

# **ORALIX AC**

## ***WALL MOUNTED SYSTEM***

## ***MOBILE SYSTEM***

*This manual contains descriptive information on the Oralix AC intraoral dental X-Ray system.  
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*Gendex Dental Systems*

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# 1. INTRODUCTION

The Oralix AC system (230V) provides optimal solution for the intraoral routine radiography. The 65 kV Tubehead in combination with the 20 cm collimator offers the ideal tool to the radiologist who wants to make use of the parallel technique.

The stable and strong mechanical construction ensures an optimal image quality, allowing accurate and simple patient positioning.

## WARNING

*X-ray units produce ionizing radiation that may be harmful if not properly controlled. It is therefore recommended that this equipment be operated in accordance with local guidelines on radiation protection.*

## 2. **SYSTEM INFORMATION AND COMPATIBILITY**

The Oralix AC system is available in various versions:

- wall mounted;
- mobile.

The basic components of the system are:

Oralix AC system	5303 0xx1
Tubehead Oralix AC, 230 V	9869 000 00101
Densomat Timer	9869 002 00102
Secondent Timer	9869 002 00202
Wall Support	9869 005 00001
Extension Arm 90 cm	9869 001 00201
45 cm (option)	9869 001 00001
Folding Arm	9869 001 00301
Collimator circular 20 cm (standard)	9801 712 10104
Collimator rectangular 20 cm (option)	9801 712 10004
Mobile Stand	9801 502 02104

For identification of the components refer to AZ-2.

### 3. DESCRIPTION OF MAJOR COMPONENTS

This following chapter describes the mains parts and the mains features of the Oralix AC System.

#### 3.1. DENSOMAT TIMER

The Timer Densomat is an electronic film density control unit with object-programmed selection of the exposure factors, via the keyboard of the operator front panel, based on patient size, film speed and anatomical region being radiographed.

It provides microprocessor control of the filament preheating time and of the exposure time.

The Densomat incorporates a Line On-Off switch, a display for numeric and alarm indication, a membrane keyboard for system control and is provided with a “dead-man” type exposure switch with coiled cord, for operation of the X-ray system.

When the exposure button is pressed, the X-ray ON indicator lights and an audible signal sounds. The exposure is terminated when the exposure button is released or when the programmed exposure time is completed.

The Densomat automatically compensates for line voltage fluctuations, consistently providing films with optimal density. (The voltage compensation can be inhibited by means of a dedicated jumper).



It also incorporates other circuits dedicated to safety functions such as back up timing, with independent monitor of the power line and stop of exposure if the maximum limit of 3.2 s. is exceeded.

The Densomat offers different customization functions as follows:

- film speed coefficient adjustment;
- time table customization;
- Tubehead version selection (220-230-240 VAC).

The Timer is provided with dedicated LED for “ready for exposure” and “X-ray emission”.

By optional extension hardware it is possible:

- to connect external lamps for “ready for exposure” and “X-ray emission” indications;
- to control 2 Tubeheads.

#### 3.2. SECONDET TIMER

The Secondent is an electronic unit which automatically provides control of X-ray exposure, depending on exposure time selected by the operator.

It provides microprocessor control of the filament preheating time and of the exposure time.

The Secondent incorporates a Line On-Off switch and indicator light, a selector knob with 19 selectable exposure times, and is provided with a “dead-man” type exposure switch with coiled cord, for operation of the X-ray system.

When the exposure button is depressed, the X-ray ON indicator lights and an audible signal sounds. The exposure is terminated when the exposure button is released or when the programmed exposure time is completed.

The Secondent automatically compensates for line voltage fluctuations, consistently providing films with optimal density. (The voltage compensation can be inhibited by means of a dedicated jumper).

The Secondent offers the possibility to select different Tubehead versions (220-230-240 VAC)

The Timer provides 3 LED indicators for: "ready for exposure" (green), "X-ray emission" (yellow) and "alarm" condition (red). By optional extension hardware it is possible to connect external lamps for "ready for exposure" and "X-ray emission" indications.



### **3.3. TUBEHEAD ORALIX AC**

The X-ray Tubehead Oralix AC (230 V) consists of a high voltage and filament transformer, and 3-elements, grid-control X-ray tube, in a lead shielded, oil filled metal case, covered by a plastic housing. A collimator/positioning device with quick connect bayonet fitting is supplied with the Tubehead.

### **3.4. FOLDING ARM**

The Folding Arm is a 2-section spring counter-balanced dental X-ray arm. The end of the Folding Arm has a 3-conductor cable which interconnects with the Densomat/Secondent Timer via the Wall Support, when the system is assembled.

### **3.5. EXTENSION ARM**

An Extension Arm available in 45-90 cm is provided with the system. Electrical wiring and mechanical interconnection between the Folding Arm and the Wall Support is made via the Extension Arm.

### **3.6. WALL SUPPORT**

The Wall Support incorporates a mechanical fitting into which the support tube of the Extension Arm is installed. A terminal strip is provided for wiring interconnection between the Densomat/Secondent Timer and the Folding Arm and Tubehead.

## 4. TECHNICAL DATA

### 4.1. MAINS SUPPLY

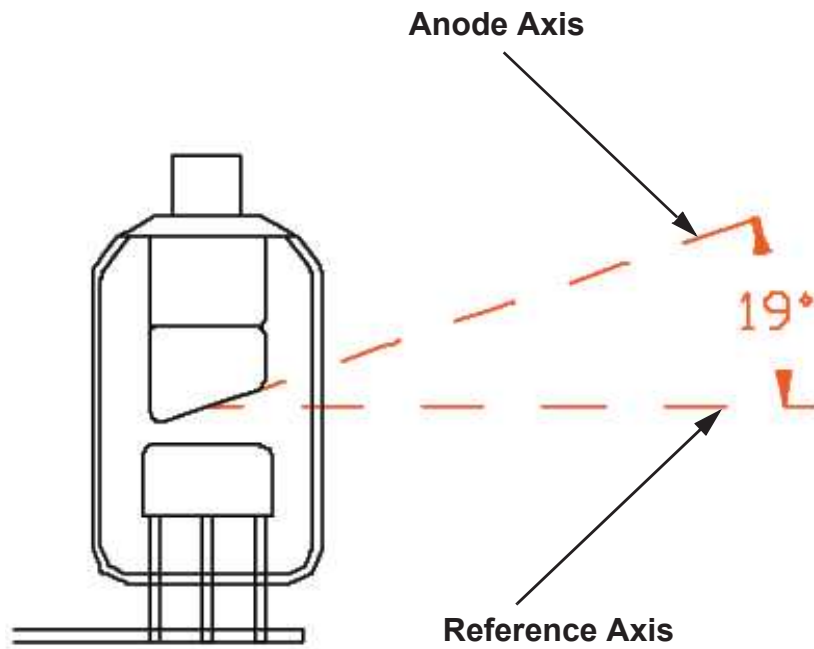
Mains voltage	230 VAC +/-10%, single phase (polarized) or double phase it is recommended to use a dedicated magneto/thermal circuit breaker (10 A max) and an earth leakage circuit breaker (leakage current of 30 mA)
Current absorption	5A Maximum; 0.1A Stand-by
Mains fuse	F6.3A / 250V, fast blow 2 <sup>nd</sup> fuse for double phase, with by-pass jumper
Frequency	50 Hz / 60 Hz $\pm$ 2 Hz
Line resistance	0.8 Ohm

### 4.2. TUBEHEAD

Peak tube potential (see section D-3.2.)	60.0 kVp +/- 8% (Nominal mains Voltage -10%) 65.0 kVp +/- 8% (Nominal mains Voltage) 68.5 kVp +/- 8% (Nominal mains Voltage+10%)
Tube current (see section D-3.3.)	6.9 mA +/- 10% (Nominal mains Voltage -10%) 8.25 mA +/- 10% (Nominal mains Voltage) 9.6 mA +/- 10% (Nominal mains Voltage +10%)
Radiation output	5 mGy/sec +/-30% at 20 cm from the focus
Tube rating chart (only 1 fixed working point)	65 kVp, 8.25 mA, 2.5 s
X-ray tube Target material	800-0003G3, grid controlled, single focus and pulse Tungsten
X-ray Tubehead	Oil immersed, shielded
Minimum filtration permanently in the beam	2.0 mm Al equiv. @ 65 kVp (IEC 522/1976)
Beam quality half value layer (H.V.L.)	better than 1.7 mm Al @ 65 kVp
Focal spot	0.7 mm (IEC 336/1982)
Duty cycle	1:30
Minimum wait time	3 sec
Radiation leakage	less than 44 microGy/h (5 mR/h) @ 1 meter
Leakage Technique factors	0.1 mA @ 65 kVp
Anode angle	19.5° +/- 0.5 respect to the reference axis

## ***Anode Tube***

### ***Reference Axis and Anode Target Angle***





### 4.3. COLLIMATOR

Collimator type	metal cone, lead shielded, bayonet fitting
Distance from Focal Spot to distal cone end	20 cm
Irradiated field at distal cone end	6 cm diameter (circular, standard) 3 x 5 cm (rectangular, optional)

### 4.4. TIMER

Versions	<ul style="list-style-type: none"> <li>Densomat, object programmed with +/- manual time correction, with possibility to control 2 Tubeheads by optional extension hardware.</li> <li>Secondent, with manual time setting by time selector.</li> </ul>
Selectable exposure times	among 19 settings, according to R10 scale: 0.03, 0.05, 0.06, 0.08, 0.10, 0.12, 0.16, 0.20, 0.26, 0.32, 0.40, 0.50, 0.64, 0.80, 1.00, 1.26, 1.60, 2.00, 2.50.
Actual exposure time	<ul style="list-style-type: none"> <li>For 50 Hz is the number of X-ray pulses corresponding to the selected time.</li> <li>For 60 Hz is the number of X-ray pulses with minimum deviation respect to the selected exposure time.</li> <li>the exposure time is measured between 25% of the level of the anode current waveform. The accuracy is +/- (10% + 1 ms)</li> </ul>
"X-ray ON" indication	visual (LED) and audible (buzzer)
Preheating time	120 msec (default) 6 pulses @ 50 Hz, 7 pulses @ 60 Hz
Compensation of mains fluctuations	by automatic correction of exposure time

### 4.5. WEIGHTS

Wall System		25 kg
Mobile System		60 kg
Tubehead Oralix AC, 230V		6.3 kg, without collimator
Folding Arm		7.5 kg
Extension Arm	45 cm	3.5 kg
	90 cm	5.0 kg
Wall Support		1.5 kg
Densomat Timer		2.0 kg
Secondent Timer		2.0 kg

For the dimensions of the system see AZ-3 and AZ-4

## 5. IEC CLASSIFICATION

Class 1, type B.

## 6. APPLICABLE STANDARDS

<p><b>IEC 60601-1 :1988 + A1 : 1991 + A2 :1995</b></p> <p><b>IEC 60601-1-1 : 2000</b></p> <p><b>IEC 60601-1-2 :2001+A1:2004</b></p> <p><b>IEC 60601-1-3 :1994</b></p> <p><b>IEC 60601-2-7 : 1998</b></p> <p><b>IEC 60601-2-28 : 1993</b></p> <p><b>IEC 60601-2-32 : 1994</b></p> <p><b>Council Directive 93/42/EEC</b></p> <p><b>ISO 13485 2003/Cor1: 2009</b></p>	<p>Oralix AC models are X-ray equipment with radiation protection in accordance with IEC 60601-1-3:1994 X-ray Source Assembly(Gendex Model 9869-00-00101), IEC 601-2-28 (1993)</p> <p>Oralix AC models and associated equipment complies with:</p> <p>General requirements for safety and performance</p> <p>Safety requirements for medical electrical systems</p> <p>Electromagnetic compatability - Requirements and tests</p> <p>Radiation protection in diagnostic X-ray equipment</p> <p>Particular requirements for the safety of high-voltage generators of diagnostic X-ray generators</p> <p>Particular requirements for the safety and performance of X-ray tube assemblies for medical diagnosis</p> <p>Particular requirements for the safety of associated X-ray equipment</p> <p>European Medical Device Directive</p> <p>Medical devices - Quality management systems - Requirements for regulatory purposes</p>
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## 7. ENVIRONMENTAL DATA

Ambient temperature	Operation: +10°C to +40°C Transport and storage: -40°C to +70°C
Relative humidity	Operation (no condensation): 30% to 90% Transport and storage: 10% to 95%
Pressure	Operation: 700hPa to 1060hPa Transport and storage: 500hPa to 1060hPa



The serial number of the Gendex X-ray tube (PN 800-0003G3) is stamped on the copper anode of the tube assembly.



## **SECTION B**

### **INSTALLATION**

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# 1. WALL MOUNTED SYSTEMS

## 1.1. ROOM PREPARATION

The Wall Support shall be mounted either on a side-wall or on back-wall respect to the patient, outside of the dentist operational area.

The maximum distance from the center of the patient head is 170 cm (135 cm with the short Extension Arm) in order to ensure the needed reach for all the possible techniques; the recommended height from the floor is 133 cm in order to guarantee the easy positioning either with patient sitting or lying down.

### NOTE

*The static load applied by the system on each attachment point is 72 Kg (159lb). Considering a safety factor of four, it is specified that each attachment point is able to support pull and thrust load of 288 Kg (636lb).*

### REMARK

*It is task of the installation engineer to choose the proper fixation hardware in relation to the type of the mounting wall.*

### WARNING

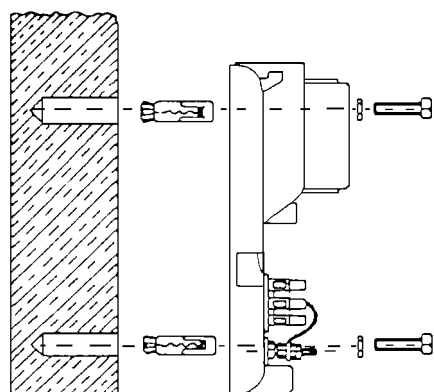
*Insufficient wall or hardware strength may cause the wall mount to pull out of the wall, and the arm and Tubehead to fall, causing serious injury to the patient or operator.*

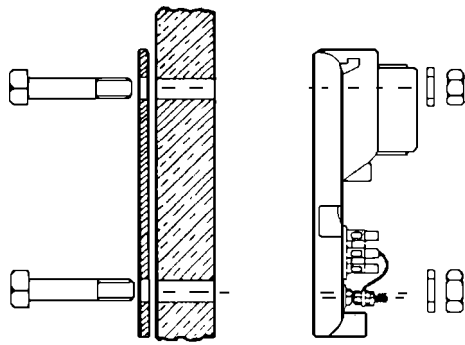
## 1.2. WALL MOUNTING METHODS

### **Wall mountig by means of expansion screws.**

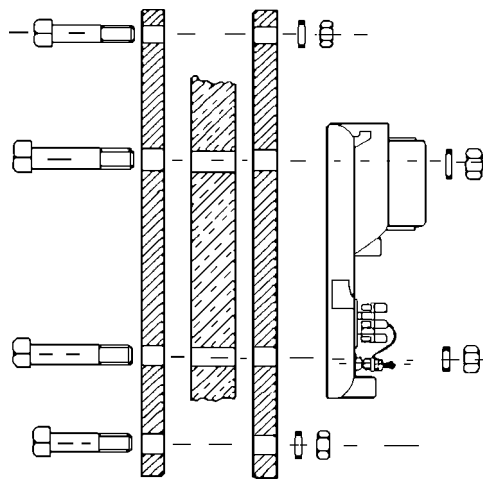
*The Wall Support is delivered with a set of expansion screws (M6x60, diameter 11 mm) only suitable for use with concrete walls type R 300 and over (resistance to compressive load >300 Kg/cm<sup>2</sup>).*

*In case that such a wall is available, drill the mounting holes (diameter 12 mm) in the desired location of the wall, making use of the template BZ-1.*





**Wall mounting by means of the “through the wall” method.** In case of other strong wall types (concrete with R not Known, solid brick) it is recommended to use the “THROUGH THE WALL” method of attachment which makes use of a steel counter plate (2 mm thick), of the same size of the Wall Support, tied with screws or stay bolts (class ISO 8-8, diameter 8 mm), ensuring a tightening torque on the bolts of 10 N/m.



**Wall mounting by means of 2 reinforcement steel plates.** In case of other less strong wall types (hollow tile, wood), which however can bear the specified load without evident deformation, it is recommended to use the “THROUGH THE WALL” method of attachment, which makes use of an anterior reinforcement steel plate (2 mm thick) and a steel counter plate (2 mm thick) of dimensions larger than the Wall Support, tied with screws or stay bolts (class ISO 8-8, diameter 8 mm), ensuring a tightening torque on the bolts of 10 N/m.

#### NOTE

*Doubling the surface of the steel plates respect to the size of the Wall Support will halve the static load applied on the wall.*

In case of other very weak walls (wood, etc.) a steel construction is needed.

The Timer is equipped with 4 expansion screws, which are suitable for all types of walls having a min. thickness of 5 cm.

Drill the mounting holes (diameter 8.5 mm) in the desired location of the wall using the template BZ-2.

### 1.3. ADDITIONAL CABLING

A mains cable (2 poles + ground) shall be prepared from the mains supply fusebox (or breaker) to the intended location of the Timer.

Another power cable (2 poles + ground) shall be prepared from the Timer to the location of the Wall Support.

#### WARNING

*The total resistance of the earth wiring, from the mains input earth point to any exposed metal part of the equipment, shall be lower than 0.1 Ohm.  
In case of long distances between Timer and Wall Support a separate protective earth conductor of the proper size may be needed to fulfill this requirement.*

The Timer is provided with a window on the rear side for the entrance of the cabling.

The Wall Support is provided with an electrical knockout, in correspondence of which the cable duct in the wall should terminate.

#### NOTE

*The recommended sizes of the power cables wires and the relevant resistances/meter are shown below:*

<i>recommended cable wires size</i>	<i>resistance</i>
<i>AWG 16 1.35 mm<sup>2</sup></i>	<i>2 x 0.015 Ohm/meter</i>
<i>AWG 14 2.11 mm<sup>2</sup></i>	<i>2 x 0.0094 Ohm/meter</i>

It must be considered that the length of these cables will affect the total mains resistance of the system, and must be kept to a minimum.

For example a 5 meters cable of size 1.35 mm<sup>2</sup> has a resistance of 0.15 Ohm; adding on top a mains resistance of 0.65 Ohm, as measured at the input of the Timer, and adding also the fixed resistance of the Folding Arm cable (0.14 Ohm), it will result a total mains resistance of 0.94 Ohm (0.8 Ohm line resistance + 0.14 Ohm Folding Arm cable), which is the value specified for the nominal performance of the system at 230 Vac mains supplies.

### 1.4. UNPACKING

Unpack each box and check the completeness according to ITEMS SUPPLIED BZ-3.

Verify also that the rated voltage of Timer and Tubehead, as stated on the type number plates, are corresponding to the local situation.

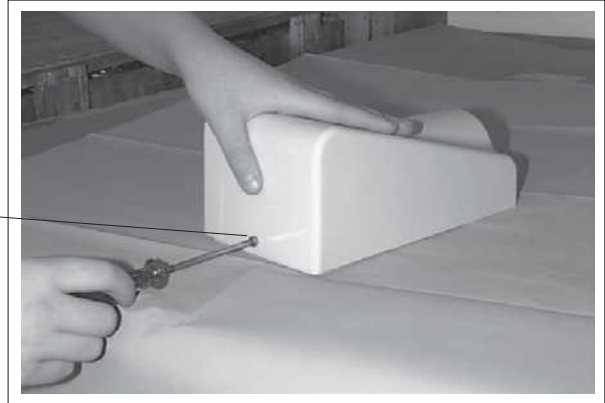
## 2. *INSTALLATION PROCEDURE*

### 2.1. *OPENING WALL SUPPORT AND TIMER*

**1**

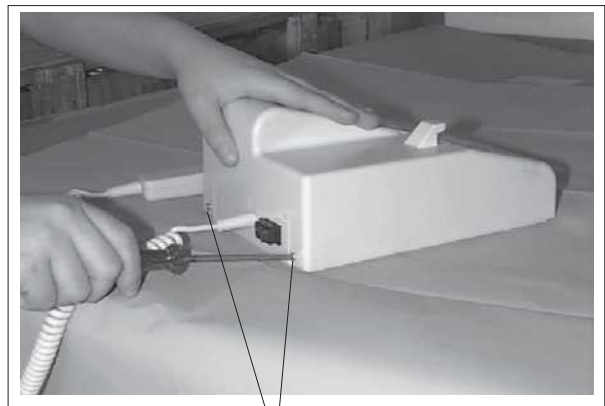
Remove cover away from the Wall Support, by unscrewing the screw (a).

(a)

**2**

Unscrew the two locking screws (b) and remove cover of the Timer.

(b)



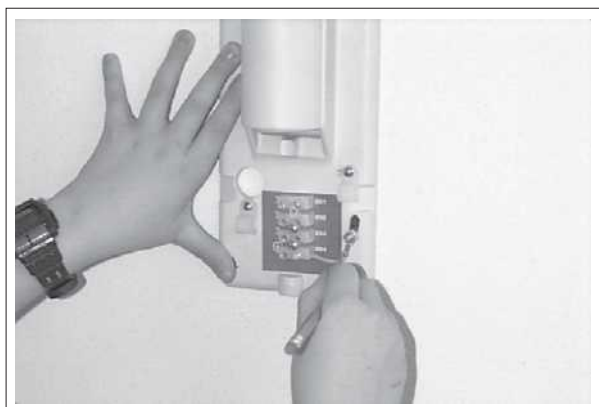


## 2.2. INSTALLATION TO THE WALL

Place the Wall Support and the Timer at the desired location on the wall and mark the holes in the wall,

**1** using the Wall Plate as a template

... and the template on page BZ-2 for the Timer.



### WARNING

*Do not use the Timer as a template ! Electronic components could be irreparably damaged !*

**2** Drill the four pilot holes:

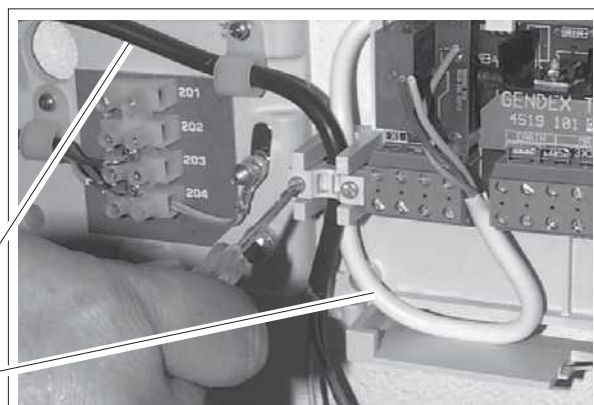
- for the Wall Support (with a 9 mm drill bit)
- for the Timer (with a 8 mm drill bit).



**3** Position the Timer over the four pilot holes, having routed the line cable through the Timer knock out and having routed additional cable from the Timer to the Wall Support.

additional cable  
Timer-Wall Support

line cable  
(mains)

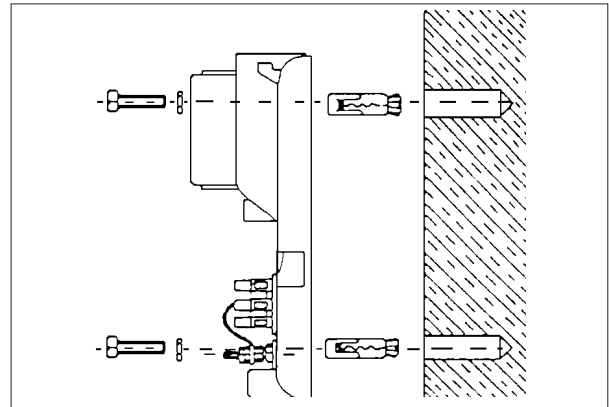


**WARNING**

*It is a task of the installation engineer to choose the proper fixing hardware in relation with the type of mounting wall available. Failure to do so could cause the X-ray system to come loose and fall, causing possible injury to the patient or operator.*

**4**

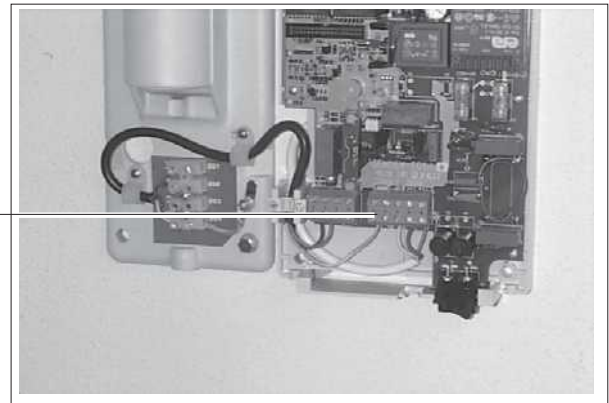
Install and tighten all screws with lock washers (see page B-2, Wall mounting methods).

**NOTE**

*Ensure that Timer will be aligned with Wall Support.*

**5**

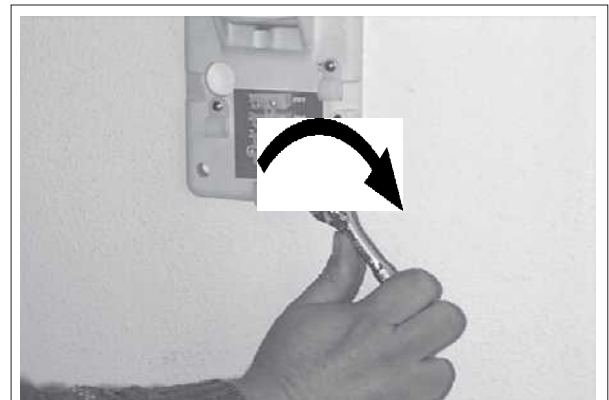
Connect line cable on terminal block X3 of the Timer (see also BZ-4, System electrical connections).

**6**

Tighten all bolts with lock washers. Apply on fixing bolts a torque of 10 Nm.

