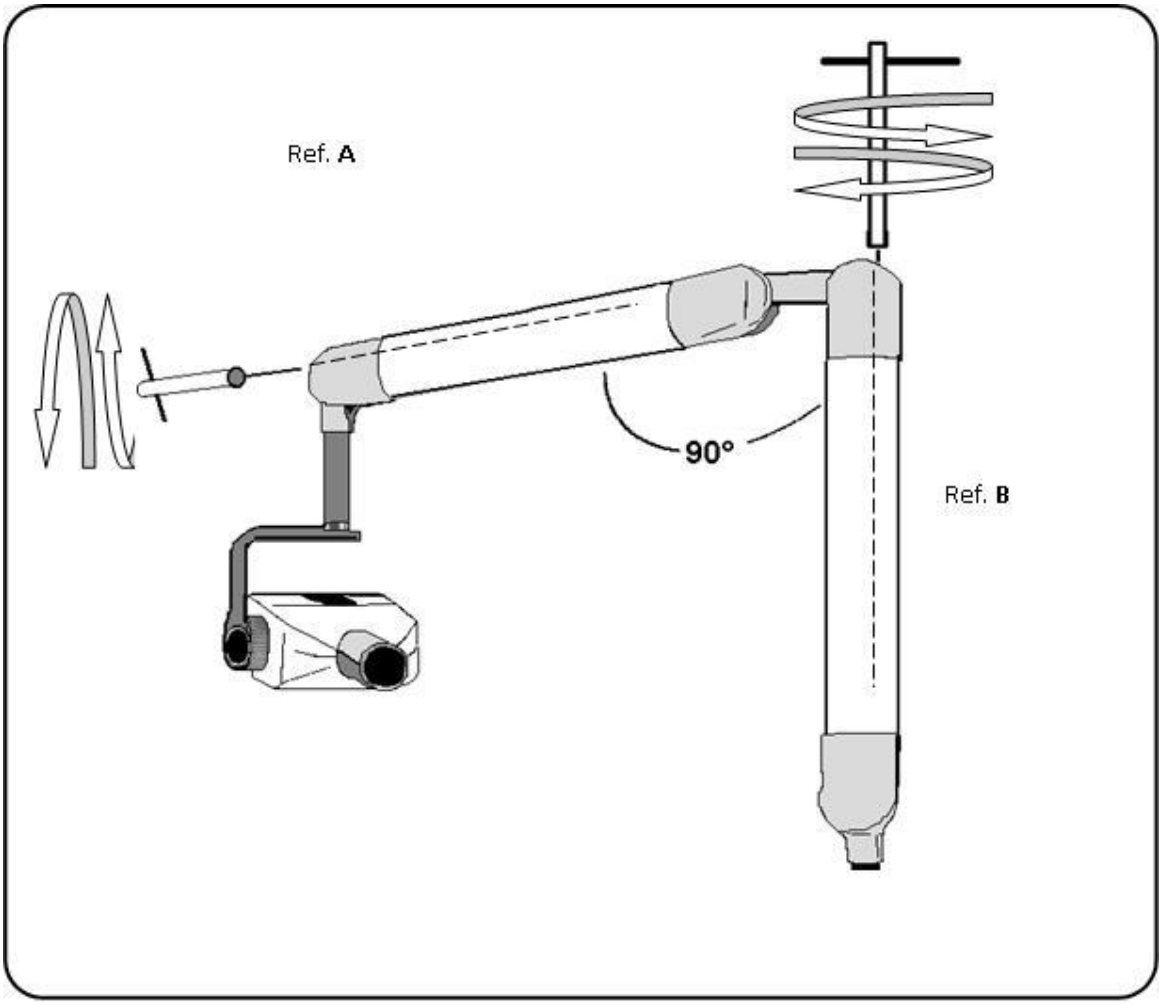
1) Bring side **"A"** of th double jointed arm in **STOP** position upowards, forming an angle of **90°** with side **"B".**
2) Remove the locking cap.
3) Insert inside the arm the tube key **M13** provided and push it softly till the end.
4) Hook the nut **M.8**
5) **TURN:**
   to the RIGHT to increase load.
   to the LEFT to decrase load.
6) Slip out the tube key **M13** and check the counterbalancing of the arm.
7) If everyting is regular, replace the locking cap

Ref. B

1) Let side **"B"** in vertical **STOP** position
2) Remove the locking cap
3) Insert inside the arm the tube key **M13** provided and push it softly till the end.
4) Hook the nut **M.8**
5) **TURN:**
   to the RIGHT to increase load.
   to the LEFT to decrase load
6) Slip out the tube key **M13** and check the counterbalancing of side **"B".**
7) If everyting is regular, replace the locking cap

CAUTION! 

DURING THE BALANCING TEST DRAW OUT THE TUBE KEY AS TO AVOID TO DAMAGE THE MECHANISMS.



TECHNICAL CHECKINGS

CAUTION! ⚠

IONIZING RADIATION DURING TEST.

Keep always in the back of the x-ray generator as to not be in direct correspondence with the primary beam at a distance of at least 2 meters.