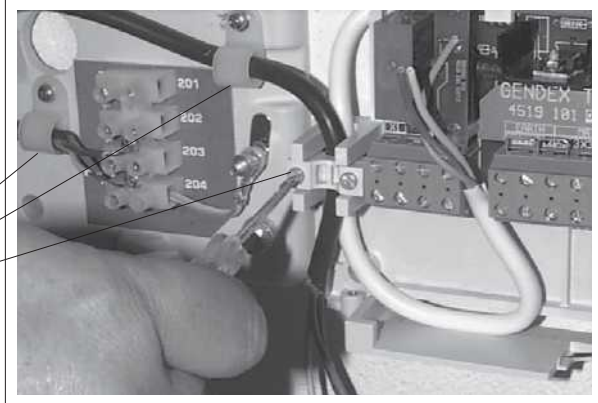
**NOTE**

*Ensure that Wall Support is perfectly aligned in vertical position.*



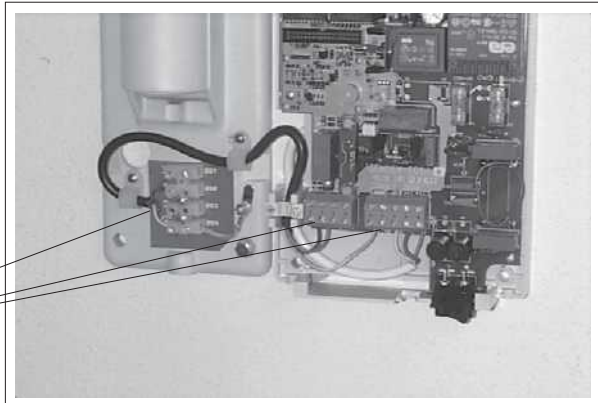
- 7** Fix additional cable from the Timer to the Wall Support with retainers.

cable retainers



- 8** Connect on both sides to terminal blocks.

See BZ-4,  
System electrical connections



- 9** Verify the jumpers and dip-switches setting as described in Section C, “Jumpers and dip-switches setup” of this manual.

**NOTE**

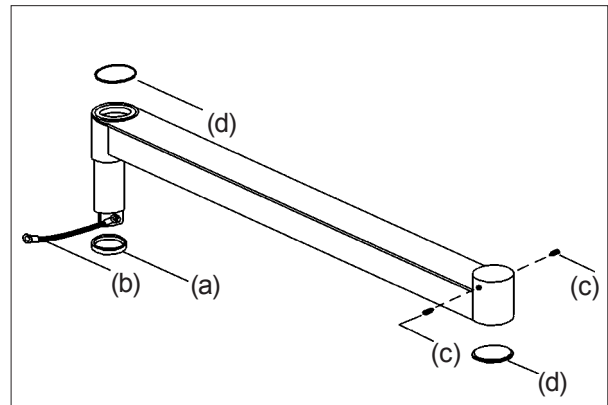
*Do not reinstall covers of Wall Support and Timer until the end of the installation procedure.*

### 2.3. MOUNTING OF EXTENSION ARM

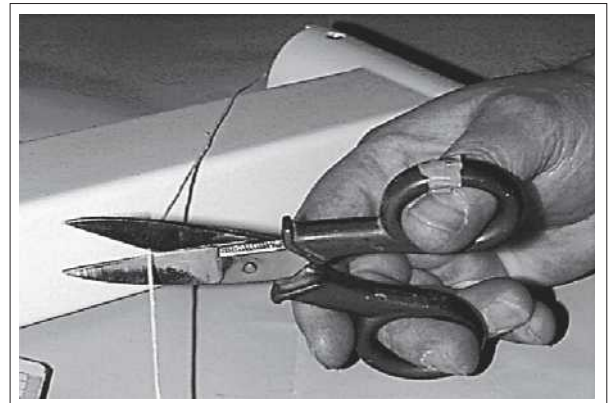
**1**

Unpack the Extension Arm and verify the completeness according to items supplied:

- (a) ring
- (b) ground wire with nut and lock washer
- (c) friction screws
- (d) snap-out covers


**2**

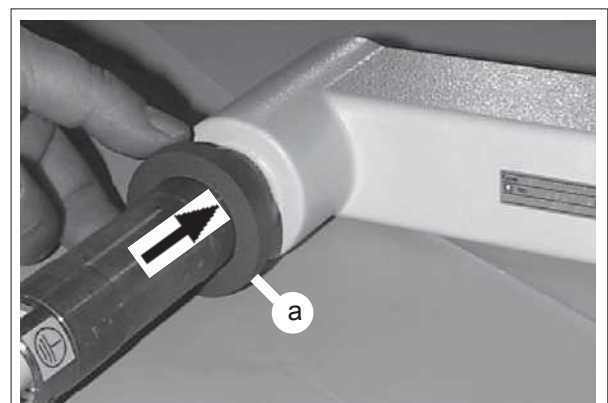
Cut the guide string.


**WARNING**

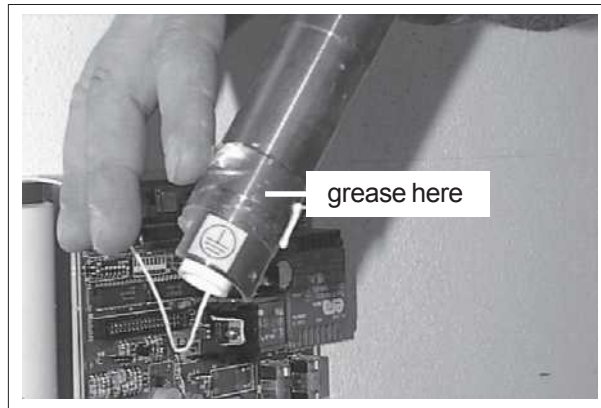
*do not pull string completely out the arm.*

**3**

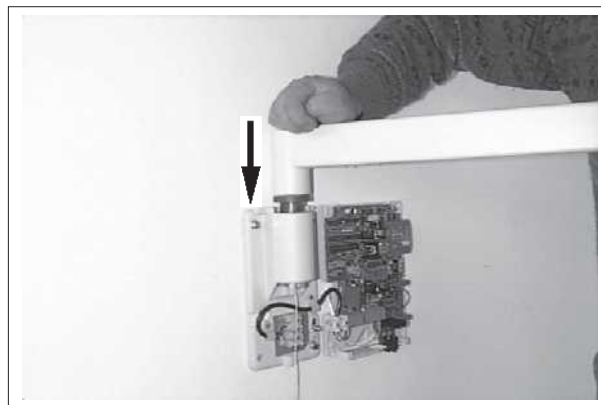
Push the ring (a) over support tube of Extension Arm.



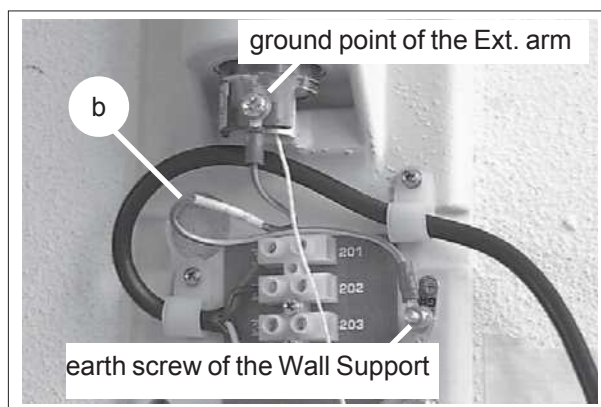
- 4** Lightly grease support tube of Extension Arm.



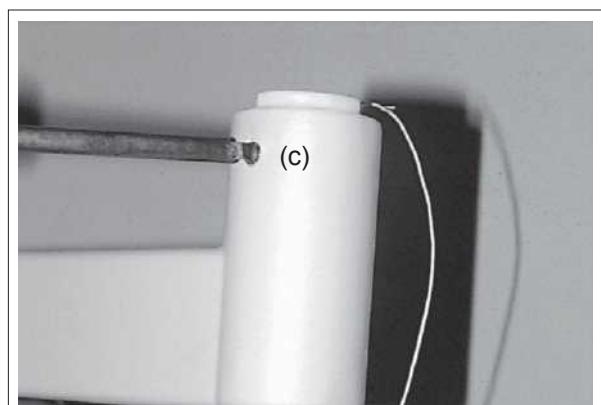
- 5** Feed guide string and insert Extension Arm into opening at top of Wall Support.



- 6** By using the nut and lock washer supplied, connect one side of the protective ground wire (b) to the ground point of the Extension Arm, then connect the other side to the earth screw of Wall Support.



- 7** Loosen two friction screws (c) of Extension Arm. Remove round snap-out covers (d) at both ends of Extension Arm (see figure in the previous page).



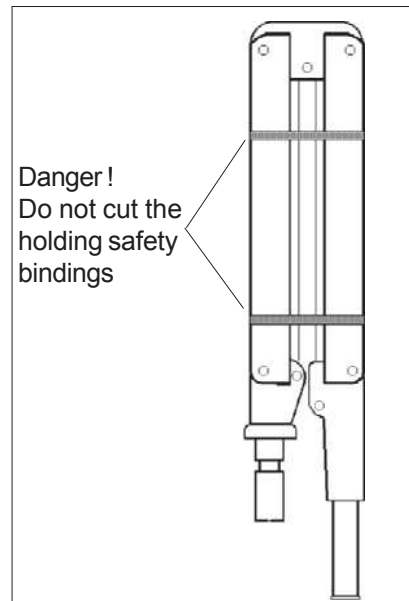
## 2.4. MOUNTING OF FOLDING ARM

**1**

Unpack the Folding Arm taking care not to remove its bindings before the Tubehead is installed.

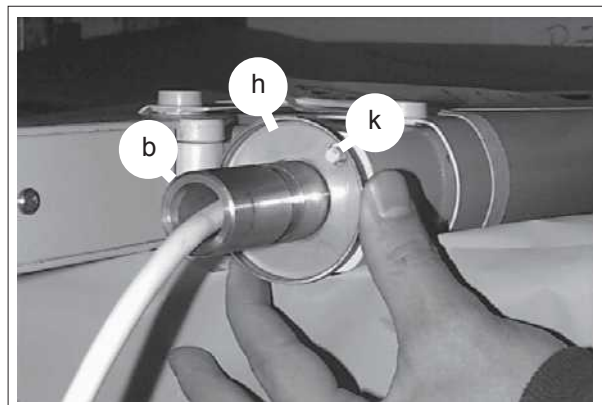
### WARNING

*The springs in the Folding Arm are powerful and may cause injury to installer (as well as possible damage to the arm) if not handled properly. Do not remove binding of Folding Arm until indicated in the instructions below.*



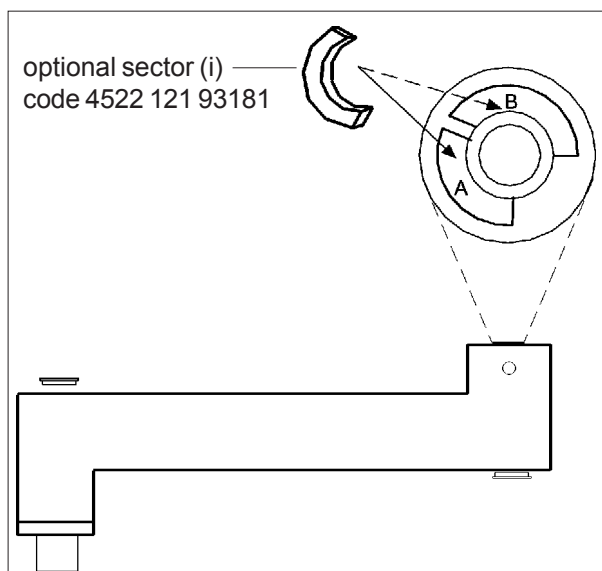
**2**

Slide the chromium ring (h) over support pin (b), fitting the ring hole into locking pin (k).



**3**

If necessary set sector (i) (not supplied, only available as spare part) into the track provided of Extension Arm, to limit horizontal rotation.



### REMARK

*Set in position A, to limit right hand rotation.  
Set in position B, to limit left hand rotation.*

**4**

Tie the guide cord of the Extension Arm to the Folding Arm cable.

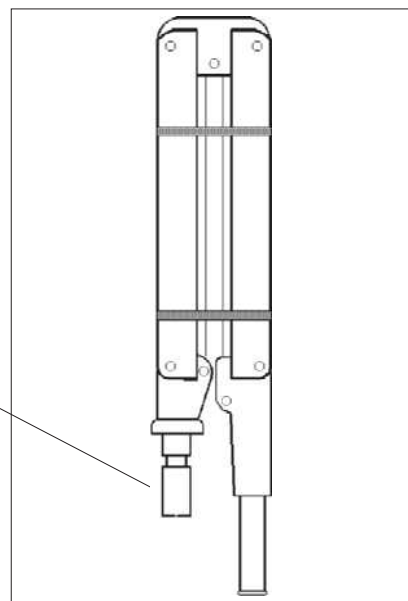
**5**

Feed the Folding Arm cable through the Extension Arm and through the Wall Support, with the help of the guide cord.



**6**

Lightly grease the support pin



**7**

By moving vertically, carefully insert the support pin of the Folding Arm into the Extension Arm; secure finally the screws (c) of the Extension Arm.

Connect the wires of the Folding Arm cable to the Wall Support terminal strip, as described in BZ-4, System electrical connections.





## 2.5. POLARITY TEST

The following test is applicable only for phase/neutral mains supply. In case of phase/phase mains supply the test is not applicable. If a reversible mains plug is used, the polarity test is not applicable and the second mains fuse F3 must be enabled by cutting jumper W11 (see diagram Z1-1).

### REMARK

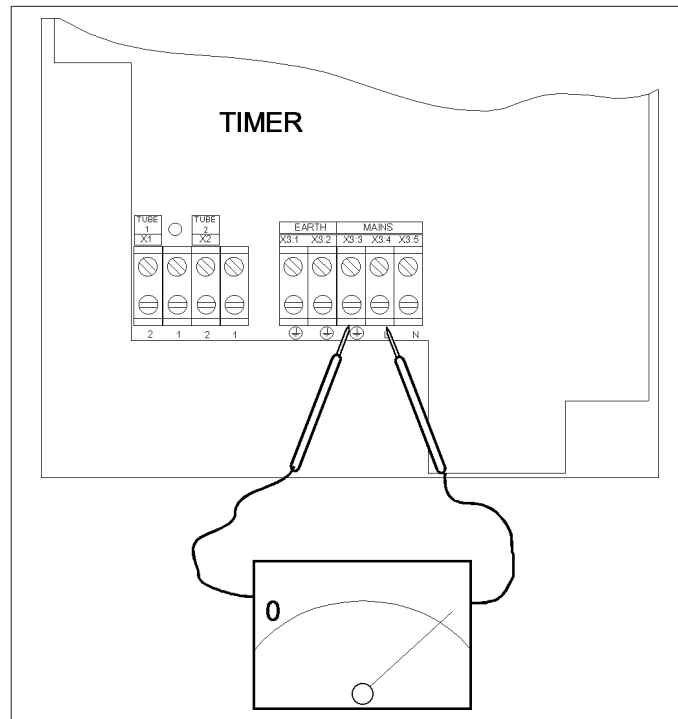
*Do not mount Tubehead until Polarity Test has been satisfactorily completed.*

The correct polarity of the mains shall be tested, to ensure that the live wire of the line is protected by the mains fuse F4 as required. Perform the test as follows:

- 1** Connect an AC voltmeter between the block terminal X3:4 (live) and X3:3 (ground). Turn on mains supply and verify that the full line voltage is measured.

If no voltage is measured, proceed as follows:

- turn off the mains,
- reverse the line wires connection,
- turn on the mains again,
- repeat the line voltage measure.



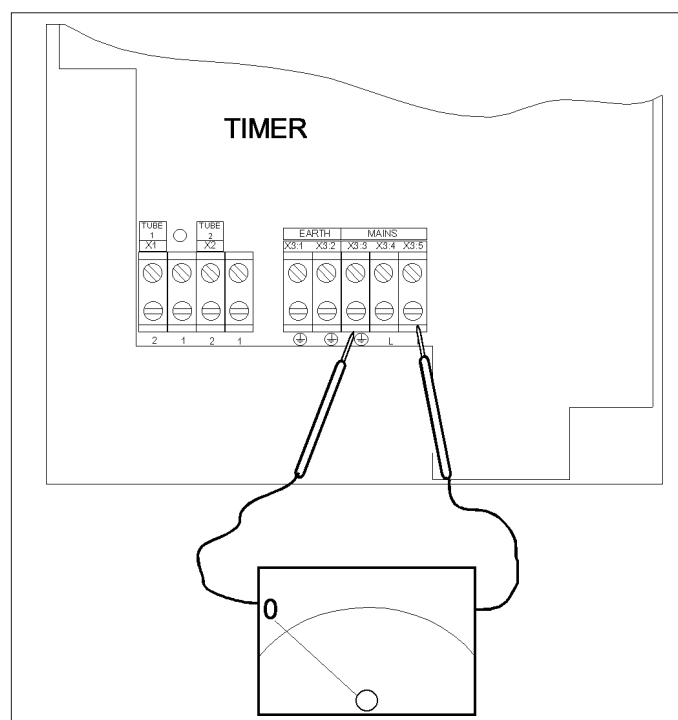
- 2** Verify also that in the same conditions no voltage is present between the block terminal X3:5 (neutral) and X3:3 (ground).

If any voltage is found, verify the mains distribution.

- 3** Check by an Ohmmeter the continuity of the electrical connections from Timer to Tubehead (see BZ-4).

### NOTE

*This is necessary to ensure that the wave suppressor circuit incorporated in the Tubehead performs effective attenuation of the negative half-wave of the mains power (unloaded half-wave). It reduces the no load magnetic currents and inductive voltage spikes, ensuring a safe operation and prolonged lifetime of the equipment.*

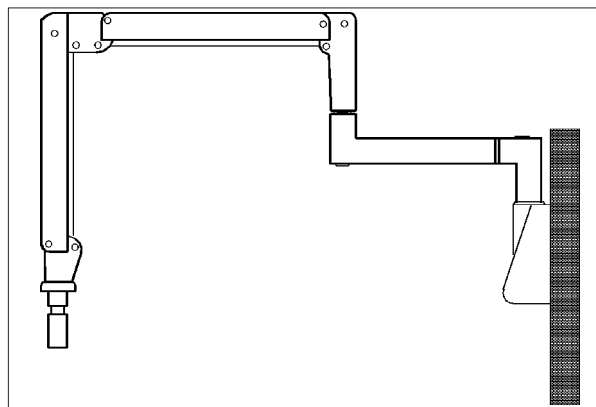




## 2.6. MOUNTING OF THE TUBEHEAD

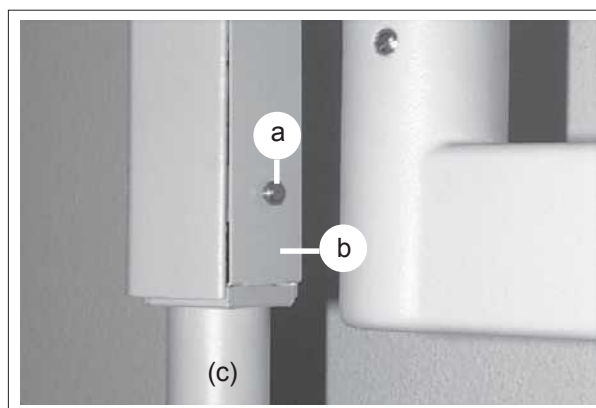
**1**

Before mounting the Tubehead remove very carefully the security binding of the Folding Arm and guide the arm slowly to the horizontal position opposing by hand to the springs action directed upwards. If the Folding Arm is released without Tubehead and without opposing by hand to the springs action, it is possible to damage the springs themselves.



**2**

Partially loosen the screw (a) ... and remove cover plate (b).



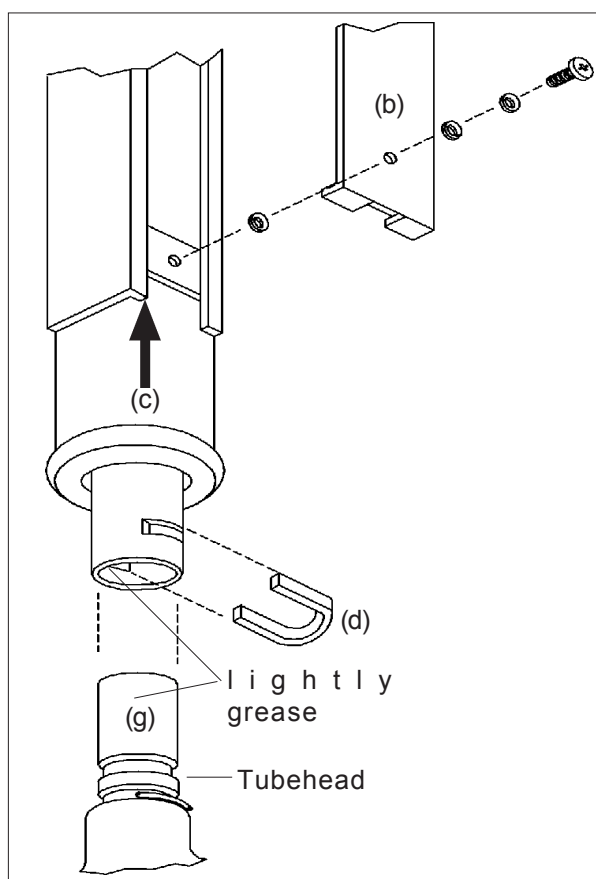
**3**

Shift upwards handle (c) and remove "U" shaped retaining clip (d).

**4**

Remove clear plastic tube from Tubehead contact assembly.

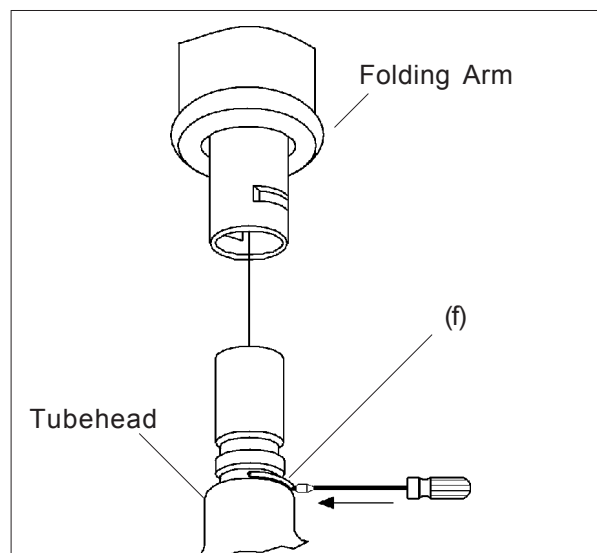
Lightly grease the Tubehead contact pin (g) and inner part of Folding Arm.



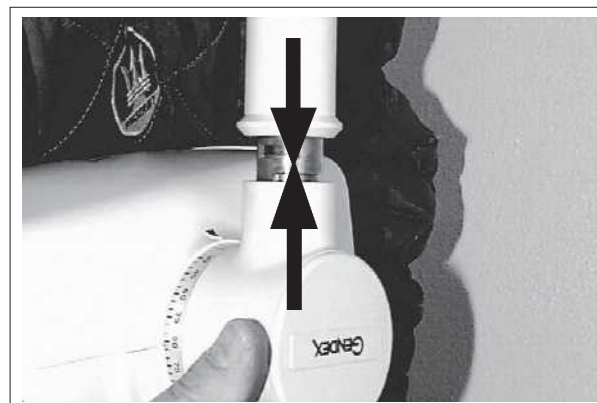
### WARNING

*Do not grease electrical connections on top of Tubehead contact pin and into Folding Arm.*

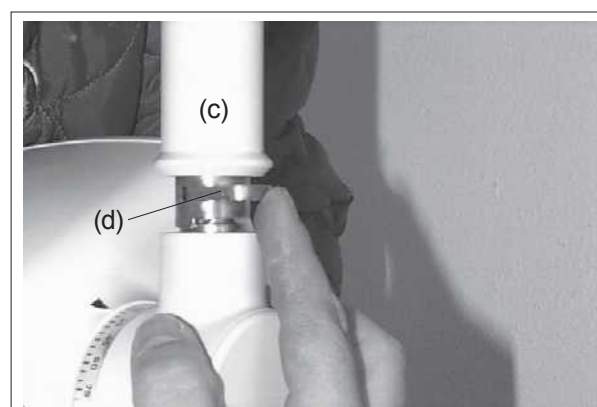
- 5** Depressing ground contact (f) with a screwdriver.



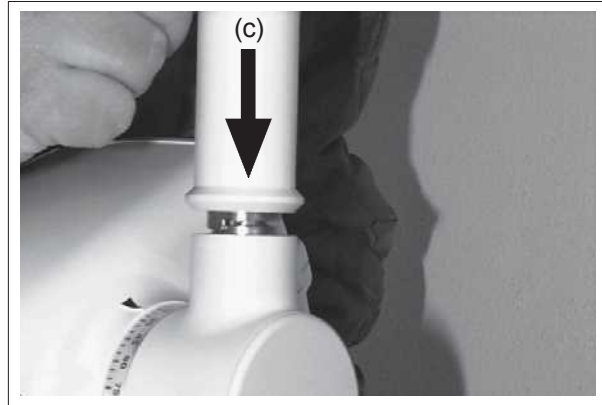
- 6** Insert Tubehead pin into the Folding Arm.



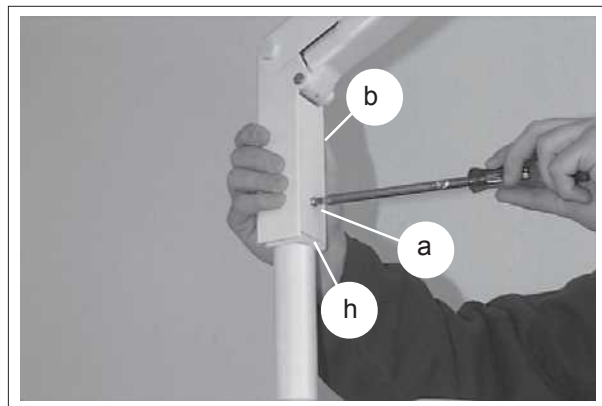
- 7** Secure with "U" shaped retaining clip (d), ensuring it is flush in slots.



- 8** Pull handle (c) down.



- 9** Reinstall cover plate (b) with screw (a).



**WARNING**

*The correct installation of the plate (b) is important for the safe attachment of the Tubehead. Verify the integrity of the locking teeth (h) and the presence of the lock washer.*

- 10** Finally, install the collimator.



## 2.7. CLOSING THE UNIT

Before closing the unit perform the Setting to work actions, as described in the Section C.

At the end of the installation replace all covers and coverplates on Wall Support, Extension Arm and Timer.

### 3. **MOBILE SYSTEM MOUNTING**

The Mobile Oralix AC and stand incorporate provisions for the attachment and strain relief of a field installed mains cable assembly (PN 4519-103-0000) provided with unit. The assembly consists of a 3-conductor harmonized H05VV-F cable (2 poles and earth; wire size 1.00 mm<sup>2</sup>, 3.8 m long) and male plug (CEE 7/7 16A/250V).

#### 3.1. **ROOM PREPARATION**

A mating wall socket shall be prepared within 1.5 m from the chair, with the protective earth pin connected to the equipotential earth point of the room, and with the line wires of the proper size.

**NOTE**

*The mains resistance, with 230 V A.C. mains, as measured at the wall socket must be less than 0.618 Ohms.*

#### 3.2. **UNPACKING**

Unpack each box and check the completeness according to ITEMS SUPPLIED BZ-3.

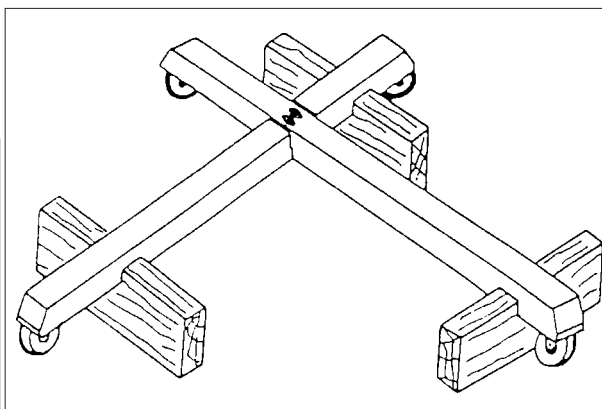
Verify also that the rated voltage of the Timer and Tubehead, as stated on the type number plates, are corresponding to the local situation.

### 3.3. ASSEMBLING THE MOBILE STAND

- 1** Place the two legs as shown by the picture.

**WARNING**

*In order to simplify the installation, please use the three wood-pieces from the wrapping as shown in the drawing.  
To insure that the two legs are mounted only in the correct position, the two guide-bolts are shaped in different thick.*



- 2** Set the column on the pedestal, insert the two exagonal screws M8 x 70 (a) and lock washers supplied.

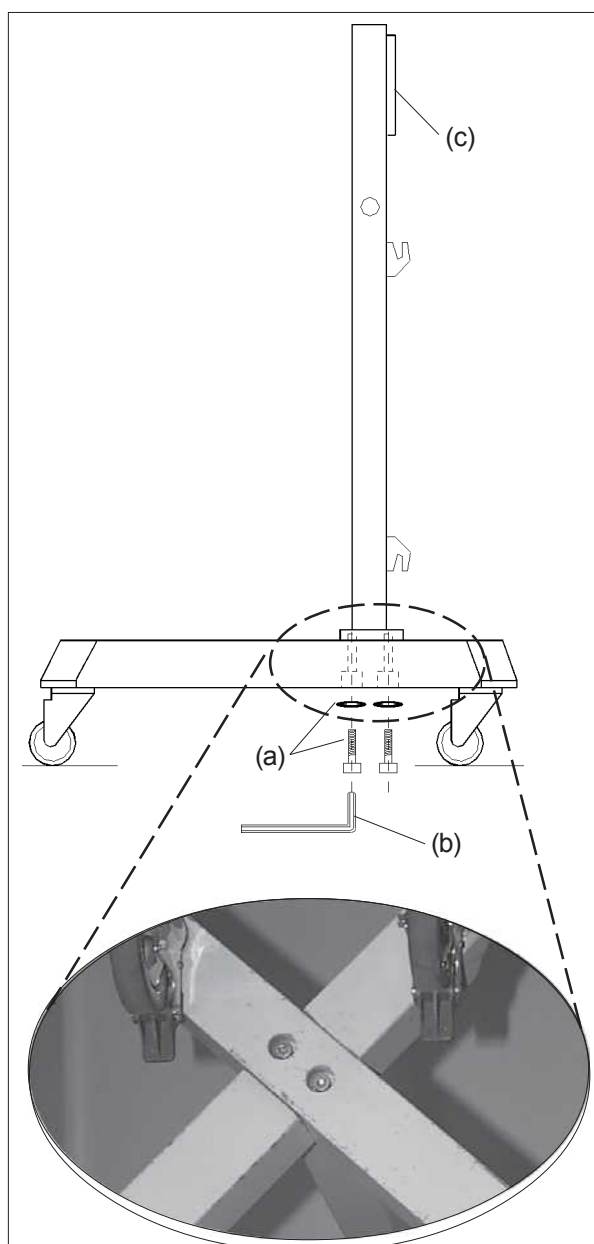
**WARNING**

*The proper fixation of the column to pedestal is fundamental for the strenght and stability of the mobile stand.*

- 3** By means of a proper exagonal wrench (b), tighten firmly the column and the pedestal togheter.

**REMARK**

*Ensure that the timer mounting plate (c) of the column is positioned at the rear of the Mobile Stand, on the short legs side.*



### 3.4. INSTALLING THE FOLDING ARM

#### WARNING

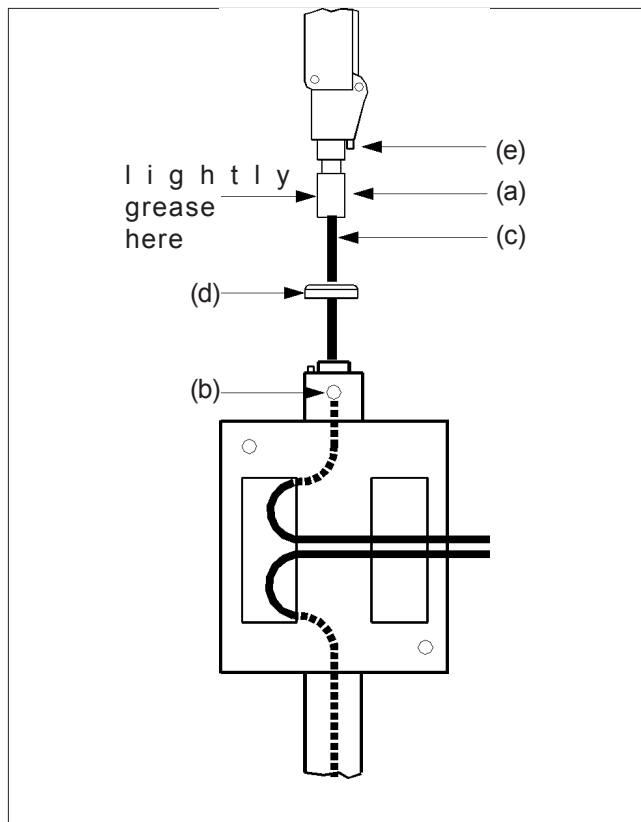
*The Folding Arm is packed in the folded position and secured with tape; it is counter loaded to balance the weight of the Tubehead, therefore the utmost care must be taken when removing the securing tape (see also mounting Tubehead).*

**1** Lubricate the spigot (a) of the Folding Arm with grease.

**2** Loosen the four locking screws (b) a few turns.

**3** Push the ring (d) over the support pin (a), fitting the ring hole into locking pin (e).

**4** Pull down through the column the cable (c) of the Folding Arm to the mounting plate of the Timer.



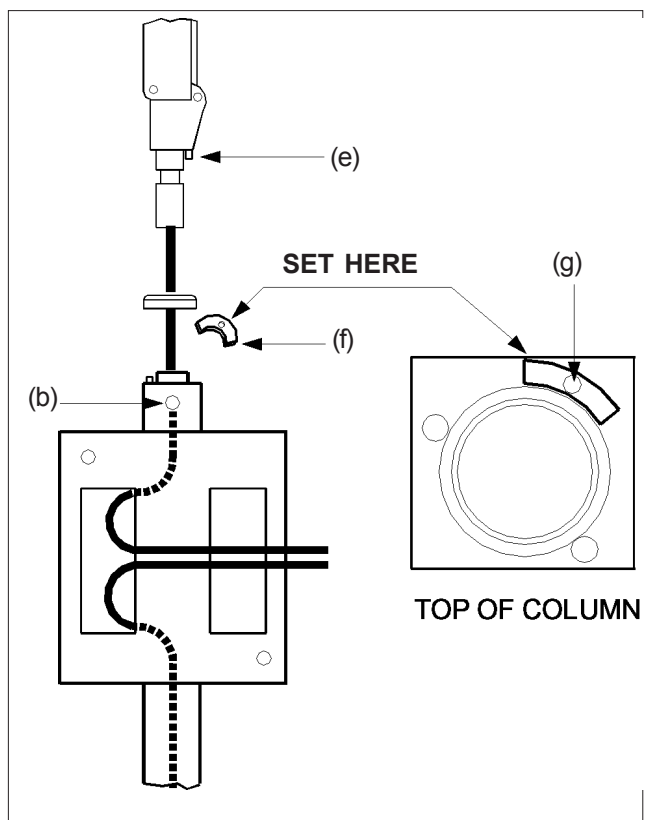
**5** Prepare the sector (f) on top of the column, in the position indicated in the drawing.

#### WARNING

*The installation of the sector is very important for the proper stability of the Mobile Stand and to ensure that the Folding Arm can be extended only in the direction of the long legs of the pedestal.*

**6** Insert the spigot of the Folding Arm into the column of the Mobile Stand. Ensure that the pin (e) is fitted into the sector hole (g).

**7** Fasten the four locking screws (b).



### 3.5. INSTALLING THE TIMER

**1** Remove the cover of the Timer and fit it on the two screws stud (b) provided on the mounting plate of the column (see figure).

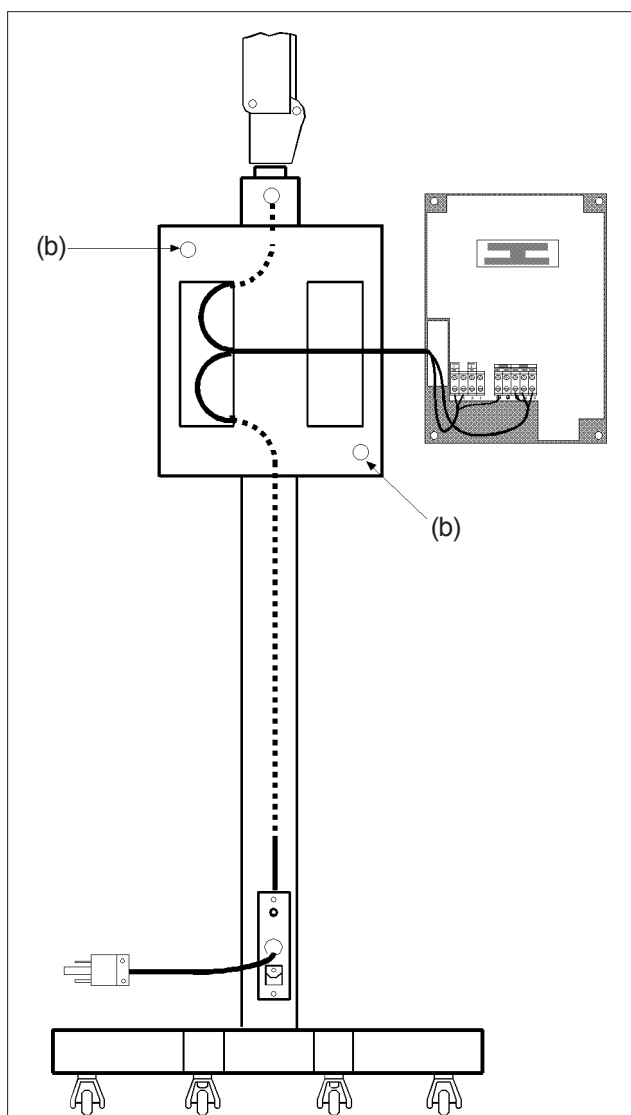
**2** Fix it with the nuts and rings supplied.

**3** Connect on the terminal block of the Timer the wires from the Folding Arm cable and the wires of the cable from the column to the Timer's terminal block, according to BZ-5.

Ensure that the protective earth lead (y/g) from Folding Arm cable is securely connected at block terminal pin X3:1; the protective earth lead (y/g) from mains power of the column is securely connected at block terminal pin X3:3; the protective earth lead (y/g) from the stud of the column is securely connected at block terminal pin X3:3.

**4** Verify the jumper and dip-switches settings as described in Section C, "Jumpers and Dip-switches setup" of this manual.

Do not remount the Timer cover until the polarity check has been performed.



### 3.6. POLARITY TEST

Please refer to paragraph "2.5 Polarity test" on this manual.

### 3.7. MOUNTING OF THE TUBEHEAD

Please refer to paragraph "2.6 Mounting of the tubehead" point 2 and following on this manual.

### 3.8 CLOSING THE UNIT

Before closing the unit perform the Setting to work actions, as described in the section C of this manual.







## **SECTION C**

### **SETTING TO WORK**

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## **1. INTRODUCTION**

This section contains detailed information about adjustment and test procedures for the setting up of the Oralix AC system.

## **2. TOOLS AND INSTRUMENTS REQUIRED**

For the setting of the Oralix AC system, the following are required:

- standard service tools;
- digital voltmeter. (Accuracy  $\approx$  1%)

### 3. CONTROLS, INDICATORS AND JUMPERS SETUP

For a survey of the controls and indicators of the Timers see CZ-1 and CZ-2.

#### 3.1. JUMPERS AND DIP-SWITCHES SETUP

The table below describes the jumpers and dip-switches setup on Densomat/Secondent Timer.

JUMPER	DENSOMAT		SECONDENT	
	Factory default setting	Custom setting	Factory default setting	Custom setting
W1	Not used	Not used	Not used	Not used
W2	1-2 (B.U.T. enabled)	2 - 3 (B.U.T. test)	1 - 2	Not used
W3	Unplugged	Not used	Opened	Not used
W4	Plugged	Not used	Closed	Not used
W5	Closed	Not used	Closed	Not used
W6	Opened	Not used	Opened	Not used
W7	Opened	Not used	Opened	Not used
W8	1-2 (X-ray enabled)	2-3 (X-ray inhibited)	1-2 (X-ray enabled)	2-3 (X-ray inhibited)
W9	Opened	Not used	Opened	Not used
W10	Closed	Not used	Closed	Not used
W11	Closed (F3 shunted)	Opened (F3 working)	Closed (F3 shunted)	Opened (F3 working)

S1	DENSOMAT	SECONDENT
1	not used	see table "Tubehead version selection"
2	OFF= single Tubehead (*) ON = double Tubehead	
3 (**)	ON= compensation inhibited (*) OFF = compensation enabled	OFF= compensation inhibited ON =compensation enabled (*)
4	OFF= X-ray inhibited ON = X-ray enabled (*)	OFF= X-ray inhibited ON = X-ray enabled (*)
8	not used	not used

(\*) = DEFAULT (\*\*) = Manual mode only

(Exposure time selected manually by pressing S+/S- pushb)

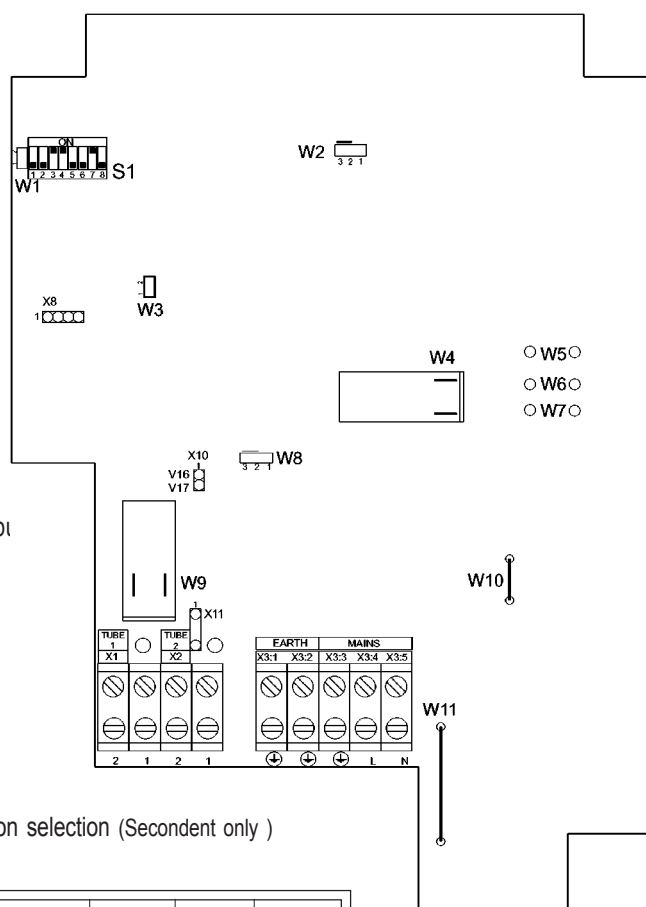
Preheating time selection at 50Hz  
(applicable for Densomat & Secondent)

TIME (ms)	S1		
	5	6	7
80	OFF	OFF	OFF
100	OFF	OFF	ON
120 (*)	OFF	ON	OFF
140	OFF	ON	ON
160	ON	OFF	OFF
180	ON	OFF	ON
200	ON	ON	OFF
220	ON	ON	ON

Tubehead version selection (Secondent only )

(\*)= DEFAULT

Tube version	230V (*)	240V	220V	spare
S1 - 1	ON	OFF	ON	OFF
S1 - 2	OFF	ON	ON	OFF



## **4. MECHANICAL FUNCTIONING**

### **4.1. FOLDING ARM**

The spring tension of the Folding Arm is factory adjusted: as a result the arm with Tubehead shall return to standby position, both horizontally and vertically, when slightly displaced by hand.

Otherwise the arm remains steady in work position when a larger displacement is applied.

If not, proceed first to an adjustment of the friction screws: when this is not sufficient adjust also the spring tension.

Refer to section F for the relevant adjustment procedures.

### **4.2. TUBEHEAD**

The Tubehead shall balance in all positions and the torque required to rotate it shall not exceed 1.8 Nm in the horizontal plane, or 1.5 Nm in the vertical plane.

If an adjustment of the frictioning of the vertical rotation is required, refer to section F for the adjustment procedure.

### **4.3. EXTENSION ARM**

The Extension Arm is provided with friction screws for the adjustment of the horizontal rotation of the Folding Arm.

Refer to section F for the adjustment procedure.

### **4.4. MOBILE STAND ADJUSTMENTS**

Adjust if necessary the verticality of the Mobile Stand column as described in the relevant unit manual.

#### **NOTE**

*There is no facility on the Mobile Stand for the frictioning of the horizontal rotation of the Folding Arm around the Mobile Stand column.*

## 5. ELECTRICAL CHECKS

### 5.1. CHECK OF THE MAINS VOLTAGE MEASURING CIRCUIT

- 1) Using an AC voltmeter (accuracy  $\approx <1\%$ ) verify on TIMER AC terminal blocks shown in BZ-4 that the mains voltage is at its nominal value.
- 2) Boot the "DVM routine (Digital Voltmeter) on the Timer (see paragraphs 5.2 and 5.3 of this Section) and verify that the mains voltage value measured by the Timer is the same as that measured with the AC Voltmeter at point 1.  
If not, proceed to an adjustment of the mains voltage measuring circuit as described in Section F.

### 5.2. TEST AND DIAGNOSTIC ROUTINE: DENSOMAT

#### 5.2.1. Test of LEDs/Keys and Display functionality (Test mode routine)

The "Test mode routine" is booted by pressing the "Vx" key and "Bitewing" key simultaneously at power on.

**NOTE**

*During all the test and the diagnostic routines X-RAY emission is inhibited.*

All segments of display light up, then software version is visualized: Ux.x

When the "Test mode routine" is active all LEDs of keyboard must be on (except the X-ray on LED): the operator can press all keys sequentially and verify that the correspondent LED is switched OFF.

**NOTE**

*The Tubehead 1 and Tubehead 2 LEDs work in toggle mode so that they cannot both be switched on (or off) at the same time.*

The display shows the key's code according to the following table.

KEY CODE	KEY FUNCTION	KEY CODE	KEY FUNCTION
S1	S+	S11	UPPER PREMOLAR
S2	S-	S12	UPPER MOLAR
S3	TUBEHEAD 1	S13	LOWER INCISOR
S4	TUBEHEAD 2	S14	LOWER CANINE
S5	NOT PRESENT	S15	LOWER PREMOLAR
S6	SMALL PATIENT	S16	LOWER MOLAR
S7	MEDIUM PATIENT	S17	BITEWING
S8	LARGE PATIENT	S18	VX
S9	UPPER INCISOR	S19	PREP (handswitch)
S10	UPPER CANINE		

Pressing "P" key exits and automatically enters in the "Tubehead Voltage Select routine".

### 5.2.2. Tubehead Voltage Select routine

This routine is provided for installation of the older types of 220 V and 240 V tubeheads. The Timer AC is only provided with 230 V tubeheads and so the 230 V default value should not be changed.

After having completed the "Test mode routine" (by pressing the "P" key) the "Tubehead Voltage select routine" is entered and "SEL" will be displayed for a second.

It is possible to change the nominal mains voltage for the type of tubehead being used. Select the tubehead via the TUBEHEAD 1 and TUBEHEAD 2 keys and change the voltage by pressing the S+ and S- keys.

Pressing the "P" key exits and "VAC" is displayed.

### 5.2.3. Measurement of mains voltage (DVM routine)

After having completed the "Tubehead Voltage Select routine" (by pressing the "P" key) the "DVM routine" (Digital Voltmeter) is initiated and "UAC" (VAC) will be displayed for a second.

The "DVM routine" is a test function used to check the mains voltage value measured by the Timer. This value is shown on the display.

During "DVM routine", every 1 second the display is updated showing actual value of mains voltage with an accuracy of  $\pm 1V$ .

Pressing "P" key exits "DVM routine" and the display shows "cnt".

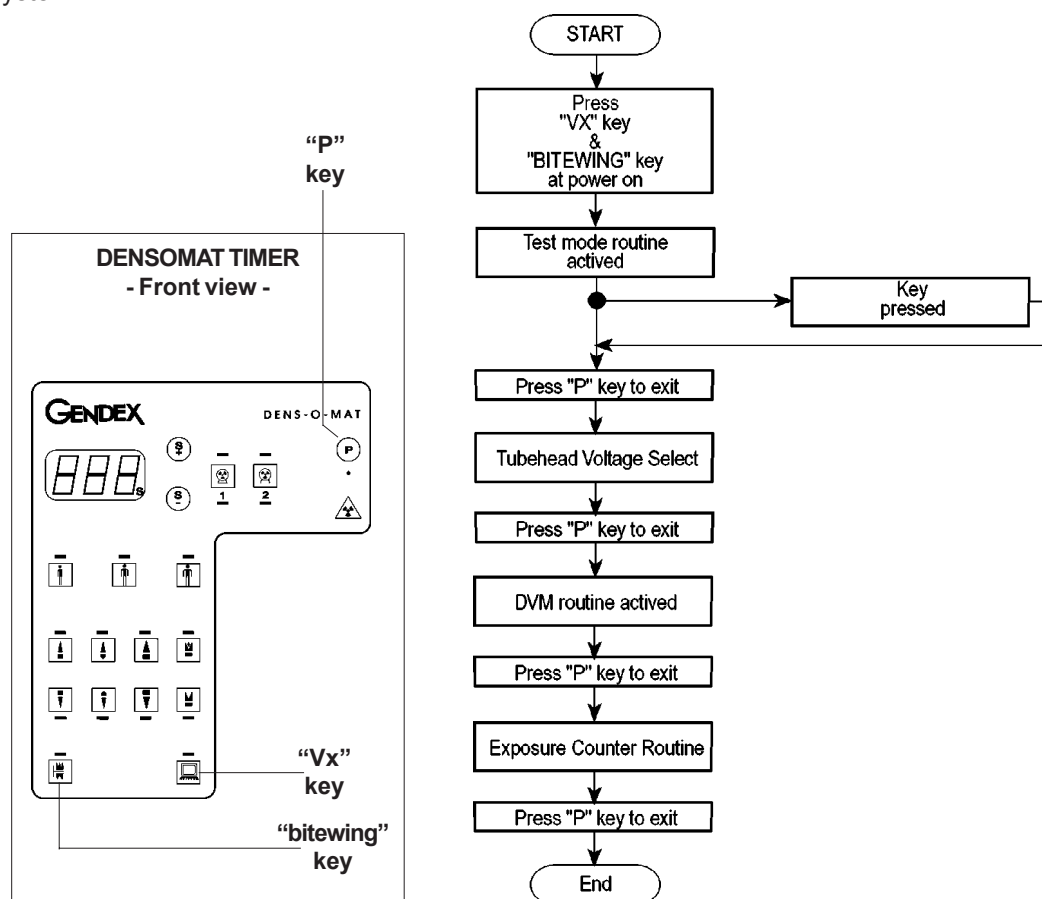
### 5.2.4. Exposure Counter routine

After having completed the "DVM" routine (by pressing the "P" key) the "Exposure Counter routine" is entered and "cnt" will be displayed for a second.

It is possible to view the number of exposures made for the selected tubehead. This number is displayed in multiples of ten; e.g. if 015 is shown on the display than between 150 and 160 exposures have been made. Select the tubehead via the TUBEHEAD 1 and TUBEHEAD 2 keys.

Pressing "P" key exits and the display shows "END".

Switch off the System.



### 5.3. TEST AND DIAGNOSTIC ROUTINE: SECONDDENT

#### 5.3.1. Test of LEDs functionality (Test mode routine)

The "Test mode routine" is booted by keeping "PREP" key (handswitch) pressed at power on.

#### NOTE

*During "Test mode routine" X-RAY emission is inhibited.*

All LEDs must be ON (except X-ray LED).

Pressing "PREP" key (handswitch) exits "Test mode routine" and automatically enters in "DVM routine".

#### 5.3.2. Measure of mains voltage (DVM routine)

After having completed or aborted the "Test mode routine" (by pressing the "PREP" key) the DVM routine (Digital Voltmeter) is initiated.