1) To exactly estimate the results of the controls, it is important to verify the line voltage. Its drop, during the functioning, must not be higher than 3%. The calculation must be done following the formula below:
(Volt without load - Volt with load) / (Volt with load) = X%

2) Functioning of the x-ray control and the x-ray generator:
   - Turn ON the timer.
   - Make sure that the timer has come ON and that on the SELEMATIC device is displayed the preselected time for a medium patient. Select an exposure time of 0,05 seconds and perform a radiograph.
   - Repeat this operation for 5 times increasing little by little, the exposure time (0,05 – 0,1 – 0,5 - 1 -1,32)
   - This operation is useful to check the perfect working of the timer and, in the same time, for the conditioning of the x-ray tube before its normal use

3) Measuring high voltage and exposure time.

Measure the high voltage (KVP) by using not invasive instruments such as, **VICTOREEN NERO 6000M / MINI-X / MINI-X PLUS** or similar. Simultaneously, it is possible to draw the following factors:
- KVP/Exposure time in seconds. and splits
- x-ray dose emitted in mR or mGy.

In lack of one of the above mentioned instruments, as alternative and for high voltage (Kv.) evaluation only, it is possible to use the classic penetrometer x-ray test cassette.

To validate the instruments consider the following values:

a) KV = 70+/- 10% (63-77)
b) Exposure time = Nominal value +/- 10%
(ex: 1 sec = 0,9- 1,1)

The test, both for KV and exposure time, must be carried out on an average value of at least 10 exposures

POSSIBLE TROUBLE AND THEIR SOLUTIONS

TROUBLE	PROBABLE CAUSE	SOLUTIONS

When the equipment is turned On, no indicator lines comes on	The main switch is in open position (0).	Move the switch to the position (I)
When the equipment is turned ON, the line switch comes ON but the timer device is OFF	Fuse FU1 (T 6,3 A.) has blown (line).	Replace fuse FU1 with one having the same amperage rating i.e.: T. 6,3 A-250 V. - (5x20).
	Fuse FU2 (F 160 mA.) has blown (fuse for safety primary of timer transformer)	Replace fuse FU2 with one having the same amperage rating i.e. : F. 160 mA - 250V. (5x20).
	Fuse FU3 (F. 400 mA.) has blown (safety fuse on the secondary-exit 17 V. – of the transformer of the power board).	Replace fuse FU3 with one having the same amperage rating i.e.: F. 400 mA – 250V (5x20)
	Fuse FU4 (F.250 mA) has blown (safety fuse on the secondary- exit 15 V. – of the transformer of the power board).	Replace fuse FU4 with one having the same amperage rating i.e.: F. 250 mA – 250V (5x20)
One or more buttons on the timer device do not work	Faulty button(s)	Replace the timer device
During x-ray emission the audible signal is not given out.	Audible warning device is fulty	Replace the power board
During x –ray emission fuse F1 T. 6,3 A burns	The connecting wire between timer and x-ray equipment are in short circuit	Replace the cable
	Generator in short circuit	Replace the generator. To check if the trouble comes from the cable or the generator, do as follow: withdraw the generator from the arm. Restore fuse FU1 t.6,3A. Select an exposure time of 1,32 secs and make an exposure without the x-ray generator and check , moving the arm if the phenomenon is repente. If it is positive the cable is faulty. If it is negative the x-ray generator is faulty Send the generator to ARDET Dental & Medical Devices s.r.l.
Apparently, the x-ray equipment works but there is no x-ray emission.	X-ray tube filament interrupted or vaporized	Send the x-ray generator back to ARDET Dental & Medical Devices s.r.l.
The x-ray control is completely out of work. No LEDS switched ON.	LED 1 - switch OFF	Microprocessor out of service. Do not use the x-ray control and send it back to ARDET Dental & Medical Devices s.r.l.
Continuously or now and then, is heard a sound similar to a	X-ray tube vacuum losing	Send the x-ray generator back to ARDET Dental & Medical