#### NOTE

*During DVM routine X-ray emission is inhibited.*

The "DVM routine" is a test function used to check the mains voltage value measured by the Timer. This value is indicated on the operator panel as follows:

- 1) If the voltage readout is **230 VAC** the lower LED and the higher LED are lit (Fig. 1).
- 2) If **V<230 VAC**, upper LEDs are lit with two volts per step increment (Fig. 2).
- 3) If **V>230 VAC**, bottom LEDs are lit with two volts per step increment (Fig. 3).

2.50 ●  
2.00 ○  
1.60 ○  
1.26 ○  
1.00 ○  
0.80 ○  
0.64 ○  
0.50 ○  
0.40 ○  
0.32 ○  
0.26 ○  
0.20 ○  
0.16 ○  
0.12 ○  
0.10 ○  
0.08 ○  
0.06 ○  
0.05 ○  
0.03 ●

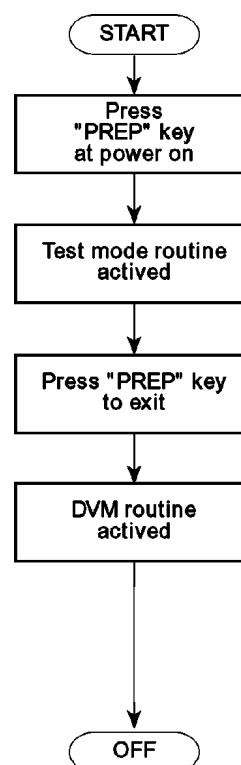
*Fig. 1 - Optical indications when mains voltage is V = 230 VAC: the lower and the upper LEDs are lit.*

2.50 ● V=228 V  
2.00 ● V=226 V  
1.60 ● V=224 V  
1.26 ● V=222 V  
1.00 ○  
0.80 ○

*Fig. 2 - Optical indications when mains voltage is V < 230 VAC: the the upper LEDs are lit, starting from the top one.*

0.20 ○  
0.16 ○  
0.12 ○  
0.10 ○  
0.08 ● V=238 V  
0.06 ● V=236 V  
0.05 ● V=234 V  
0.03 ● V=232 V

*Fig. 3 - Optical indications when mains voltage is V > 230 VAC: the the lower LEDs are lit, starting from the bottom one.*



## 5.4. TUBEHEAD VERSION SELECTION

It is possible to select different tubehead versions (220-230-240 VAC). For DENSOMAT see paragraph 5.2.2 of this section; for SECONDET see paragraph 3.1, table "Tubehead version selection", at the beginning of this section.


# 6. FUNCTIONAL TEST

Upon completion of the ORALIX AC System installation, perform the following test procedure to verify the proper operation.

### **WARNING**

X-rays will be generated during this test. Observe appropriate precautions.

## 6.1. FUNCTIONAL TEST ON TIMER SECONDET

- 1) Position Tubehead with Collimator toward radiation-safe area, away from personnel, and cover distal end with 2mm lead.
- 2) Switch on the Secondent by pressing the LINE ON switch: the green LINE ON indicator  and LED "0.40" should light.
- 3) Take exposure button and move to a radiation safe-area.
- 4) Press exposure button and verify that amber X-ray ON indicator lights up and X-ray buzzer signal is audible during exposure.
- 5) Verify that audible and visible X-ray ON indicators go OFF when exposure terminates.

### "Dead-man" function test

- 6) Set Time Selector Knob to longest exposure time.
- 7) Press and immediately release exposure button, verifying that audible and visible X-ray ON indicators go OFF immediately after exposure button is released. The red LED "alarm" flashes.

### **CAUTION**

*Observe the prescribed waiting time between exposures.  
Do not make more than 8 seconds of cumulated exposure in any 10 minute period.*

### Check mechanical stability of the electrical connections

- 8) Move Tubehead, Folding Arm and Extension Arm assembly through all positions. Periodically depress exposure button and verify that audible and visible X-ray ON indicators operate properly.
- 9) Turn power OFF.
- 10) Perform Acceptance tests as described in section D.
- 11) Complete the installation as described in section B "Closing the unit"



## 6.2. FUNCTIONAL TEST ON TIMER DENSOMAT

- 1) Position Tubehead with Collimator toward radiation-safe area, away from personnel, and cover distal end with 2mm lead.
- 2) Switch on the Densomat by pressing the LINE ON switch; verify that the LEDs light ON, as shown by figure 1.
- 3) Take exposure button and move to a radiation safe-area.
- 4) Press exposure button and verify that the “X-ray ON” indicator (see figure 2) of the Tubehead 1 should light and X-ray buzzer signal is audible during exposure.
- 5) Verify that audible and visible X-ray ON indicators go OFF when exposure terminates.
- 6) After the exposure any further X-ray command shall be inhibited for the relevant wait time; if a new exposure is commanded during the wait time the indication “ $\frac{11}{-}$ ” appears on the display.

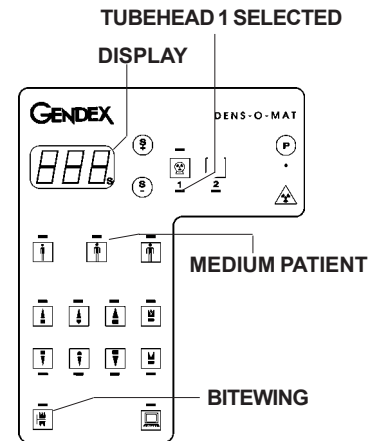


Figure 1

### “Dead-man” function test

- 7) Press “S+” button (see figure 3) until the indication “2.5” appears on display.
- 8) Press and immediately release exposure button, verifying that audible and visible X-ray ON indicators go OFF immediately after exposure button is released. The display flashes.

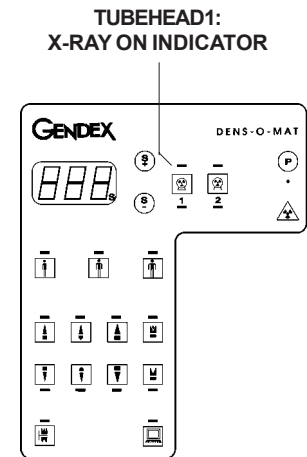


Figure 2

### Check mechanical stability of the electrical connections

- 9) Move Tubehead, Folding Arm and Extension Arm assembly through all positions. Periodically press exposure button and verify that audible and visible X-ray ON indicators operate properly.
- 10) Turn power OFF.
- 11) Perform Acceptance tests as described in section D.
- 12) Complete the installation as described in section B “Closing the unit”.
- 13) Repeat all the tests from point 2 to 11 for the second Tubehead, if installed.

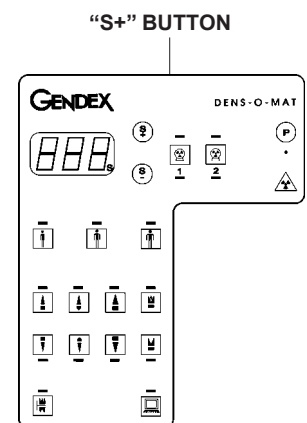


Figure 3

## **SECTION D**

### **ACCEPTANCE**

<b>1. INTRODUCTION .....</b>	<b>D-1</b>
<b>2. EQUIPMENT REQUIRED .....</b>	<b>D-1</b>
<b>3. ACCEPTANCE TESTS .....</b>	<b>D-2</b>
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#### **DRAWINGS:**

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-----------------------------------	-------------

## **1. INTRODUCTION**

This section contains information about acceptance tests, required to ensure the customer that the Oralix AC system conforms to the specification.

## **2. EQUIPMENT REQUIRED**

Digital Multimeter (Accuracy  $\leq 1\%$ ).  
Oscilloscope.  
Bonding Tester.  
No-invasive KV meter (Accuracy  $\leq 2\%$ ).

### 3. ACCEPTANCE TESTS

**NOTE**

*Record items on Acceptance checklist, DZ-1.*

#### 3.1. LABELS, INDICATORS AND WARNINGS

- (1) Verify and record that Certification, Identification, Place and Date of Manufacture labels on Timer, Tubehead and Collimator/P.I.D. are permanently affixed, legible and readily accessible to view.
- (2) Verify and record that the technique factors are indicated on the Tubehead and on the Timer.

#### 3.2. ACCURACY OF $kV_{peak}$

The kVp is defined as the stationary high voltage value which settles under load after the preheating time. The measurement is possible by using no-invasive KV meter instruments (accuracy  $\leq 2\%$ ) placed at the end of the collimator.

Measurement shall be made with mains supply at nominal conditions.  
Refer to technical data Section A - 4.2. for the tube voltage and tolerance.

#### 3.3. ACCURACY OF TUBE CURRENT

For the possibility of damaging the tube covers, the following test is to be performed only if strictly necessary. The tube current is defined as the average value of the stationary current which settles after the preheating time.

Direct measurement can be performed with a digital mA meter at the midpoint of the high voltage transformer secondary (by shunting Tubehead resistor **GA-R5**).

Use a precision mA meter, f.s. 10mA DC, accuracy 1%.

Measurement shall be made with mains supply at nominal conditions.  
Refer to technical data Section A - 4.2. for the tube current and tolerance.

#### 3.4. ACCURACY OF EXPOSURE TIME

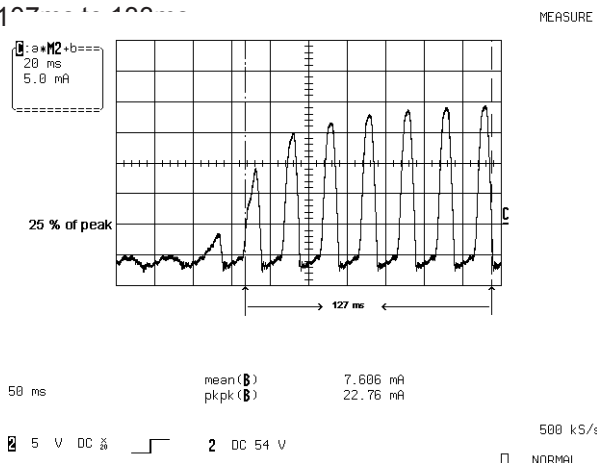
The total time consists of the "preheating time" and the "exposure time". The first 120 msec (117 msec for 60 Hz mains supplies) during which no significant X-rays are produced are considered as "preheating time". (warm up pulses whose amplitude is lower than a minimum threshold, and are to be excluded from the measurement).

The "exposure time" is the time during which X-rays are generated: it can be selected by the operator through the controls of technique, anatomical region, patient size and film speed for Densomat (or by selector for Secondent), and it is displayed on the 3-digits display.

The exposure time is controlled by the micro processor, with accurate sensing of the mains zero crossing. The exposure time can be checked at nominal conditions by following the procedure below:

- a) connect an oscilloscope across resistor R5 of the Oralix AC tubehead.

- b) make an exposure with an exposure time greater than 160ms; measure the peak value of the waveform and record it as  $I_{peak}$ .
- c) select the desired exposure time and make an exposure.
- d) on the obtained waveform measure the time between the first cross over the 25% of the  $I_{peak}$  and the last cross under the 25% of the  $I_{peak}$ .
- e) the figure below shows the measurement for 120ms exposure time; the acceptance is : 120ms+/- (10%+1ms) = from 117ms to 121ms

**NOTE**

*Using non-invasive instruments for these measurements does not allow a proper verification of the compliance to the IEC Standard.*

Perform the test at different technique, patient, and film speed selections, and verify that the measured exposure time is corresponding to the displayed exposure time (within the acceptable accuracy). (see AZ-5)

### 3.5. RADIATION LEAKAGE

Perform radiation leakage measurements at 100 cm from the focus in any direction, and verify that the dose rate values for the combination Tubehead and collimator are lower than 45  $\mu\text{GY/h}$  (5 mR/h) as specified. (See Section A).

**WARNING**

*The prescribed duty cycle factor (1:30) shall be taken into account in the calculations, in order to obtain the correct dose rate figure.*

### 3.6. EARTH RESISTANCE

#### 3.6.1. Wall mounted systems

The Oralix wall mounted system requires a fixed installation, therefore the resistance between any exposed conductive part and the earth terminal of the Timer has to be lower than 0,1 Ohm.

Disconnect the unit from the mains and measure with the Bonding tester.

#### 3.6.2. Mobile systems

The Oralix mobile system is an equipment provided with protective earth conductor in non detachable flexible supply cord, therefore the resistance between the earth pin of the mains plug and any exposed conductive part of the X-ray installation has to be lower than 0,2 Ohm.

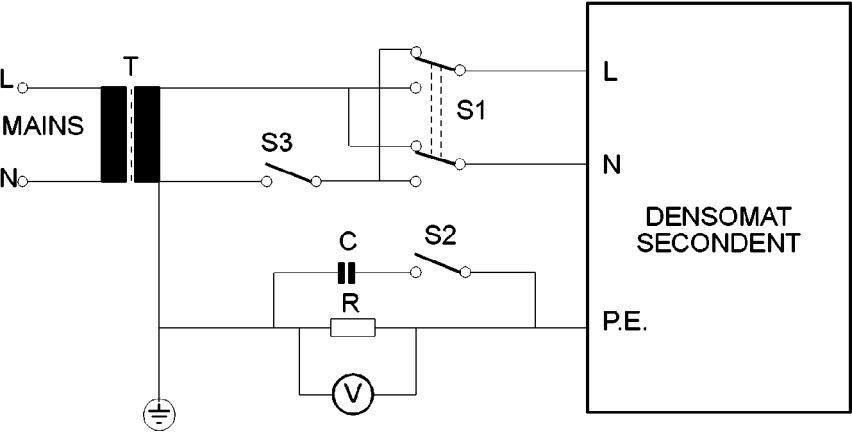
Disconnect the mains plug from the socket and measure with the Bonding tester.

3.7. EARTH LEAKAGE

Measure the earth leakage currents in all conditions, using the circuit arrangement shown below.

Verify that the results conform to the table below:

S1	S2	S3	Max.leak.current (mA)	
			Mobile	Wall mount
off	off	on	< 2	< 0.5
off	on	on	< 2	< 0.5
on	off	on	< 2	< 0.5
on	on	on	< 2	< 0.5
off	off	off	< 2	< 2
off	on	off	< 2	< 2
on	off	off	< 2	< 2
on	on	off	< 2	< 2



V = DIGITAL VOLTMETER: INPUT IMPEDENCE = 10 MOhm  
R = 1 KOhm ± 1%  
C = 0.15 uF ± 5%  
T = K1

MOBILE SYSTEM	
L	= LINE PIN OF MAINS PLUG
N	= NEUTRAL PIN OF MAINS PLUG
P.E.	= PROTECTIVE EARTH OF MAINS PLUG

WALL MOUNT SYSTEM	
L	= LINE TERMINAL
N	= NEUTRAL TERMINAL
P.E.	= PROTECTIVE EARTH TERMINAL

## **SECTION E**

### **PREVENTIVE MAINTENANCE**

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### **DRAWINGS**

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# **1. INTRODUCTION**

These instructions describe the preventive maintenance actions to be carried out on the Oralix AC dental systems to ensure operational security and efficiency.

The actions mentioned in these instructions are based upon recommendations given BRH, IEC, and the other standard which the system complies with.

Where necessary the actions should be adapted to the local standards.

It is responsibility of the User to maintain the equipment efficient and in compliance with the standards by following the manufacturer's recommended maintenance schedule.

Failure of the User to properly maintain the equipment relieves the manufacturer, or his agent, from all responsibility for the non compliance which may result.

It is to be recommended that preventive maintenance be carried out either by Gendex specialists, or by others especially trained by Gendex to do this job.

## **2. PRELIMINARY**

### **2.1. INSPECTION CYCLE**

The suggested frequency is 24 months for each inspection of the Oralix system. One man is needed for the execution of the preventive maintenance inspection.

### **2.2. EQUIPMENT REQUIRED**

Digital DC voltmeter.

Standard service toolkit.

Dosemeter.

Special pushing drift code 4519 190 00871 (Option).

Bonding tester.

### **2.3. CLEANING MATERIALS AND LUBRICANTS**

Dry woollen cloth.

Soft long haired brush for removing dust.

Brush for applying grease.

White grease Molikote Longterm W2.

## **3. PREVENTIVE MAINTENANCE CHECKLIST**

The preventive maintenance checklist is given at the end of this section to provide recording of all the useful data from each inspection.

The space on top of the first page is available for stating the customer data.

The column R/S enables remarking of actions concerning safety (S) or/and actions involving use of radiation (R).

The column ACTIONS contains the individual that must be carried out in sequential order.

Refer to paragraph 4.n for the procedure corresponding to the test n.

The columns INSPECTION are provided to record the measured values for each inspection: data in these columns indicate that the corresponding action has been carried out.

## 4. PREVENTIVE MAINTENANCE INSTRUCTIONS

### WARNING

*Always disconnect the equipment from the mains supply before starting any maintenance action: the mains voltage may be present on parts of the system (such as electronic board, Tubehead, Folding Arm cable) even in the stand-by condition.*

*Do not allow liquid, spray or vapour the equipment, as they may cause short circuits or corrosion. Use white grease Molikote Longterm W2 for any lubrication required.*

*In case of replacement/maintenance of Tubehead, Folding Arm and Extension Arm it is necessary to park the Folding Arm in a safe position by guiding the arm slowly to the horizontal position opposing by hand to the springs action directed upwards (see figure in pag.B14).*

*If the Folding Arm is released without Tubehead and without opposing by hand to the springs action, it is possible to damage the springs themselves.*

### 4.1. VISUAL INSPECTION

#### 4.1.1. Cables, connectors and plugs

Verify that all cables are not damaged and properly fixed: that no conductor lead is exposed or stressed. Connectors and plugs must securely fit and be of matching type.

#### 4.1.2. Controls and indicators

Verify that controls and indicators do not show any damage and check during the performance test that they are working properly.

#### 4.1.3. Labels

Verify that all the required labels (certification of date of manufacture, serial number, etc.) are properly affixed to certified components which have been installed or replaced.

#### 4.1.4. System mechanical performance

Before dismounting the system, move the arms in various positions to check for noise or binding problems. When the frictioning of the arm and Tubehead assembly is well adjusted, the arm must return in standby position, both horizontally and vertically, when slightly displaced by hand.

On the contrary the arm shall remain steady in work position when a larger displacement is applied.

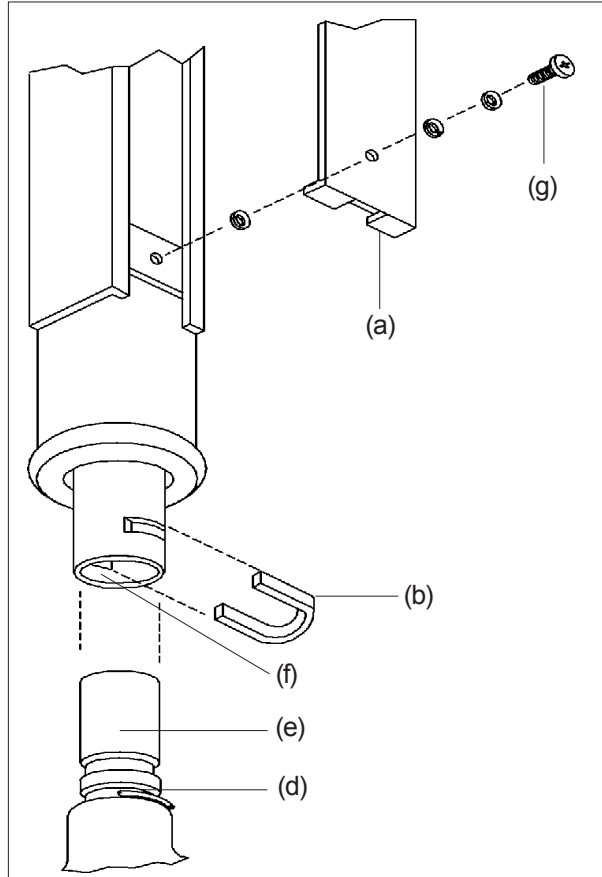


## 4.2. MECHANICAL CHECKS

### 4.2.1. Maintenance of the Tubehead

For the maintenance of the Tubehead follow the procedure below:

- 1** Inspect for any damage and/or wear to the Tubehead and the cone: any defective item affecting the safe operation must be repaired or replaced.
- 2** Inspect the Tubehead for oil leakage; a slight oiliness of the rubber expensor is normal.
- 3** Remove the snap out cap with the logo GENDEX and check the conditions of the twisted cable.
- 4** Check that the handle cover (a) of the Folding Arm is properly fixed and there is no access possibility to the Tubehead retaining clip (b).
- 5** Partially loosen the screw (g) and remove the plate (a) and inspect the wires connection: inspect also the earth point (d) for corrosion or damage which could alter the electrical continuity.
- 6** Remove the retaining clip (b) and extract the Tubehead spigot from the Folding Arm guide, taking care of supporting the Tubehead itself.
- 7** Inspect the retaining clip (b) for wear or damage and replace it if necessary.
- 8** Grease the Tubehead spigot (e) and the internal part of the Folding Arm guide (f).



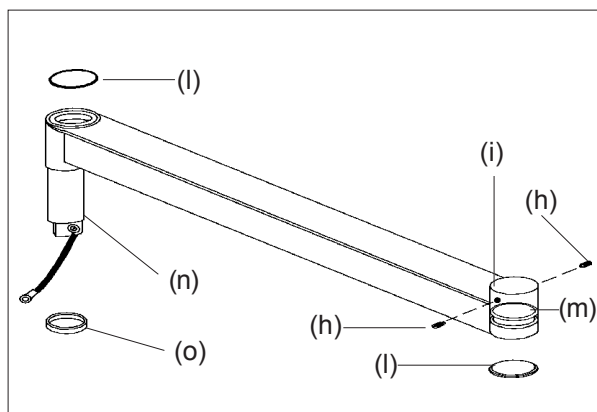
#### WARNING

*Take care not to grease the electrical connections on top of the Tubehead spigot and into the Folding Arm guide.*

### 4.2.2. Maintenance of the Extension Arm

For the maintenance of the Extension Arm follow the procedure below:

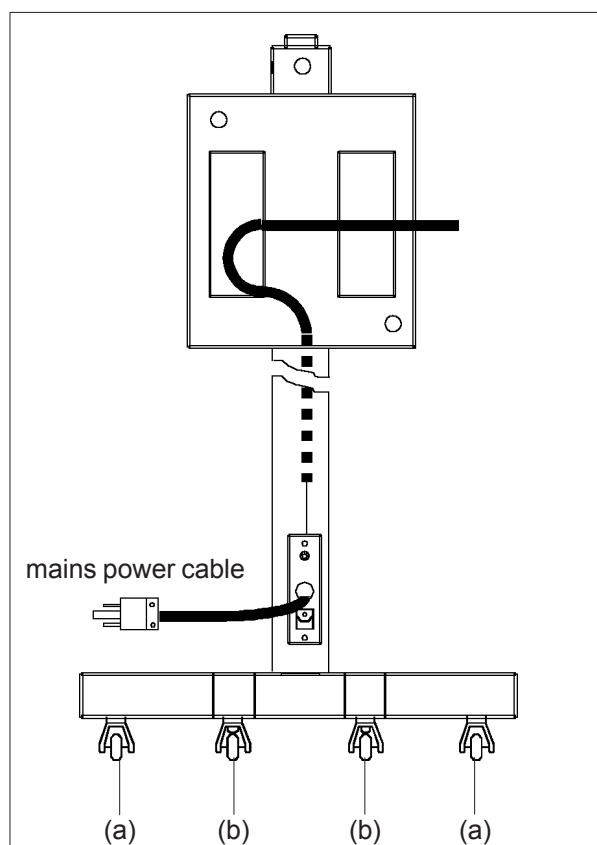
- 1** Unscrew the two friction screws (h).
- 2** Extract slightly the arm base to access the ball bearing (i): inspect for wear and lubricate it.
- 3** Screw back the friction screws (h).
- 4** Remove the snap-out caps (l) and inspect for wear the bush (m): replace it if required and remount the caps (l).
- 5** Lift slightly the Extension Arm at the side of the Wall Support and grease the spigot (n).
- 6** Inspect for wear ring (o) and replace it if required.
- 7** Inspect for wear the cabling and check the protective earth connection.



### 4.2.3. Maintenance of the Mobile Stand

For the maintenance of the Mobile Stand follow the procedure below:

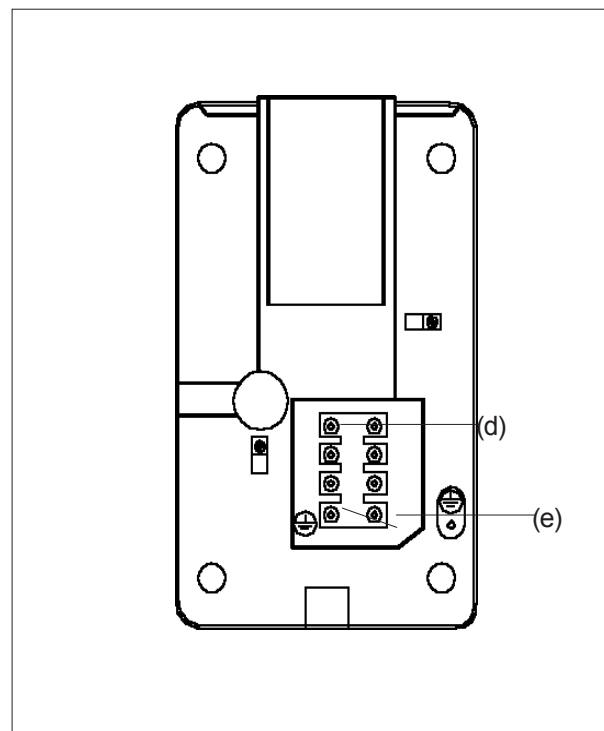
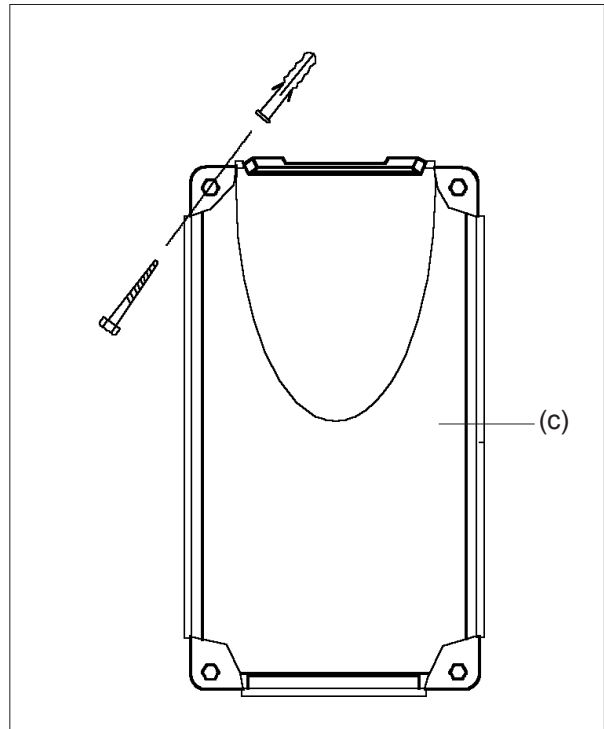
- 1** Check for wear the wheels (a) and verify the correct rotation: replace them if necessary.
- 2** Inspect the wheel brakes (b) and verify the efficiency of their action: replace the complete wheels with brakes if required.
- 3** Inspect for wear the mains cable and its attachment to the column.



#### 4.2.4. Maintenance of the Wall Support

For the maintenance of the Wall Support follow the procedure below:

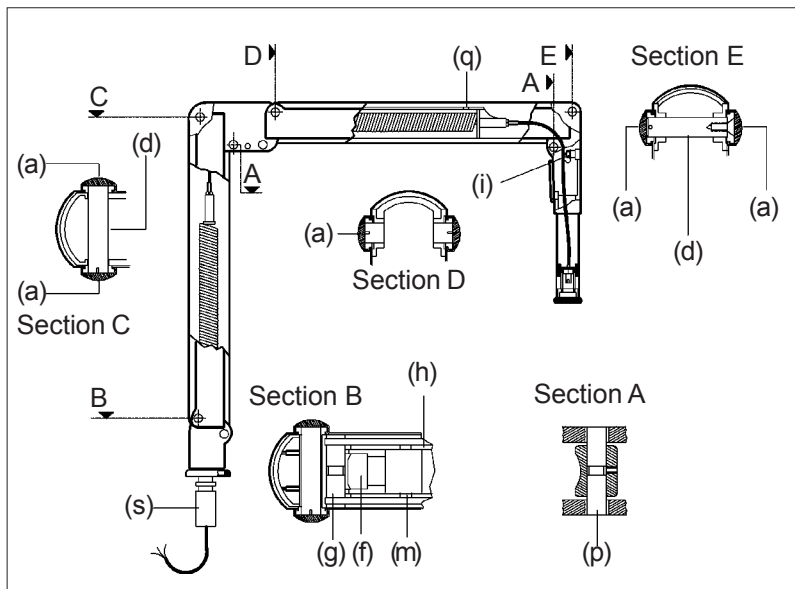
- 1** Remove the cover (c) and check that the Wall Support is firmly connected to the wall by four fixation points (the applied torque shall be 10 N/m).
- 2** Check also that it is properly levelled.
- 3** Check the power connections at the terminal block (d) and inspect the protective earth connection (e) at the ground point, checking for damage or corrosion which could alter the electrical continuity.



### 4.2.5. Maintenance of the Folding Arm

The maintenance of the Folding Arm can be performed without removing the arm itself from its base, following the procedure below:

- 1** Remove the snap out caps (a) and push out with the special pushing drift the pins (d), taking care of supporting the arm. Then remove the covers.
- 2** Inspect for wear the pins (d) and replace if required.
- 3** Unscrews the base screw and inspect for wear the lever (f), the pin (g) and the fork (h).
- 4** Grease the articulated joints (m).
- 5** Grease pins (p) by the holes provided and the springs through the holes (q) provided.
- 6** Lift slightly the Folding Arm from its support and grease the spigot (s).
- 7** Inspect the earth connections at points (i), and the respective bonding wires, checking for damage or corrosion which could alter the electrical continuity. Check also that protective conductor of the supply cable is properly connected to the earth point in the end section of the arm.
- 8** Grease the pins (d) and remount them with the help of the special pushing drift.
- 9** Remount the Tubehead into the Folding Arm spigot and secure it with the retaining clip.



### 4.2.6. System adjustments

The system adjustments shall be performed with the arms and Tubehead completely assembled.

In standby position the arm sections must be perpendicular, laying respectively horizontal and vertical to the floor.

When properly adjusted the arms shall return in standby position, both horizontally and vertically, when slightly displaced by hand.

On the contrary the arms shall remain steady in work position when a larger displacement is applied.

If not, proceed first to an adjustment of the friction screw: when this is not sufficient adjust also the spring tension of the arm section involved (for the adjustment procedures see the Section F of this manual).

The Tubehead shall balance in all positions and the torque required to rotate it shall not exceed 1.8 Nm in the horizontal plane or 1.5 Nm in the vertical plane.

If an adjustment of the frictioning of the vertical rotation is required, provide it as described in the Section F of this manual.

The Extension Arm is provided of friction screws for the adjustment in the horizontal rotation of the Folding Arm. Adjust them if required according to the Section F of this manual.

In case of Mobile System, adjust if necessary the verticality of the Mobile Stand as described in the Section F of this manual.

#### NOTE

*There is no facility on the Mobile Stand for the frictioning of the horizontal rotation of the Folding Arm around the Mobile Stand column*

## 4.3. ELECTRICAL CHECKS

### 4.3.1. Power supplies

Remove the Timer cover, check with a digital DC voltmeter that the supplies are correct on PCB TC1, according to the table below:

<i>voltage</i>	<i>measure point</i>	<i>reference point (0V)</i>
+5V	X4-8	X4-7
+9V	X4-9	X4-7
+16 to 22V	X4-10	X4-7

### ***4.3.2. Inspection of the Timer***

- (1) Verify the proper operation of the Timer according to Section C- "Functional Test" of this manual.
- (2) Inspect exposure switch and cable for wear: check for continuity and for intermittent open or short circuit; replace if necessary.
- (3) Inspect the operator control panel for wear; verify that the LEDS indication over each push button are working properly.
- (4) Check the adjustment of the mains measuring circuit according to Section C "Adjustment of the mains voltage measuring circuit" of this manual.

### ***4.3.3. Exposure counter reading***

Record on the EZ-1 module the read out value of exposure counter reading.

## ***5. FUNCTIONAL TEST***

### ***5.1. PERFORMANCE TEST***

See Section C of this manual.

### ***5.2. CUSTOMER TEST***

To prove to the customer that the system is in compliance with the standards, perform the tests described in the Section D of this manual.



## **SECTION F**

### **CORRECTIVE MAINTENANCE**

<b>1. INTRODUCTION .....</b>	<b>F-1</b>
<b>2. EQUIPMENT REQUIRED .....</b>	<b>F-1</b>
<b>3. ADJUSTMENTS .....</b>	<b>F-2</b>
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3.3. TUBEHEAD FRICTION .....	F-3
<b>4. REPLACEMENT PROCEDURES .....</b>	<b>F-4</b>
4.1. REPLACING THE WHEELS OF THE MOBILE STAND .....	F-4
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PROPER DISPOSAL OF ELECTRONIC EQUIPMENT .....	F-8

## **1. INTRODUCTION**

The Corrective Maintenance provides information about adjustment and replacement procedures concerning the Oralix AC system.

### **WARNING**

*Always disconnect the equipment from the mains supply before starting any maintenance action: the mains voltage may be present on parts of the system (such as electronic board, Tubehead, Folding Arm cable) even in the stand-by condition.*

*In case of replacement/maintenance of Tubehead, Folding Arm and Extension Arm it is necessary to park the Folding Arm in a safe position by guiding the arm slowly to the horizontal position opposing by hand to the springs action directed upwards (see figure in pag.B14).*

*If the Folding Arm is released without Tubehead and without opposing by hand to the springs action, it is possible to damage the springs themselves.*

## **2. EQUIPMENT REQUIRED**

Standard service toolkit;  
 Special drift code 4519 190 00871;  
 Loctite 290 code 1322 511 00702;  
 Special 30 mm open wrench code 4519 120 93161 (ONLY FOR MOBILE UNITS);  
 Special 30 x 17 mm open wrench code 4519 120 92141 (ONLY FOR MOBILE UNITS).

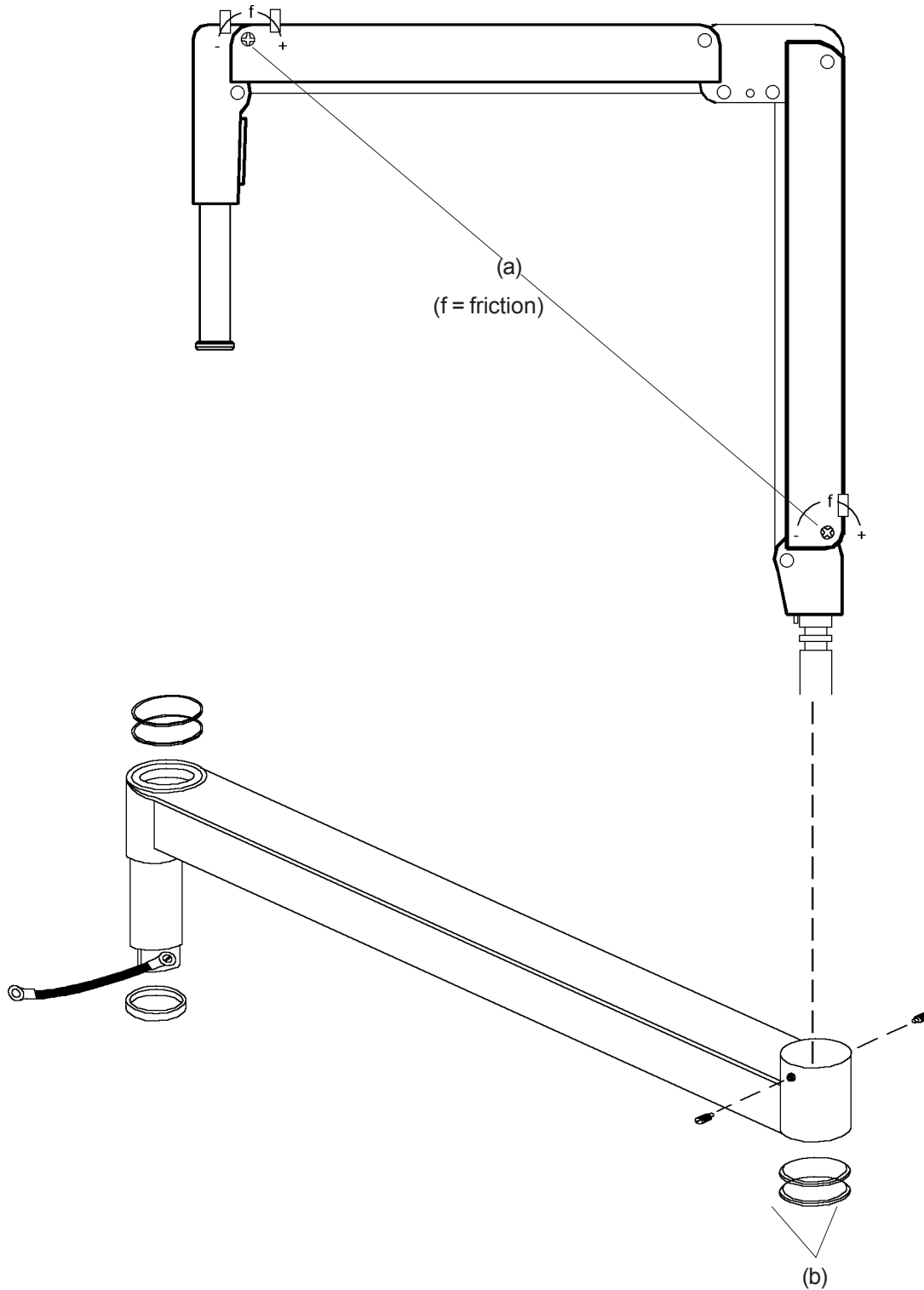


### 3. ADJUSTMENTS

#### 3.1. FOLDING ARM FRICTION

For the adjustment of Folding Arm friction operate on the screws (a) shown in the figure below.

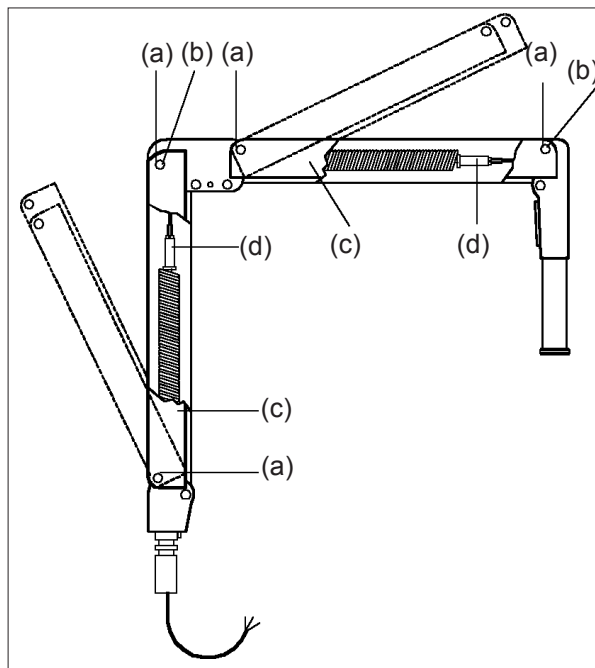
For the adjustment of friction of the horizontal rotation of the Folding Arm operate on the Extension Arm screws (b).



### 3.2. FOLDING ARM SPRING TENSION

To adjust spring tension of Folding Arm, proceed as follows:

- 1** Position tubeside section of Folding Arm in highest position, parallel to floor; other section of Folding Arm should be vertical.
- 2** Remove snap out caps (a) from arm covers.
- 3** Push out the pins (b). Use special drift.
- 4** Partly raise covers (c) to access to the threaded bushing.
- 5** Turn bushing (d) clockwise to increase spring tension, counter-clockwise to decrease tension. Use special drift.
- 6** Replace covers, pins and caps.

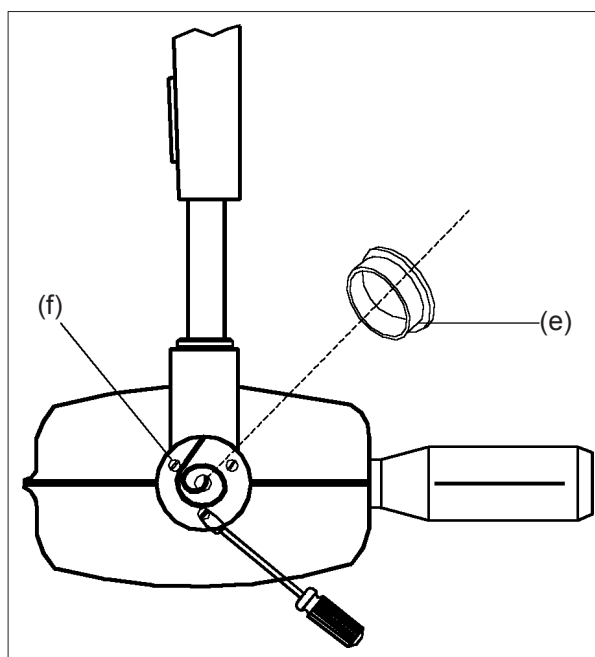


### 3.3. TUBEHEAD FRICTION

To adjust Tubehead friction at pivot axis, proceed as follows:

- 1** Remove snap-out disk (e).
  - 2** Remove three adjustment screws (f) and check for wear.
  - 3** Reinstall screws (f) and adjust up to desired Tubehead frictioning.
  - 4** Apply loctite to screw heads.
  - 5** Verify Tubehead proper balance and tension.
- NOTE**

*The specified Tubehead rotation torque is 1.6 to 2.2 Nm.*
- 6** Replace snap out cover disk.



## 4. REPLACEMENT PROCEDURES

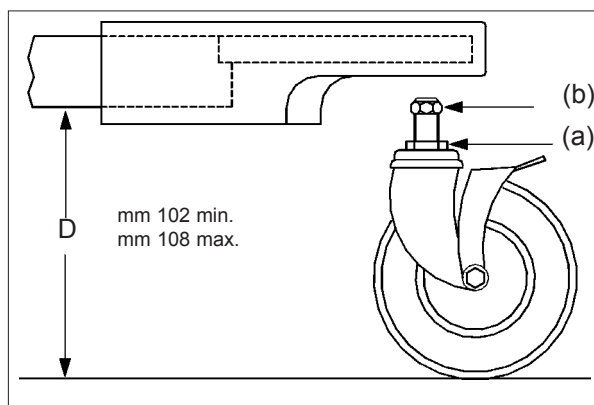
### 4.1. REPLACING THE WHEELS OF THE MOBILE STAND

**NOTE**

*The wheels of the Mobile Stand are already adjusted in factory for proper vertically of the column.*

In case of the replacement or adjustment of the wheels follow the procedure below:

- 1** Lift the Mobile Stand about 4/5 cm from the floor, suspended on wooden support.
- 2** Remove the wheel by unscrewing the wheel nut (a) with special 30 mm open wrench.
- 3** Record the position of nut (b) on the old wheel. Screw the nut (b) on the new wheel ensuring the same position of the nut.  
In this way the level adjustment of the stand shall be maintained.
- 4** Screw thoroughly the new wheel into the pedestal, by the special 30 mm open wrench on wheel nut (a).
- 5** Remove the wooden support and put the Mobile Stand on the floor.

**WARNING**

*Distance D shall not exceed 108 mm to ensure the proper resistance to stress of the wheel (see figure).*

## 5. ADJUSTMENT OF THE MAINS VOLTAGE MEASURING CIRCUIT

### WARNING

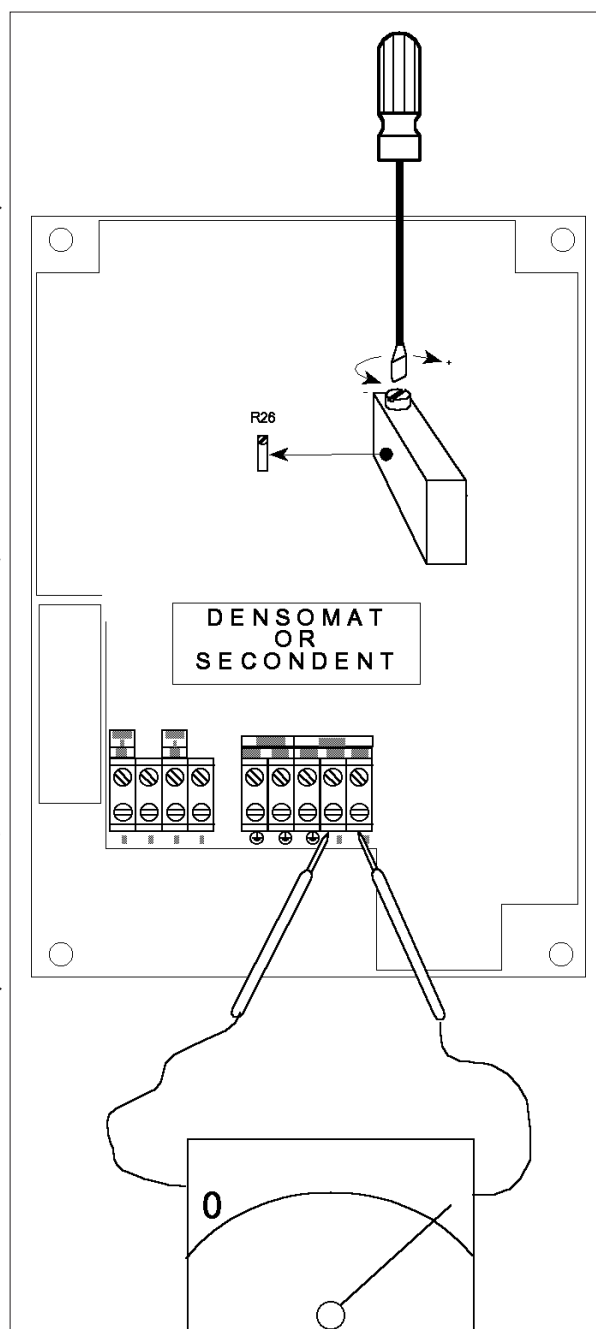
*The adjustment of the mains voltage measuring circuit have to be carried out only by qualified technical personnel when the difference between the tension measured with the voltmeter and the value displayed bi the Timer lis greater of 4V*

### 5.1. ADJUSTMENT PROCEDURE ON THE TIMER DENSOMAT

- 1** Open the cover of the timer and, by means of a precision voltmeter, measure the mains voltage applied to the terminals X3:4 (live) and X3:5 (neutral).
- 2** Start the Test and Diagnostic routine on Timer DENSOMAT by following the instruction given in this manual on Section C, chapter 5.2 - "Test and diagnostic routine: Densomat".
- 3** Run the DVM (Digital Voltage Measure) routine until the mains voltage is monitored on the display.
- 4** Adjust the trimmer R26 on the p.c.b. in order to obtain on the display the same value measured by the voltmeter (tolerance:  $\pm 1$  volt).

### 5.2. ADJUSTMENT PROCEDURE ON THE TIMER SECONDET


- 1** Open the cover of the timer and, by means of a precision voltmeter, measure the mains voltage applied to the terminals X3:4 (live) and X3:5 (neutral).
- 2** Start the Test and Diagnostic routine on Timer SECONDET by following the instruction given in this manual on Section C, chapter 5.3 - "Test and diagnostic routine: Secondet".
- 3** Run the DVM (Digital Voltage Measure) routine until the mains voltage is monitored by the LEDs.
- 4** Adjust the trimmer R26 on the p.c.b. in order to obtain on the operator panel the same value measured by the voltmeter (tolerance:  $\pm 2$  volts).



## 6. TROUBLESHOOTING

### 6.1. System equipped with Timer Densomat

When an alarm of the "Display indication" column is displayed by the Timer, perform the operations described in relevant column "Corrective actions" of the following table:

DISPLAY INDICATION	ALARM CAUSE	CORRECTIVE ACTIONS
"0.03" flashing	Exposure time, as resulting after automatic correction of the mains voltage fluctuation, is less than 0 .03 sec.	Switch off and on the Timer. Take a new exposure. If the failure still persists, replace TC1 board.
"2.5" flashing	Exposure time, as resulting after automatic correction of the mains voltage fluctuation, is more than 2.5 sec.	
"but" flashing	Exposure stopped by back up timer. This alarm must always be polled. It may trigger after exposure	Switch off and on the Timer. Take a new exposure. If the failure still persists, replace TC1 board.
"oU" flashing	Mains voltage out of range +10%	Switch off the Timer. Connect a multimeter to the mains input. Switch on the Timer in "DVM" mode and check the mains voltage on the digital multimeter: if the mains voltage exceeds the Timer working range check the mains distribution; if the mains voltage is adequate regulate the mains voltage measuring circuit until the true voltage is displayed. If the failure still persists, replace TC1 board.
"uU" flashing	Mains voltage out of range -10%	
"  " flashing	Exposure request during tube cooling waiting time (alarm message both resettable at the end of wait time or by keyboard)	Wait about two minutes. If the failure persists, switch off and on the Timer. Take a new exposure. If the failure still persists, replace TC1 board.
Display flashing	Exposure stop by dead man function	Wait about two minutes or reset the System by pressing whichever key of the Timer. Take a new exposure. If the failure persists, check if the PREP key is properly working and the good condition of the coiled cord; if necessary, replace them.
"bth" flashing	Bad X-ray output (X-ray detection wrong tubehead). Active only with 2 tube option	Switch off and on the Timer. Take a new exposure. If the failure still persists, replace TC1 board.
"trc" flashing	Triac failure	
"PrP" flashing	PREP key is pressed at power on	Switch off and on the Timer. If the failure still persists, check if the PREP key is properly working and the good condition of the coiled cord; if necessary, replace them.
"rSt" flashing	Watchdog Reset	Switch off and on the Timer. Take a new exposure. If the failure still persists, replace TC1 board.
"EEP" flashing	EEPROM checksum	
"Int" flashing	External Interrupt missing	

## 6.2. System equipped with Timer Secondent

When an alarm of the "Led indication" column is shown by the Timer, perform the operations described in relevant column "Corrective actions" of the following table:

LED INDICATION	ALARM CAUSE	CORRECTIVE ACTIONS
Time selected led on - "0.03" led flashing	Exposure time, as resulting after automatic correction of the mains voltage fluctuation, is less than 0,3 sec.	By means of the rotary knob adjust properly the exposure time. If the alarm still persists, regulate the mains voltage measuring circuit (see section F, paragraph 5.1).
Time selected led on - "2.5" led flashing	Exposure time, as resulting after automatic correction of the mains voltage fluctuation, is more than 2.5 sec.	
"Ready" and "Alarm" led flashing	Mains voltage out of range ( $\pm 10\%$ )	Switch off the Timer. Connect a multimeter to the mains input. Switch on the Timer in "DVM" mode and check the mains voltage on the digital multimeter: if the mains voltage exceeds the Timer working range check the mains distribution; if the mains voltage is adequate regulate the mains voltage measuring circuit until the true voltage is displayed. If the failure still persists, replace TC1 board.
"Ready" led flashing	Exposure request during tube cooling waiting time (alarm message both resettable at the end of wait time or by selector action)	Wait about two minutes. If the failure persists, switch off and on the Timer. Take a new exposure. If the failure still persists, replace TC1 board.
"Alarm" led flashing	Exposure stop by dead man function	Wait about two minutes or reset the System by rotating the Timer rotary knob. Take a new exposure. If the failure still persists, check if the PREP key is properly working and the good condition of the flexible cord; if necessary, replace them.
System not working	Triac failure	Switch off and on the Timer. Take a new exposure. If the failure still persists, replace TC1 board.
All LED's on except "X-ray" led	PREP key is pressed at power on	Switch off and on the Timer. If the failure still persists, check if the PREP key is properly working and the good condition of the flexible cord; if necessary, replace them.
"Alarm" led flashing - "Ready" led off	"Ready" led off Watchdog Reset	Switch off and on the Timer. Take a new exposure. If the failure still persists, replace TC1 board.
"Ready" led flashing - "Alarm" led on	External Interrupt missing	

## ***Proper Disposal of Electronic Equipment***

**NOTE:** The following information is valid in the European Union. If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal.