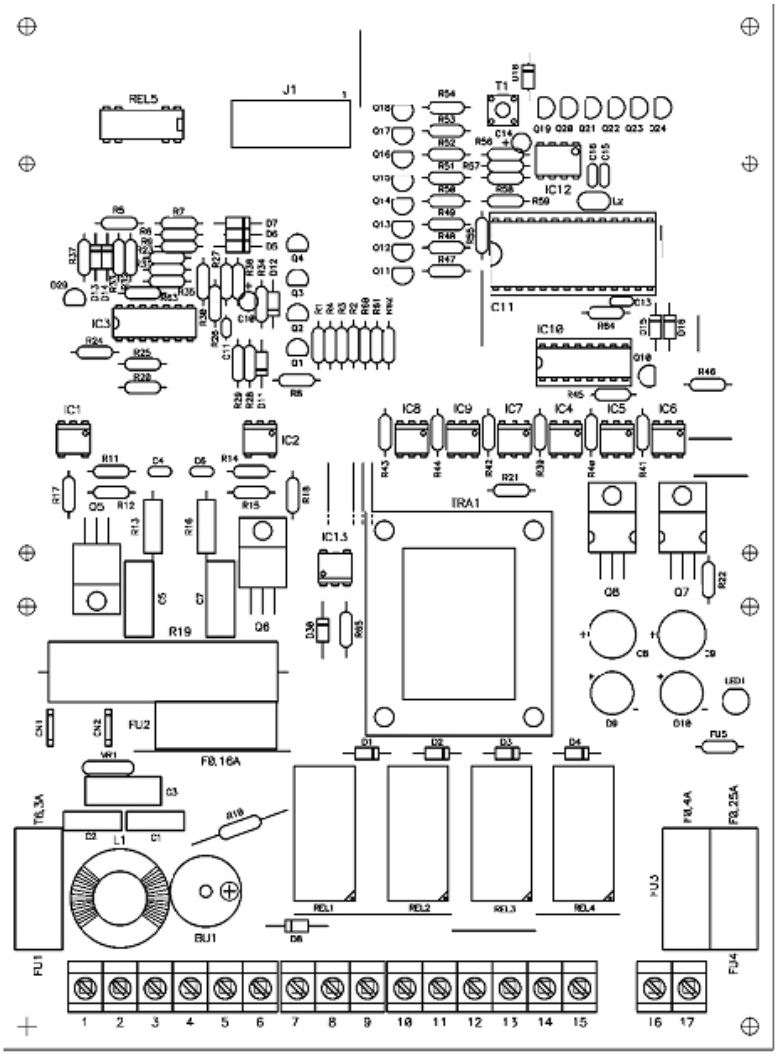
"VHOO" during exposure.		Devices s.r.l.
Continuously or now and then, electrical discharges are heard inside the x-ray generator during exposures	High voltage transformer in slow short circuit with creation of gaseous bubbles.	Send the x-ray generator back to ARDET Dental & Medical Devices s.r.l.
Apparently the x-ray equipment works perfectly but the x-ray image is outlined only.	Old x-ray film	Replace the x-ray film
	Developing baths cold or exhausted	Check the baths and/or the temperature(refer to chapter "typical inconveniences of intra oral films")
	X-ray tube filament is exhausted	Send the x-ray generator back to ARDET Dental & Medical Devices s.r.l. (this solution must be considered only after having verified the other two possible causes).
Apparently the x-ray equipment works perfectly but the x-ray images are not satisfactory in quality and detail (few penetration and darkness)	Power supply less than 10% of the nominal value	Check the electrical equipment
	Timer out of calibration	Replace the timer
The spring balance arms do not keep the position required.	Defected spring of balancing	Adjust again the compression of the spring by means of the tube key provided. In case of failure, send the arms back to ARDET Dental & Medical Devices s.r.l.
Error Code **E 01**	X-ray key released during the pre-heating period	To restore the operative mode press ENTER
Error Code **E 02**	x-ray key released during the emission period	To restore the operative mode press ENTER
Error Code **E 03**	No synchronization with the frequency network - emission not in phase	To restore the operative mode press ENTER
Error Code **E 04**	The power failed during the x-ray emission	To restore the operative mode press ENTER

SPARE PARTS

	N°	**Code**	**Article**

1	1	3100065	X-ray generator ORIX70 complete with centering device and fork
2	1	3300650	X- ray control SELEMATIC
3	1	3000558	Mobile stand complete
4	1	03CAVO1051	Extension coil cable for timer
5	1	3500036	Centering device FSD cm.20
6	1	3500040	Complete base with wheels
7	4	3500040R	Wheels for base
8	1	3500060	E-ARM aluminum oval horizontal arm cm.90
9	1	3500061	E-ARM aluminum oval horizontal arm cm.50
10	1	3500062	E-ARM aluminum oval double counterbalanced arm
11	1	3500063	E-ARM complete column without timer
12	1	3500052	Press button with coil cord
13	1	3500053	Couple of coaxial connectors
14	1	3500PATS	Panel keyboard sticker SELEMATIC
15	1	3500045	Holding head fork
16	1	3500085	E-ARM stickers
17	1	3500038	Rubber ring for centering cone
18	2	3500042	Handles for column
19	1	3500652	Electronic boards for timer SELEMATIC
20	1	3500085	Graduated scale sticker
21	1	3500071	ABS covers for horizontal arm
22	2	3500072	ABS covers for double counterbalanced arm
23	1	3500073	ABS cover for wall bracket
24	2	3500074	ABS cover for tube head
25	1	3500075	ABS cover for timer SELEMATIC
26	1	3500081	Identification plates for the tube head
27	1	3500082	Identification plate for timer SELEMATIC
28	1	3500083	Identification plate for the horizontal arm
29	1	3500084	Identification plate for the double counterbalanced arm
30	4	3500091	Cover caps for the double counterbalanced arm
31	1	3500092	Cover cap for the fork
32		3500095	Fixing screws M.4 (UNI/DIN) for timer cover/wall bracket
33		3500096	Fixing grain screw M.4
34	1	3500097	Tube to lock the wedge
35	1	3500098	Brass wedge to fix the generator

X-RAY CONTROL ELECTRIC DRAWING



GENERAL ELECTRICAL SCHEME