This symbol on the products and/or accompanying documents means that used electrical and electronic products should not be mixed with general household waste.

For proper treatment, recovery, and recycling please take these products to designated collection points where they will be accepted on a free-of-charge basis. Alternatively, in some countries, you may be able to return your products to your local retailer upon the purchase of an equivalent new product.

Disposing of this product correctly will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling.

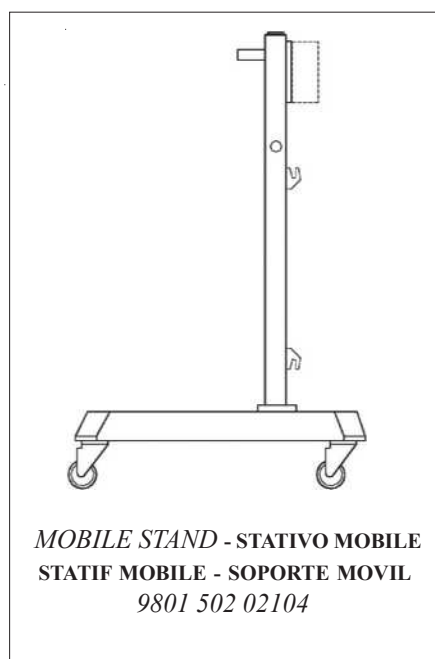
Please contact your local authority for further details of your nearest designated collection point. Penalties may be applicable for incorrect disposal of this waste in accordance with national legislation.

**NOTE: For Business users in the European Union**

If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

# **Appendix Appendice Appendice Apéndice**





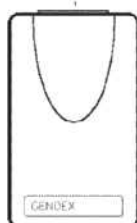
**FOLDING ARM - BRACCIO ARTICOLATO**  
**BRAS ARTICULE - BRAZO ARTICULADO**  
 9869 001 00301

**TUBEHEAD ORALIX AC, 230V**  
**MONOBLOCCO ORALIX AC, 230V**  
**MONOBLOC ORALIX AC, 230V**  
**MONOBLOQUE ORALIX AC, 230V**  
 9869 000 00101

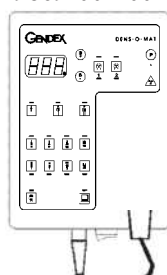
**CIRCULAR COLLIMATOR**  
**COLLIMATORE CIRCOLARE**  
**CONE CIRCULAIRE**  
**CONO CIRCULAR**  
 (L = cm 20, standard)  
 9801 712 10104

**EXTENSION ARM**  
**BRACCIO DI ESTENSIONE**  
**BRAS D'EXTENSION**  
**BRAZO DE PROLONGACION**  
 (cm 45, option)  
 9869 001 00001

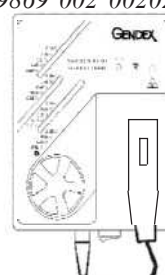
**RECTANGULAR COLLIMATOR**  
**COLLIMATORE RETTANGOLARE**  
**CONE RECTANGULAIRE**  
**CONO RECTANGULAR**  
 (Option)  
 9801 712 10004



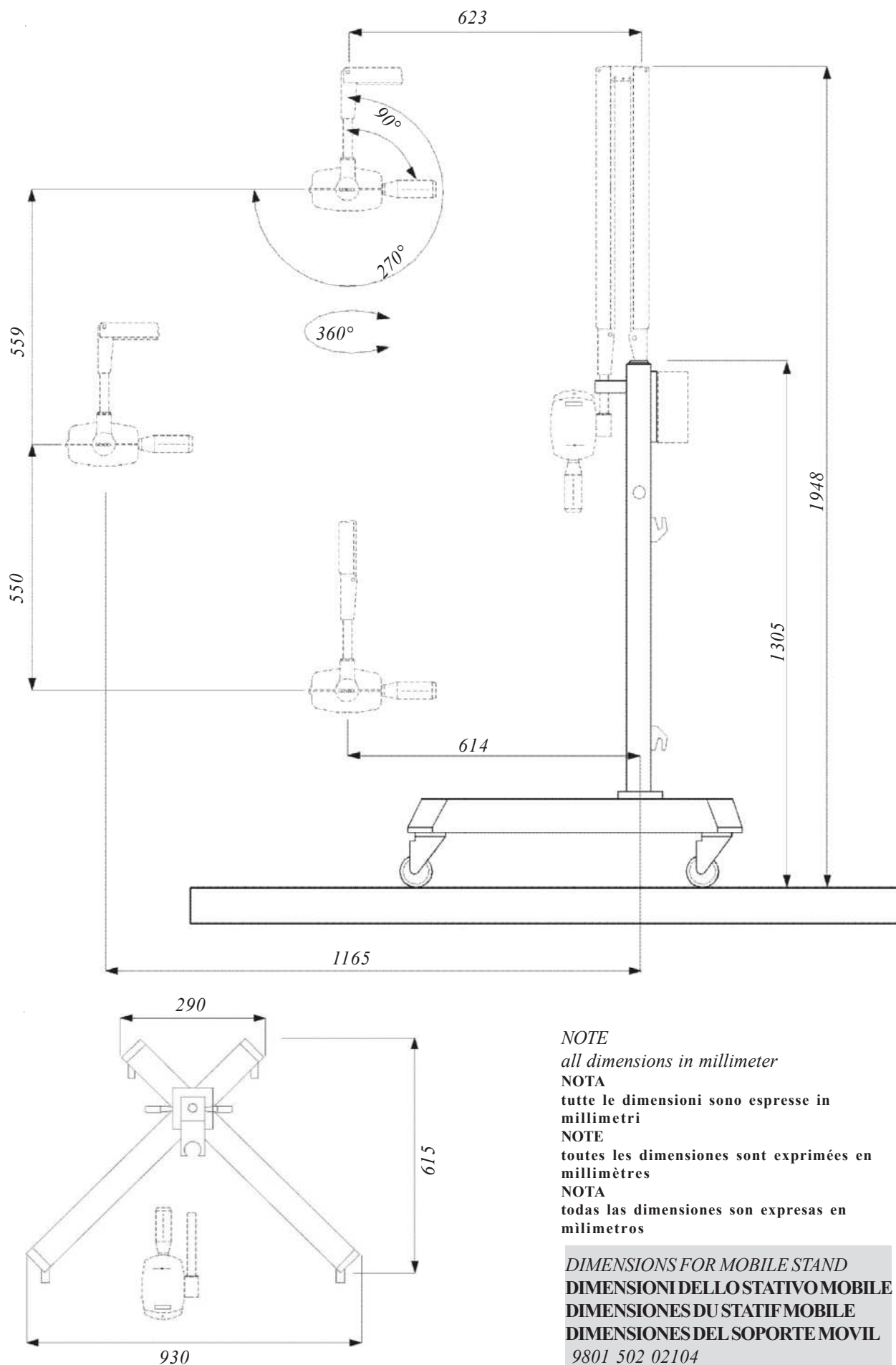
**DENSOMAT TIMER**  
**MINUTERIE DENSOMAT**  
 9869 002 00102

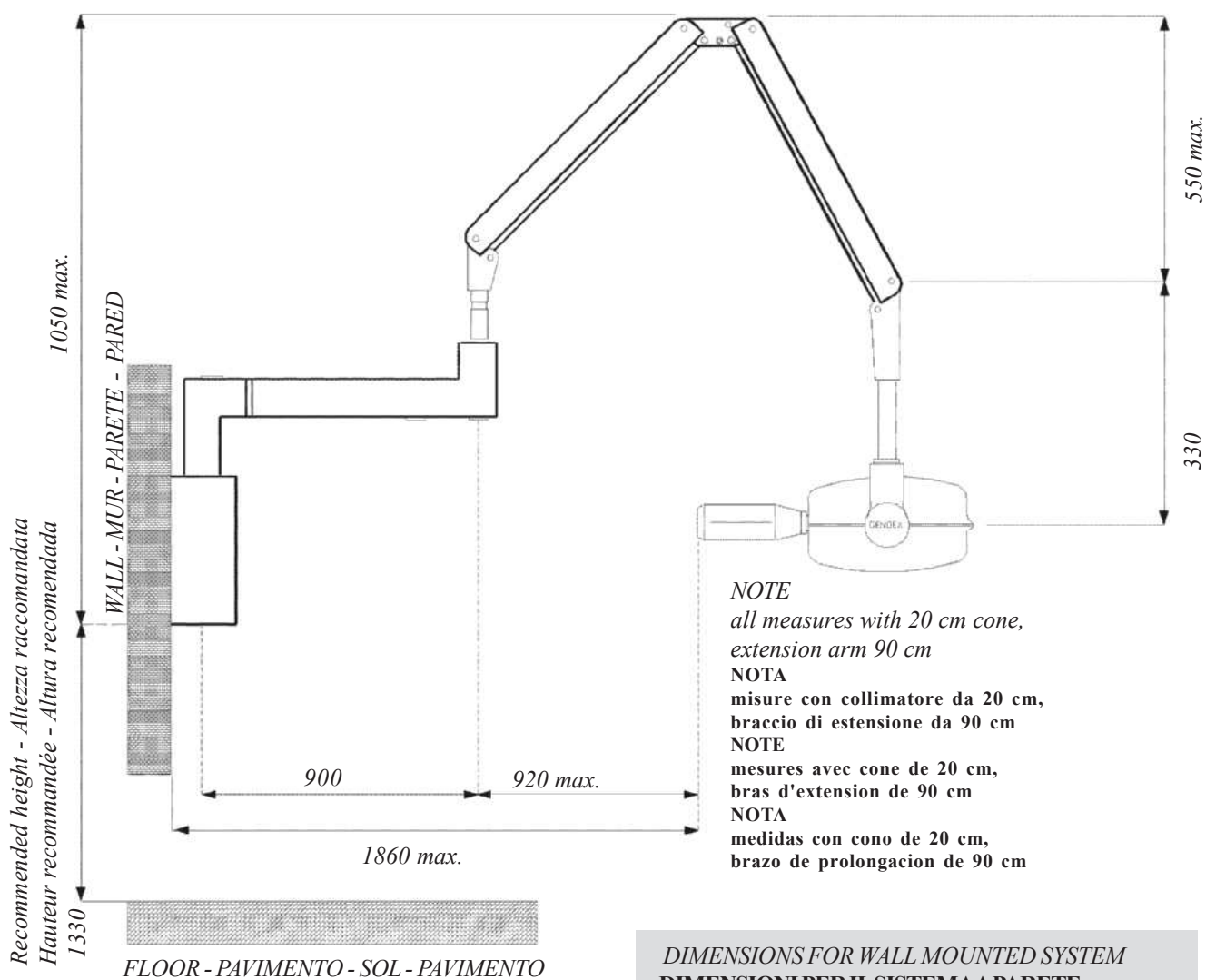
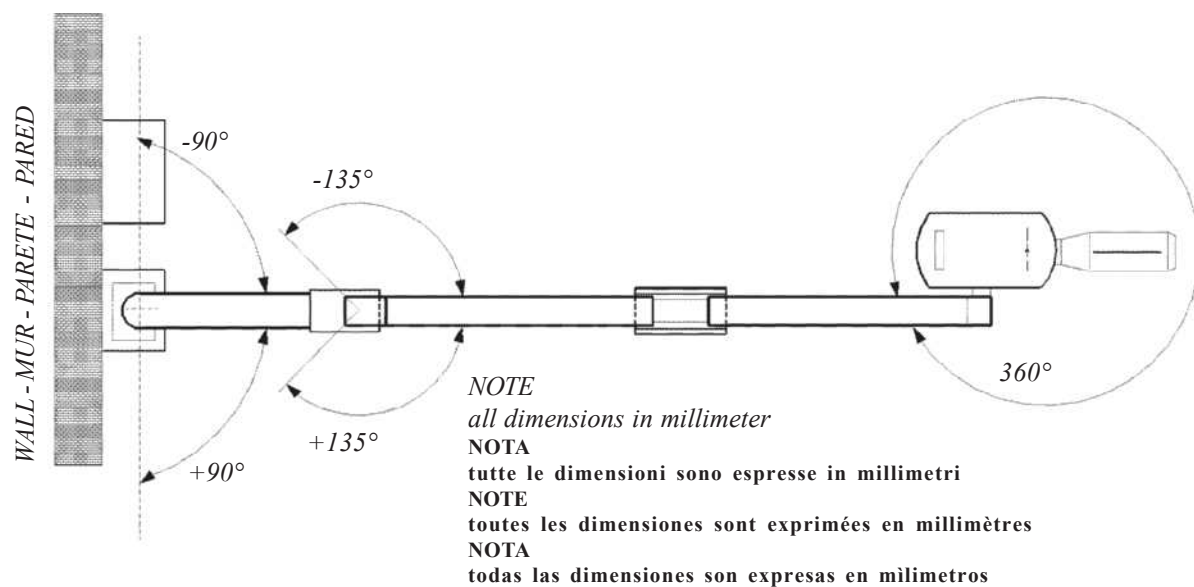


**SECONDET TIMER**  
**MINUTERIE SECONDET**  
 9869 002 00202



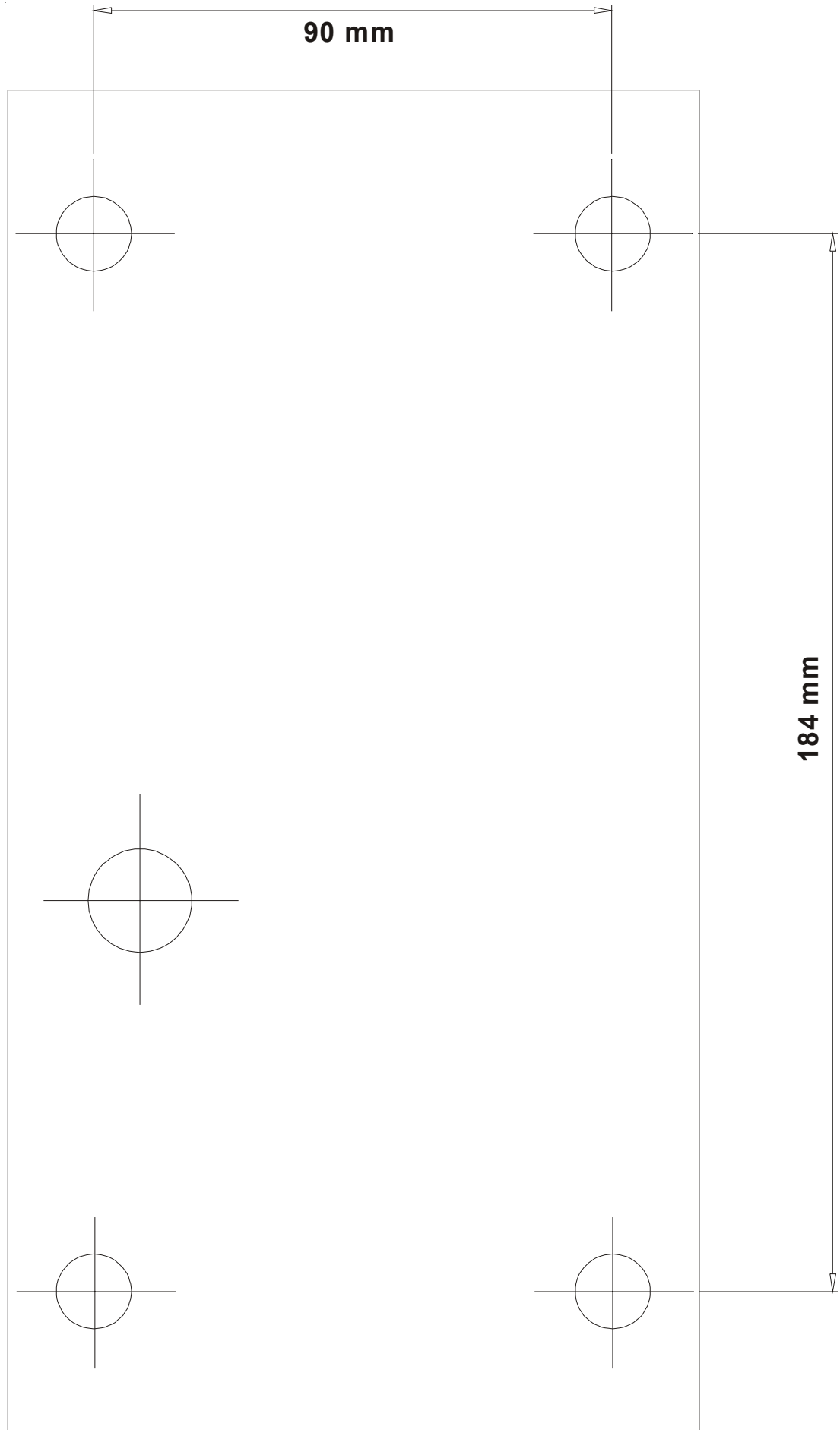
**SYSTEM ASSEMBLY**  
**CONFIGURAZIONE SISTEMA**  
**CONFIGURATION DU SYSTEME**  
**CONFIGURACION DEL SISTEMA**





**DIMENSIONS FOR WALL MOUNTED SYSTEM**  
**DIMENSIONI PER IL SISTEMA A PARETE**  
**DIMENSIONS POUR LE SYSTEME MONTE A MUR**  
**DIMENSIONES DEL SISTEMA DE PARED**

<b>EXPOSURE TIME</b> Tempo d'esposizione - Temps d'exposition Tiempo de exposiciones (Sec)	<b>No.of pulses</b> N° di impulsi - N° d'impulsions N° de impulsos @50 Hz	<b>No.of pulses</b> N° di impulsi - N° d'impulsions N° de impulsos @60 Hz
0.03	2	3
0.05	3	4
0.06	4	5
0.08	5	6
0.1	6	7
0.12	7	8
0.16	9	10
0.2	11	13
0.26	14	17
0.32	17	20
0.4	21	25
0.5	26	31
0.64	33	39
0.8	41	49
1	51	61
1.26	64	77
1.6	81	97
2	101	121
2.5	126	151



**TEMPLATE FOR WALL  
SUPPORT**

INSTALLATION

ORALIX AC SYSTEM

134 mm

198 mm

**ELECTRICAL  
KNOCK OUT**

**TEMPLATE FOR TIMER  
DENSOMAT AND SECONDET**

Gendex Dental Systems

**BZ-2**

**TUBEHEAD** *MOBOBLOCCO - MONOBLOC - MONOBLOQUE*

Assembly

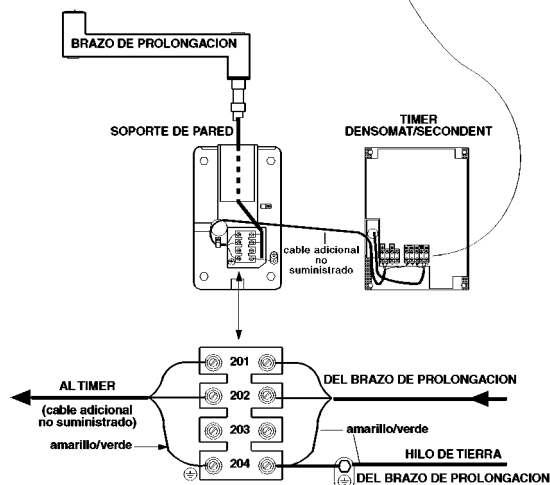
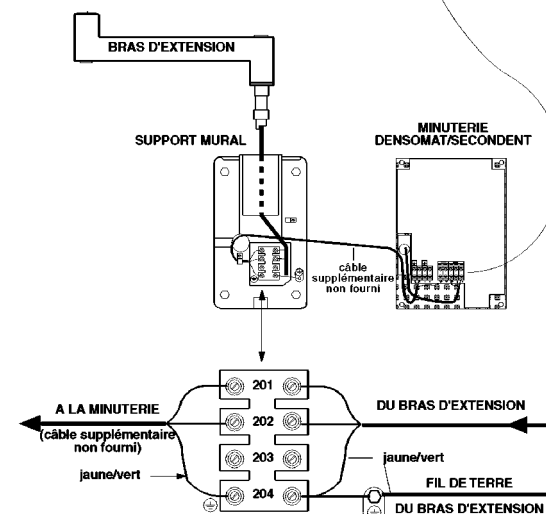
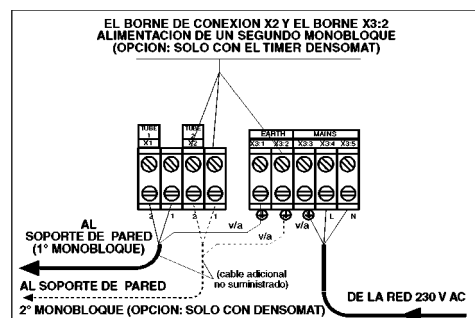
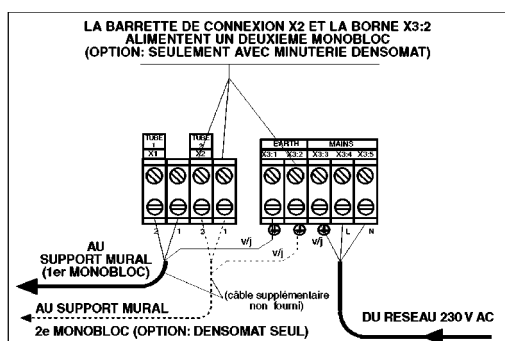
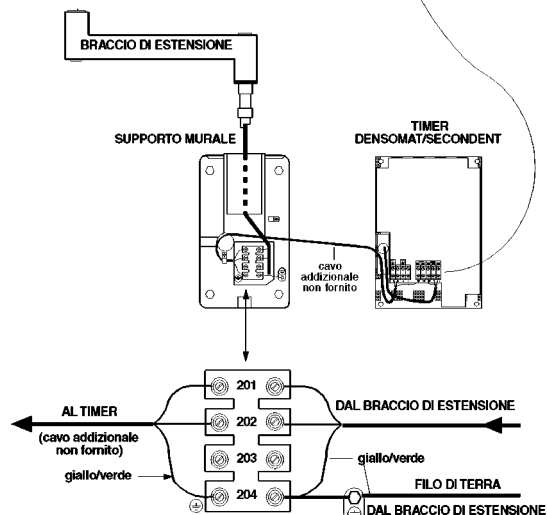
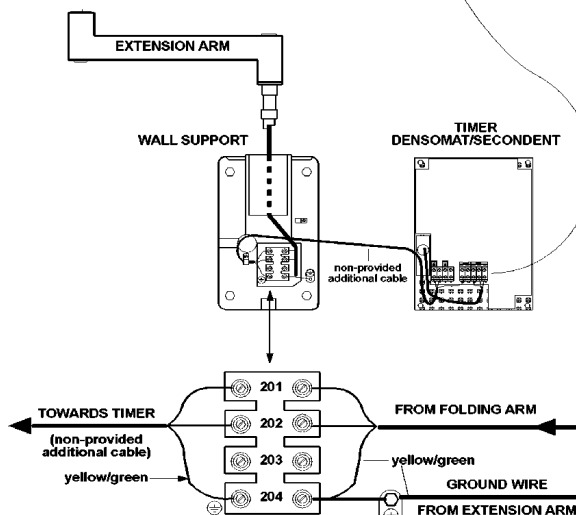
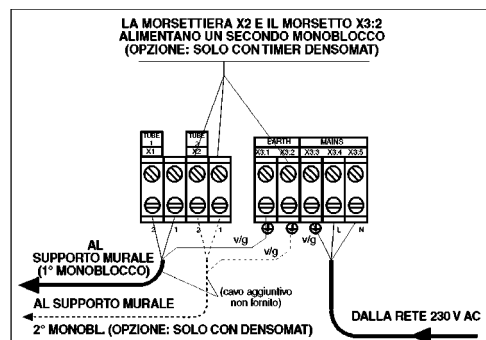
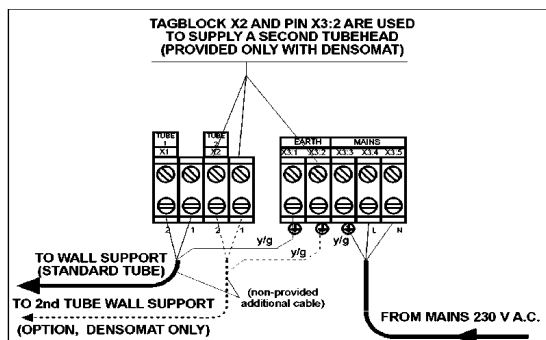
**DENSOMAT or SECONDEMENT**

Assembly

**EXTENSION ARM** *BRACCIO DI ESTENSIONE - BRAS D'EXTENSION - BRAZO DE PROLONGACION*2 - Snap out cap - *Coperchi - Cabouchons pression - Capuchones*1 - Screw - *Viti - Vis - Tornillo***FOLDING ARM** *BRACCIO ARTICOLATO - BRAS ARTICULE - BRAZO ARTICULADO*1 - Sector - *Settore - Secteur - Sector*1 - Ring - *Anello - Anneau - Anillo*4 - Snap out cap - *Coperchi - Couvercles - Tapas*1 - Rotating ring - *Anello per rotazione - Anneau pour rotation - Tornillo de sujeción***WALL SUPPORT** *SUPPORTO MURALE - SUPPORT MURAL - SOPORTE DE PARED*

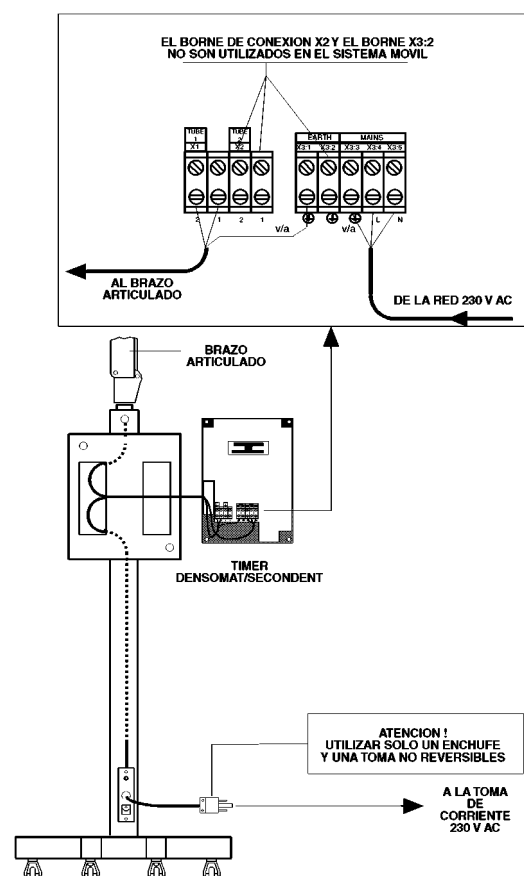
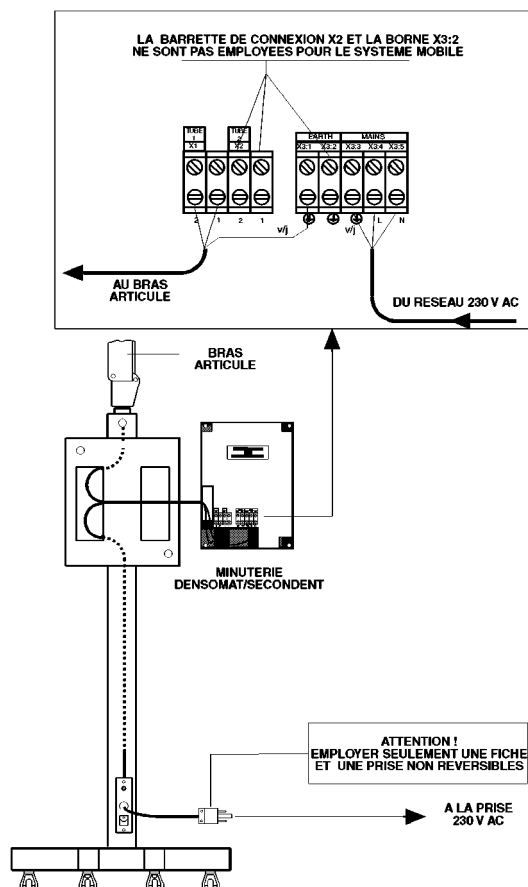
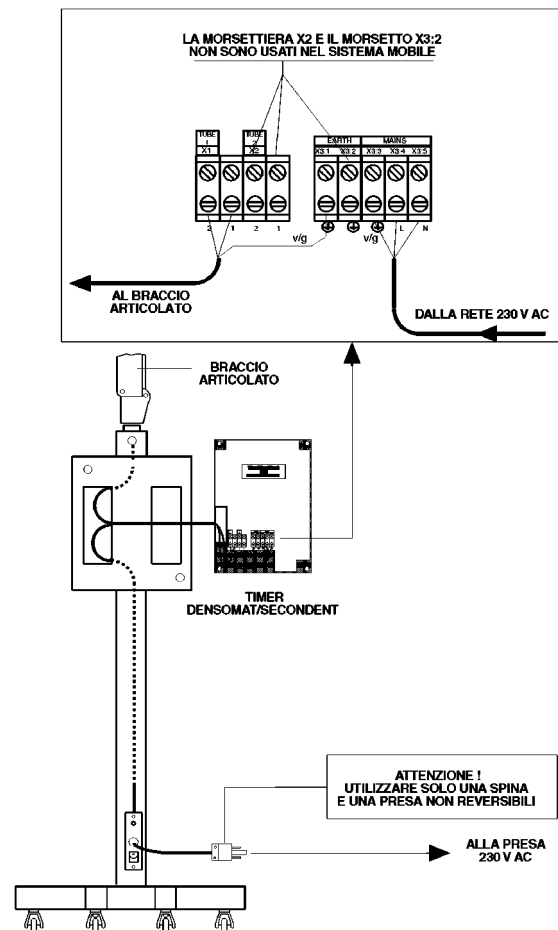
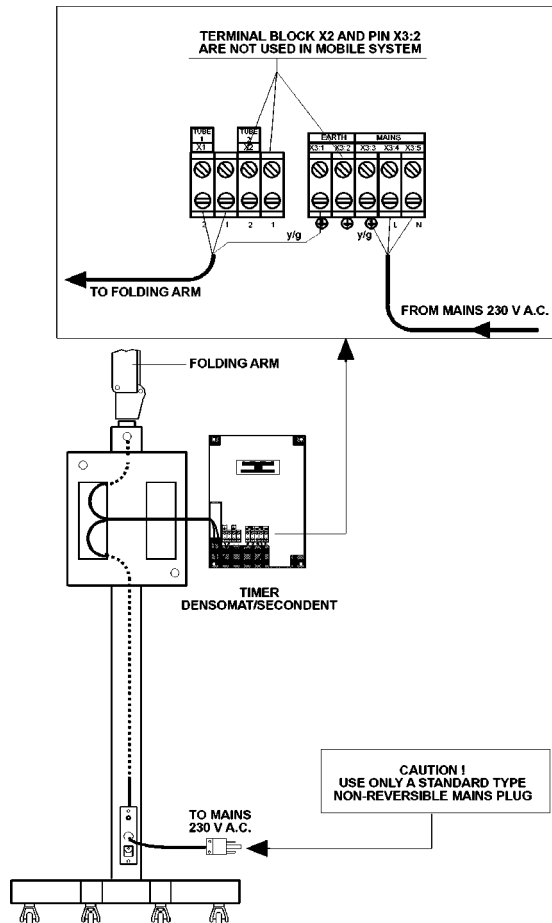
Assembly

**ITEMS SUPPLIED***LISTA MATERIALI A CORREDO  
LISTE DES ARTICLES FOURNIS  
LISTA DE LAS PIEZAS SUMINISTRADAS*

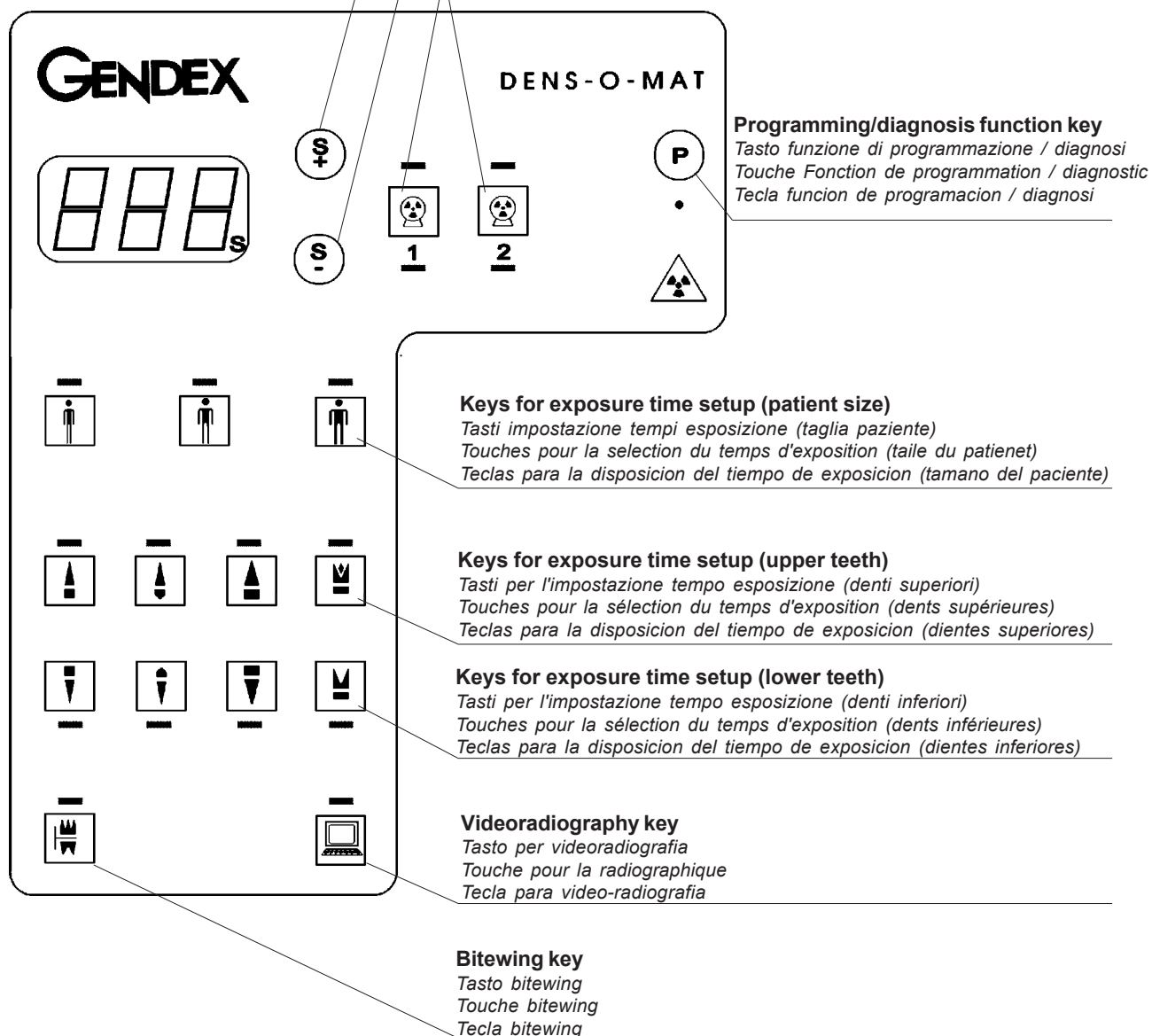


**WALL MOUNTED SYSTEM : ELECTRICAL CONNECTIONS**  
**SISTEMA A PARETE: COLLEGAMENTI ELETTRICI**  
**SYSTEME MURAL: CONNEXIONS ELECTRIQUES**  
**EQUIPO DE PARED: CONEXIONES ELECTRICAS**

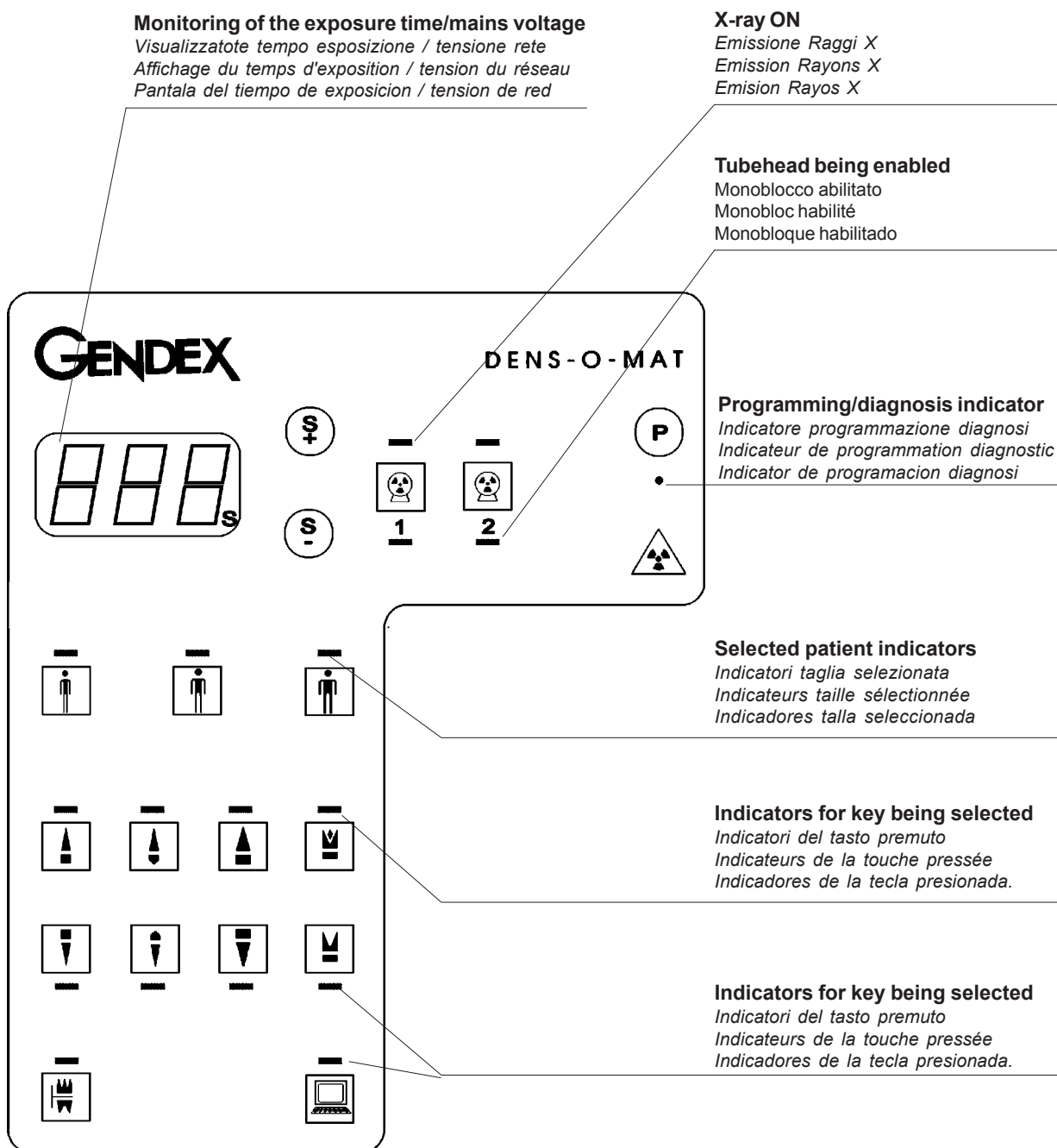




**MOBILE SYSTEM: ELECTRICAL CONNECTIONS**  
**SISTEMA MOBILE : COLLEGAMENTI ELETTRICI**  
**SYSTEME MOBILE: CONNEXIONS ELECTRIQUES**  
**EQUIPO MOVIL: CONEXIONES ELECTRICAS**

**Increase manually the exposure time.***Riduzione manuale del tempo di esposizione.**Réduction manuelle du temps d'exposition**Reduccion manual del tiempo de exposicion***Decrease manually the exposure time.***Incremento manuale del tempo di esposizione.**Accroissement manuel du temps d'exposition**Incremento manual del tiempo de exposicion***Tubehead 1 enabling key. Tubehead 2 enabling key. (optional)***Tasto attivazione monoblocco 1. Tasto attivazione monoblocco 2 (opzionale)**Touche activation monobloc 1. Touche activation monobloc 2. (optionnel)**Tecla encendido monobloque 1. Tecla encendido monobloque 2. (opcional)*

**CONTROLS ON TIMER DENSOMAT**  
**COMANDI SUL TIMER DENSOMAT**  
**COMMANDES SUR LA MINUTERIE DENSOMAT**  
**MANOS DET TIMER DENSOMAT**



**INDICATORS ON TIMER DENSOMAT**  
*INDICATORI SUL TIMER DENSOMAT*  
*INDICATEURS SUL LA MINUTERIE DENSOMAT*  
*INDICADORES DET TIMER DENSOMAT*

**Alarm indicator**

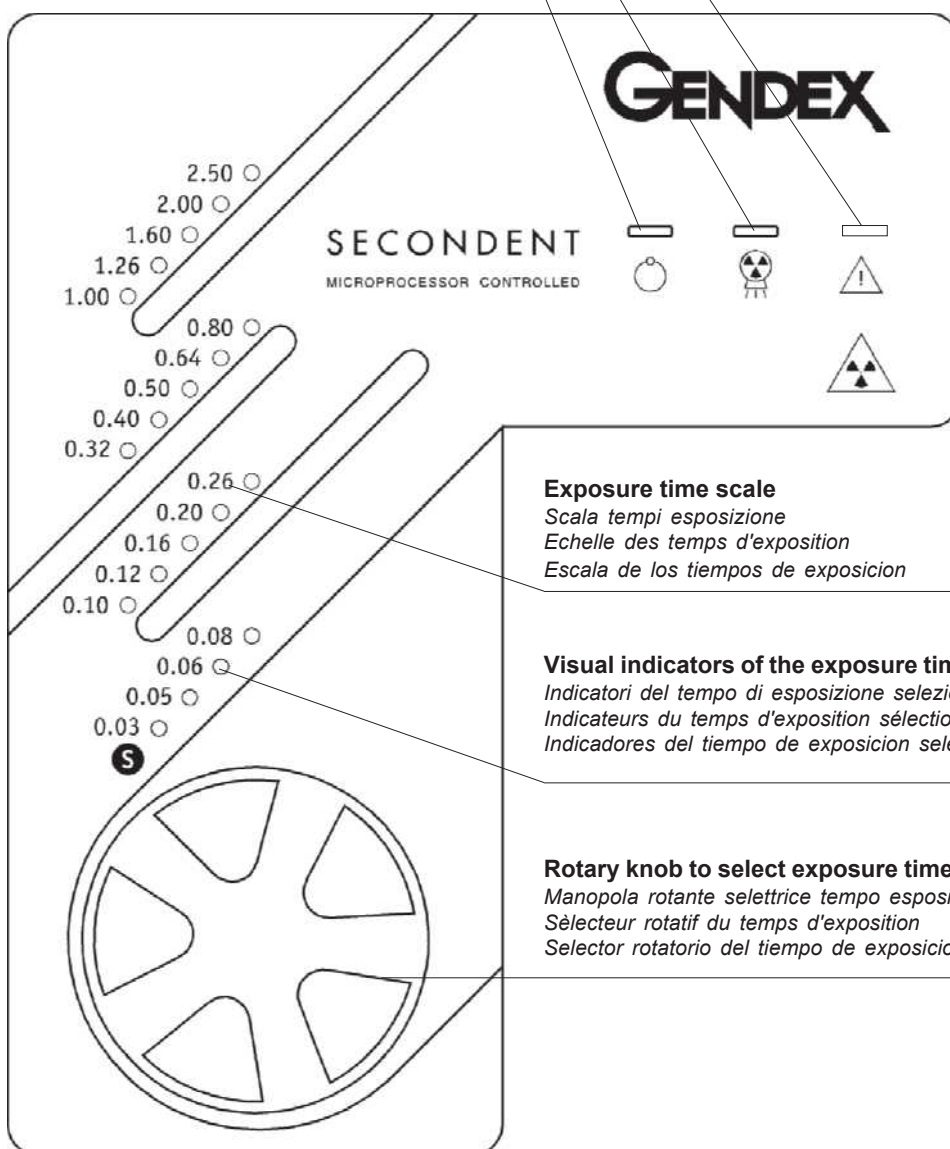
Indicatore di allarme  
 Indicateur d'alarme  
 Indicador de alarma

**X-ray ON indicator**

Indicatore emissione Raggi X  
 Indicateur d'émission rayons X  
 Indicador de emisión rayos X

**System ON indicator**

Indicatore di sistema acceso e in funzione  
 Indicateur du système allumé et en fonction  
 Indicador de sistema encendido y en funcion

**Exposure time scale**

Scala tempi esposizione  
 Echelle des temps d'exposition  
 Escala de los tiempos de exposicion

**Visual indicators of the exposure time being selected/mains voltage**

Indicatori del tempo di esposizione selezionato / tensione di rete  
 Indicateurs du temps d'exposition sélectionné / tension de réseau  
 Indicadores del tiempo de exposicion seleccionado /tension de red

**Rotary knob to select exposure time**

Manopola rotante selettice tempo esposizione  
 Sélecteur rotatif du temps d'exposition  
 Selector rotatorio del tiempo de exposicion

**CONTROLS AND INDICATORS ON TIMER SECONDENT**  
 COMANDI E INDICATORI SUL TIMER SECONDENT  
 COMMANDOS ET INDICATEURS SUL LA MINUTERIE SECONDENT  
 MANDOS E INDICADORES DET TIMER SECONDENT

**CUSTOMER**

Cliente - Client - Usuario \_\_\_\_\_

**ROOM**

Locale - Piece - Habitación \_\_\_\_\_

**TECHNICIAN**

Tecnico - Technicien - Tecnico \_\_\_\_\_

**SUBJECTS Oralix AC**

Oggetto Oralix AC -

Subject Oralix AC

Objeto Oralix AC \_\_\_\_\_

R/S	ACTIONS Azioni - Actions - Acciones (cycle 12 months)(cycle de 12 moins) (Ciclo de 12 meses)	MEASUREMENTS Misura - Mesurages Medicion	ACCEPTANCE TEST			REMARKS Note Notes Notas
			1	2	3	
	<b>3.1. LABELS,INDICATORS,WARNING</b> <i>Targhette, Indicatori, Avvertenze</i> <i>Etiquettes, Indicateurs, Avert</i> <i>Etiquetas, Indicadores, Advertencias.</i>					
R	<b>3.2 ACCURACY OF kVpk</b> <i>Verifica dell'alta tensione di picco</i> <i>Precision de kVpk</i> <i>Precision de la kVpk</i>					
R	<b>3.3. ACCURACY OF TUBE CURRENT</b> <i>Verifica della corrente del monoblocco</i> <i>Precision du courant du tube</i> <i>Precision de la corrente del tubo</i>					
R	<b>3.4. ACCURACY OF THE TIMER</b> <i>Verifica del timer</i> <i>Precision de la minuterie</i> <i>Precision del timer</i>					
R	<b>3.5. RADIATION LEAKAGE</b> <i>Dispersione della radiazione</i> <i>Radiation du fuite</i> <i>Radiacion dispersa</i>					
	<b>3.6. EARTH RESISTANCE</b> <i>Resistenza di terra</i> <i>Resistance a la terre</i> <i>Resistencia de tierra</i>					
	<b>3.7. EARTH LEAKAGE</b> <i>Dispersione di terra</i> <i>Perte a la terre</i> <i>Dispersion de tierra</i>					
<b>R/S</b>	<b>R=RADIATION</b> R= Radiazioni R= Radiation R= Radiacion	<b>S=SAFETY</b> S= Sicurezza S= Securite S= Seguridad				

**PREVENTIVE MAINTENANCE CHECKLIST****CUSTOMER :** .....**ROOM :** .....**ORALIX DENTAL SYSTEM :** .....**TECHNICIAN:** ..... **SIGNATURE:** ..... **DATE:** .....

R/S	ACTIONS (cycle 24 months)	MEASUREMENT	INSPECTION			REMARKS
			1	2	3	
S	4.1. GENERAL INSPECTION					
	4.2.1. MAINTENANCE OF THE TUBEHEAD					
	4.2.2. MAINTENANCE OF THE EXTENSION ARM					
	4.2.3. MAINTENANCE OF THE MOBILE STAND					
	4.2.4. MAINTENANCE OF THE WALL SUPPORT					
	4.2.5. MAINTENANCE OF THE ARM					
	4.2.6. SYSTEM ADJUSTMENT					
	4.3.1. POWER SUPPLIES					
	4.3.2. INSPECTION OF THE TIMER					
	4.3.3. EXPOSURE COUNTER READING					
	5.1 PERFORMANCE TEST					
	5.2 CUSTOMER TEST					
R	LABELS INDICATOR, WARNING					
R	ACCURACY OF kVpk					
R	ACCURACY OF EXPOSURE TIME					
R	RADIATION LEAKAGE					
	EARTH RESISTANCE					
	EARTH LEAKAGE					

**R/S R= RADIATION****S = SAFETY**

**MODULO DI MANUTENZIONE PREVENTIVA****CLIENTE:** .....**STANZA:** .....**ORALIX DENTAL SYSTEM :** .....**TECNICO:** ..... **FIRMA:** ..... **DATA:** .....

R/S	OPERAZIONI (periodicità di 24 mesi)	MISURA	CONTROLLO			NOTE
			1	2	3	
	4.1. ISPEZIONE VISIVA					
	4.2.1. MANUTENZIONE DEL MONOBLOCCO					
S	4.2.2. MANUTENZIONE DEL BRACCIO DI ESTENSIONE					
S	4.2.3. MANUTENZIONE DELLO STATIVO MOBILE					
S	4.2.4. MANUTENZIONE DEL SUPPORTO MURALE					
S	4.2.5. MANUTENZIONE DEL BRACCIO ARTICOLATO					
	4.2.6. REGOLAZIONI MECCANICHE					
	4.3.1. ALIMENTAZIONI					
	4.3.2. CONTROLLO DEL TIMER					
	4.3.3. LETTURA DEL CONTATORE DI ESPOSIZIONI					
	5.1 PROVA DELLE PRESTAZIONI					
	5.2 PROVE DIMOSTRATIVE AL CLIENTE					
R	Targhette, indicatori, avvertenze					
R	Verifica dell'alta tensione					
R	Verifica del tempo di esposizione					
	Radiazione di fuga					
	Resistenza di terra					
	Dispersione di terra					
<b>R/S</b>	<b>R= RADIAZIONE      S = SICUREZZA</b>					

**MAINTENANCE PREVENTIVE CHECK-LIST****CLIENT:** .....**PIECE:** .....**SYSTEME DENTAIRE ORALIX :** .....**TECHNICIEN:** ..... **SIGNATURE:** ..... **DATE:** .....

R/S	ACTIONS (cycle de 24 mois)	MESURAGE	INSPECTION			REMARQUES
			1	2	3	
S	4.1. INSPECTION VISUELLE					
	4.2.1. ENTRETIEN DU MONOBLOC					
	4.2.2. ENTRETIEN DU BRAS D'EXTENSION					
	4.2.3. ENTRETIEN DU STATIF MOBILE					
	4.2.4. ENTRETIEN DU SUPPORT MURAL					
	4.2.5. ENTRETIEN DU BRAS ARTICULE					
	4.2.6. REGLAGES DE SYSTEME					
	4.3.1. ALIMENTATION					
	4.3.2. INSPECTION DE LA MINUTERIE					
	4.3.3. RELEVÉ DU COMPTEUR D'EXPOSITIONS					
R R R	5.1 ESSAI DES PERFORMANCES					
	5.2 ESSAIS DEMONSTRATIFS AU CLIENT					
	Etiquettes, indicateurs, avertissement					
	Précision de kVpk					
	Précision de la Minuterie					
	Radiation de fuite					
	Résistance à la terre					
	Perte à la terre					
<b>R/S</b>	<b>R= RADIATION      S = SECURITE</b>					



**FICHA DE MANTENIMIENTO PREVENTIVO****USUARIO:** .....**HABITACION:** .....**SISTEMA DENTAL ORALIX :** .....**TECNICO:** ..... **FIRMA:** ..... **FECHA:** .....

R/S	ACCIONES (ciclo de 24 meses)	MEDICIONES	INSPECCION			NOTAS
			1	2	3	
	4.1. INSPECCION VISUAL					
	4.2.1. MANTENIMIENTO DEL MONOBLOQUE					
S	4.2.2. MANTENIMIENTO DEL BRAZO DE PROLONGACION					
S	4.2.3. MANTENIMIENTO DEL SOPORTE MOVIL					
S	4.2.4. MANTENIMIENTO DEL SOPORTE DE PARED					
S	4.2.5. MANTENIMIENTO DEL BRAZO ARTICULADO					
	4.2.6. AJUSTES MECANICOS					
	4.3.1. ALIMENTACION ELECTRICA					
	4.3.2. INSPECCION DEL TIMER					
	4.3.3. LECTURA DEL CONTADOR DE EXPOSICIONES					
	5.1 PRUEBA DE FUNCIONAMIENTO					
	5.2 PRUEBAS PARA EL USUARIO					
R	Etiquetas, indicadores, advertencias					
R	Precisión de la alta tensión de pico (kVpk)					
R	Precisión de la corriente del Monobloque					
	Precisión del Timer					
	Radiación dispersa					
	Resistencia de tierra					
<b>R/S</b>	<b>R= RADIACION      S = SEGURIDAD</b>					

## SECTION Q

### SPARE PARTS LIST - Lista parti di ricambio

### Liste des pieces de rechange - Lista de las piezas de repuesto

Q1	(05.0)E	
Q2	(05.0)E	TUBEHEAD - MONOBLOCCO - MONOBLOC - MONOBLOQUE
Q3	(05.0)E	FOLDING ARM - BRACCIO ARTICOLATO - BRAS ARTICULE - BRAZO ARTICULADO
Q4	(05.0)E	
Q5	(05.0)E	EXTENSION ARM - BRACCIO ESTENSIONE - BRAS D'EXTENSION - BRAZO DE PROLONGACION
Q6	(05.0)E	WALL SUPPORT - SUPPORTO MURALE - SUPPORT MURAL - SOPORTE DE PARED
Q7	(05.0)E	DENS-O-MAT AC
Q8	(05.0)E	SECONDENT AC

#### Explanation of the Spare parts list

Chiaramenti della lista parti di ricambio - Légende de la liste des pièces de rechange - Leyenda de la lista de las piezas de repuesto

<b>Column 1 =</b>	diagram or drawing No.
<b>Colonna 1 =</b>	Numero diagramma o disegno
<b>Colonne 1 =</b>	Nombre du dessin
<b>Columna 1 =</b>	Numero del diseno
<b>Column 2 =</b>	Index of items/up to and including ( the details belong to the same assy ) the items have the same description
<b>Colonna 2 =</b>	Indice degli articoli / fino a e incluso ( dettagli che appartengono allo stesso assieme ) articoli che hanno la stessa descrizione.
<b>Colonne 2 =</b>	Index des articles / y compris ( les détails appartiennent au neme enseble ) les articles ont la meme description.
<b>Columna 2 =</b>	Indice de las piezas / aquí incluso ( los detalles son relativos al mismo conjunto ) las piezas son la misma descripción.
<b>Column 3 =</b>	Designation of material
<b>Colonna 3 =</b>	Descrizione del materiale
<b>Colonne 3 =</b>	Destination du matériel
<b>Columna 3 =</b>	Destinacion del materiall
<b>Column 4 =</b>	Technical data <b>C</b> : complete assembly <b>P</b> : poles <b>D</b> : details of assembly
<b>Colonna 4 =</b>	Dati tecnici <b>C</b> : assemblaggio completo <b>P</b> : poli <b>D</b> : dettagli di assemblaggio
<b>Colonne 4 =</b>	Donnée techniques <b>C</b> : ensemble complet <b>P</b> : poles <b>D</b> : détails de l'ensemble
<b>Columna 4 =</b>	Datos técnicos <b>C</b> : conjunto entero <b>P</b> : polos <b>D</b> : detalles del conjunto
<b>Column 5 =</b>	Code number (order No.) (.....) for the series indicated this code number is delivered until the stock level is zero.
<b>Colonna 5 =</b>	Numero di codice (ordine Nr.) (.....) per le serie indicate questo numero di codice è disponibile sino ad esaurimento.
<b>Colonne 5 =</b>	Nombre de code (nombre d'ordre) (.....) pour la série indiquée, on donne le code jusqu'à l'épuisement du stock.
<b>Columna 5 =</b>	Numero de código (numero de la orden) (.....) para la serie indicada, se da el código hasta al agotamiento de stock.

#### DISPOSAL OF SPARE PARTS

Smaltimento delle parti di ricambio - Elimination des pieces du stock - Eliminacion de las piezas de la reserva

##### NOTE 1

**Oralix contains non environmental friendly substances, in particular approx. 1 kg of dielectric oil in the tubehead. Therefore disposal of discarded spare parts must be done via a company specialized in industrial wastes.**

- Oralix contiene delle sostanze nocive all'ambiente, in particolare circa 1Kg di olio dielettrico nel monoblocco. Pertanto, lo smaltimento delle parti di ricambio deve essere effettuato tramite aziende specializzate nello smaltimento di rifiuti industriali.

- Le Système Oralix comporte des substances nuisibles au milieu, en particulier 1Kg environ d'huile diélectrique dans le monobloc. Les pièces défectueuses doivent être éliminés par des spécialistes en élimination des rebuts industriels.

- El Sistema Oralix contiene en la parte central algunas materias danosas, particularmente cerca de 1Kg de aceite dieléctrico en el monobloque. Las piezas defectuosas deben ser eliminadas por de los especialistas en eliminación por de los residuos industriales.

##### NOTE 2

**In case of oil leakage from the tubehead, handle the tubehead with care, and, in particular, protect hands, face and eyes with adequate protection hardware (gloves, protective glasses, etc.), in order to avoid the contact of the dielectric oil with the skin.**

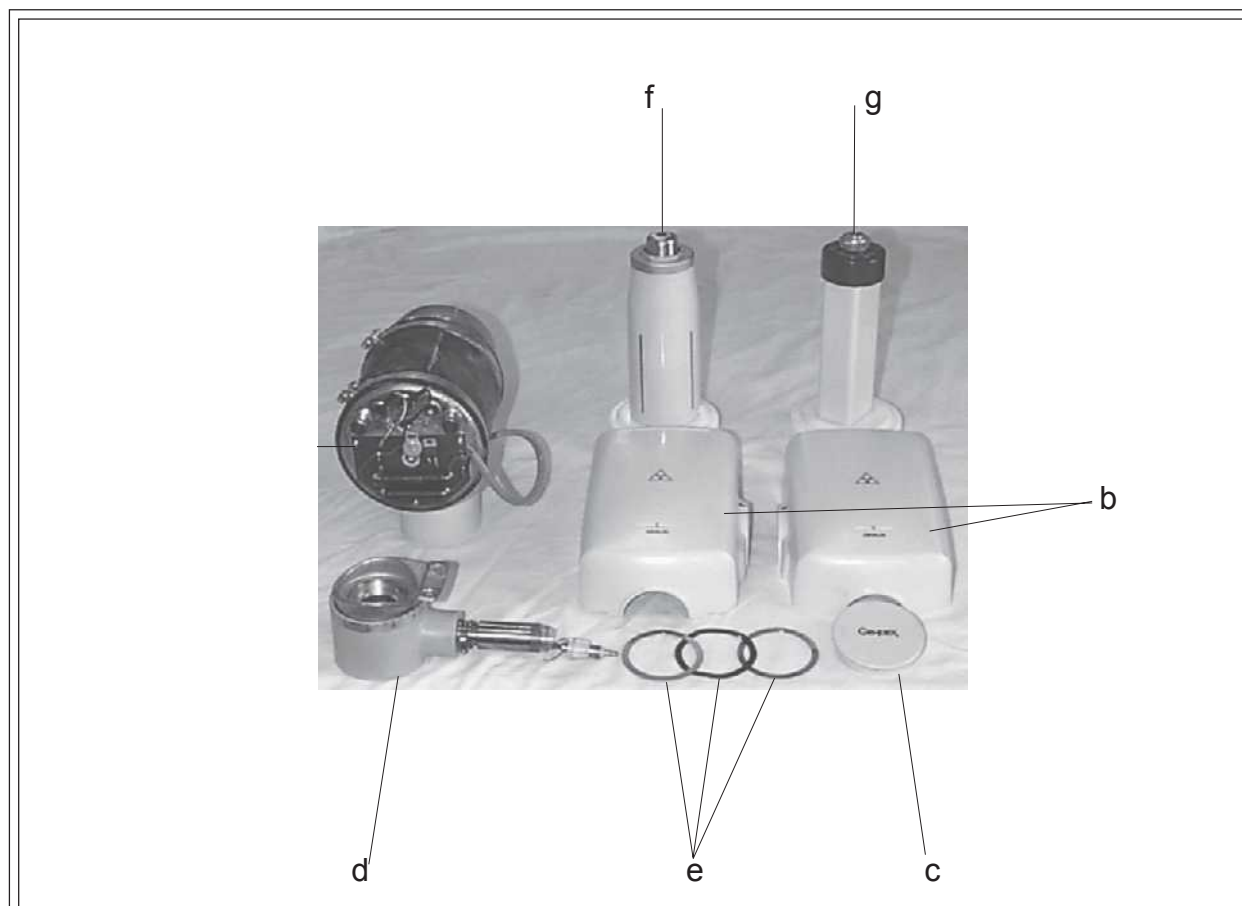
- In caso di perdita d'olio dal monoblocco, maneggiare il monoblocco con attenzione e, in particolare, proteggere le mani, la faccia e gli occhi con adeguati mezzi di protezione (guanti, occhiali protettivi, ecc.), in modo da impedire il contatto dell'olio dielettrico con la pelle.

- En case de perte d'huile du monobloc, manier le tube avec soin, protéger les mains, le visage et les yeux par un adéquat outillage de protection (gants, lunettes de protection, etc.), pour éviter que l'huile diélectrique soit en contact avec la peau.

- En caso de pérdida de aceite del monobloque, manejar el tubo con cuidado, proteger las manos, la cara y los ojos por medio de uno adecuado instrumento de protección (guantes, gafas de protección, etc.), para evitar que el aceite dieléctrico este en contacto con la piel.

**TUBEHEAD ORALIX AC 230V - MONOBLOCCO ORALIX AC - 230V**  
**MONOBLOC ORALIX AC 230V - MONOBLOQUE ORALIX AC 230V**  
**Type 9869 000 00101**

1	2	3	4	5
		<b>DESCRIPTION - DESCRIZIONE</b> <b>DESCRIPTION - DESCRIPCION</b>		<b>CODE - CODICE</b> <b>CODE - CODIGO</b>
Q2-b		<b>Set of covers</b> - <i>Gusci esterni - Coquilles extérieures</i> <i>Envolturas externas</i>		4519 190 00635
Q2-c		<b>Snap out cap</b> - <i>Coperchio a scatto</i> <i>Cabouchous pression - Casuetes a presión</i>		4519 100 67402
Q2-d	( )	<b>Coupling with pin</b> - <i>Accoppiatore - Coupleur</i> <i>Acoplador</i>	C	4519 100 71772
Q2-e	(	<b>Friction ring</b> - <i>Anelli di frizione</i> <i>Bagues d'embrayage - Aros de rozamiento</i>	D	4519 100 27862
Q2-f	)	<b>Collimator (circular)</b> - <i>Collimatore (circolare)</i> <i>Cone (circulaire) - Cono (circular)</i>	20cm, D.60mm	9801 712 10104
		<b>Collimator (circular)</b> - <i>Collimatore (circolare)</i> <i>Cone (circulaire) - Cono (circular)</i>	20cm, D.60mm	9801 712 10104U
Q2-g	)	<b>Collimator (rectangular)</b> - <i>Collimatore (rettangolare)</i> <i>Cone (rectangulaire) - Cono (rectangular)</i>	20cm, 35x45mm USA ONLY	4519 124 00803



**FOLDING ARM - BRACCIO ARTICOLATO**  
**BRAS ARTICULE - BRAZO ARTICULADO**  
**Type 9869 001 00301**

1	2	3	4	5
		<b>DESCRIPTION - DESCRIZIONE</b> <b>DESCRIPTION - DESCRIPCION</b>		<b>CODE - CODICE</b> <b>CODE - CODIGO</b>
Q4-a	GA	<b>Handle</b> - <i>Manicotto - Poignée - Empunadura</i>		4519 120 78511
Q4-c1 )		<b>Cover</b> - <i>Coperchio - Couvercle - Tapa</i>		4519 124 00881
Q4-c2 )				4519 124 00871
Q4-d		<b>Snap out cap</b> - <i>Tappo - Capouchon pression</i> <i>Casquetes a presion</i>	8x	4519 128 01401
Q4-f		<b>Retaining clip</b> - <i>Anello - Anneau - Aro</i>		4519 120 53051
Q4-g		<b>Ring</b> - <i>Spinetta a U - Etau de retenue - Tuerca de fijacion</i>		4519 122 02531
Q4-h		<b>Segment</b> - <i>Segmento - Secteur - Sector</i> <b>Cable</b> - <i>Cavo - Cable - Cable</i> <b>Cover plate</b> - <i>Coperchio piatto - Plaque couvercle</i>	* 3x AWG 18 #	4522 121 93181
Q4-i				0719 150 06011
Q4-j				4519 122 02341
Q4-k )		<b>Pin</b> - <i>Perno - Broche - Plaqueta</i>	2x	4519 122 02291
Q4-l )			2x	4519 122 02621
Q4-m )				4519 124 00901
Q4-n )			2x	4519 122 02431
Q4-o		<b>Plastic stop</b> - <i>Fermo di plastica - Arret en plastique</i> <i>Retenedor de plastico</i>	2x	4519 120 14001
Q4-p		<b>Connecting socket</b> - <i>Connettore - Cheville - Enchufe</i>		4522 935 12731

Replacement of items marked \* shall be perormed in factory or at the workshop.

# The cable lenght cable for wall mount is m 2.8

La sostituzione delle parti di ricambio indicate con \* deve essere effettuata in fabbrica o nei centri specializzati.

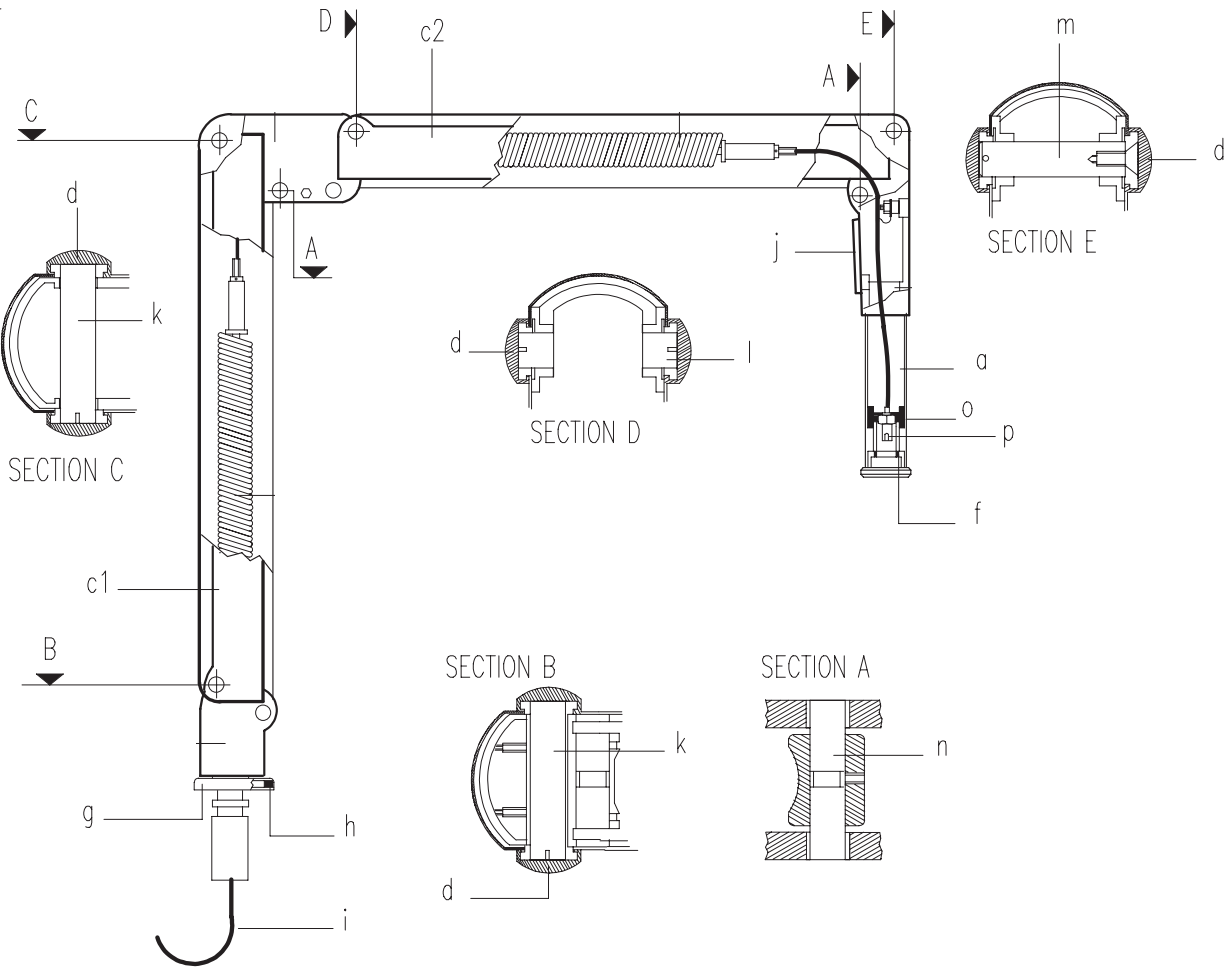
# La lunghezza del cavo per il sistema a muro è di m 2,8

Le remplacement des articles indiqués par \* doit etre effectué chez la fabrique ou chez le centre d'assistance.

# Le cable pour le montage à mur est de 2,8 m de long

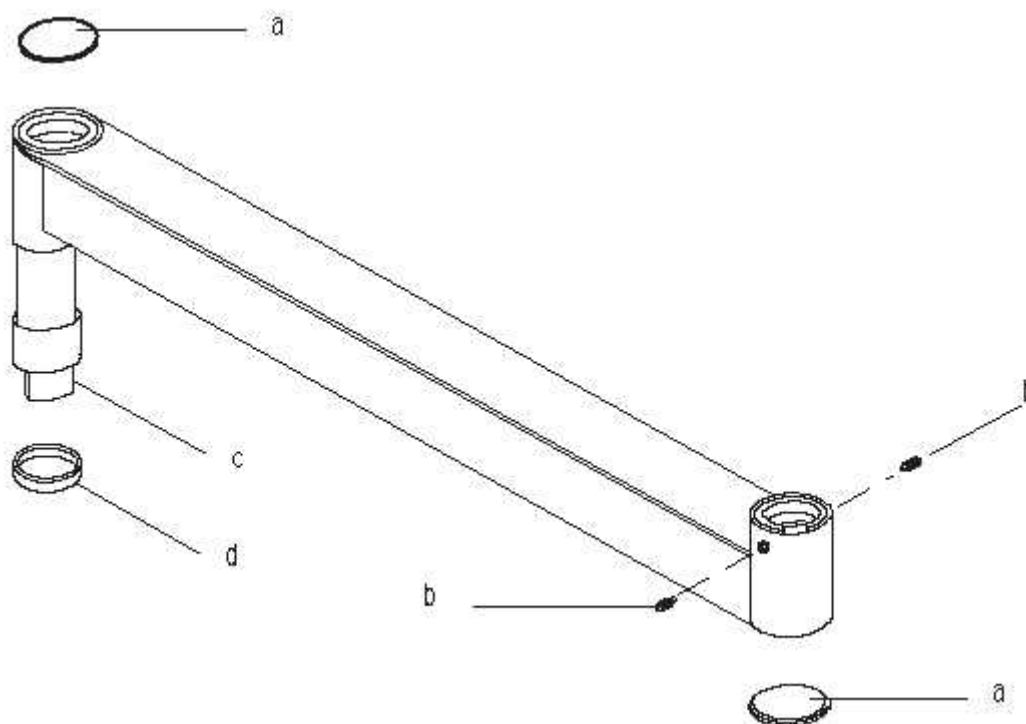
La substitution de las piezas indicadas por \* debe ser efectuada en la fabrica o en la Asistencia Técnica.

# El cable para el montaje de pared es de 2,8 m de largo



**EXTENSION ARM - BRACCIO ESTENSIONE****RALLONGE - BRAZO DE PROLONGACION****Type 9869 001 00001 - 450 mm****Type 9869 001 00201 - 900 mm**

1	2	3	4	5
		<b>DESCRIPTION - DESCRIZIONE</b> <b>DESCRIPTION - DESCRIPCION</b>		<b>CODE - CODICE</b> <b>CODE - CODIGO</b>
Q5-a		<b>Snap out cap</b> - <i>Tappo - Couvercle - tapas a presion</i>	2x	4519 120 73852
Q5-b		<b>Special screw</b> - <i>Vite speciale - Vis special</i> <i>Tornillo de rozamiento</i>	2x	4519 120 47863
Q5-c		<b>Plastic bush</b> - <i>Bussola di plastica</i> <i>Boussole en plastique - Casuillo de plastico</i>		4519 128 01391
Q5-d		<b>Ring</b> - <i>Anello - Anneau - Aro</i>		4519 120 78551



**WALL SUPPORT - SUPPORTO MURALE**  
**SUPPORT MURAL - SOPORTE DE PARED**  
**Type 9869 005 00001**

1	2	3	4	5
		<b>DESCRIPTION - DESCRIZIONE</b> <b>DESCRIPTION - DESCRIPCION</b>		<b>CODE - CODICE</b> <b>CODE - CODIGO</b>
Q6-a		<b>Cover- Coperchio - Couvercle - Tapa</b>		4519 128 02111

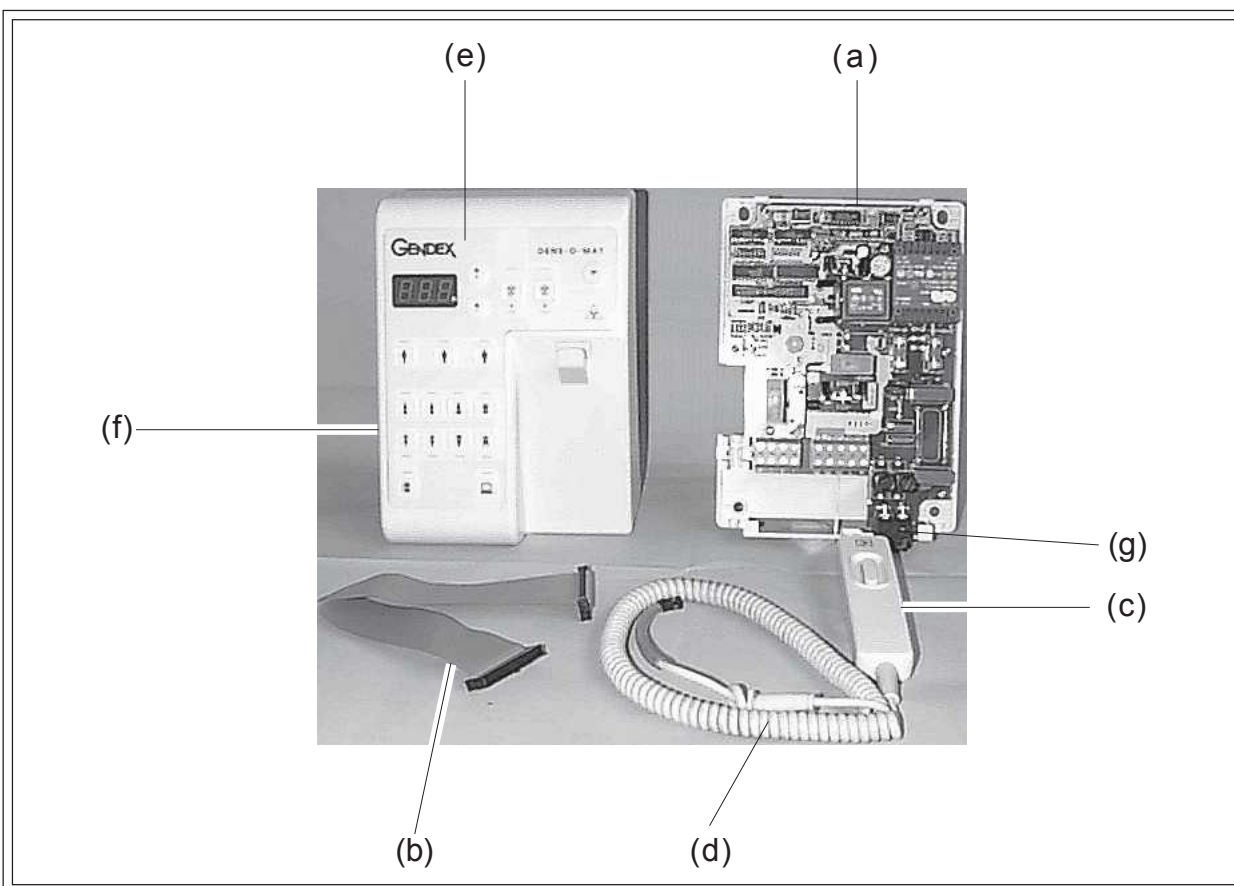


(a)

## DENS-O-MAT AC

### Type 9869 002 00102

1	2	3	4	5
		DESCRIPTION - DESCRIZIONE DESCRIPTION - DESCRIPCION		CODE - CODICE CODE - CODIGO
Q7-a	TC1()	<b>P.C.B. Power</b> - P.C.B. con alimentatore P.C.B. avec alimentateur - P.C.B. con alimentador	C C	(4519 101 02202) 4519 101 02203
	F1/2() F3/4()	<b>Fuse</b> -Fusibile di rete -Fusible de réseau Fusible de red	D T50mA-250V-5x20 2x D F6.3A-250V-5x20 2x	2422 551 00013 2432 089 01036
Q7-b		<b>Flat cable</b> - Cavo piatto- Cable plat - cable chato		4519 103 01551
Q7-c		<b>Exposure handswitch without cable</b> Comando raggi senza cavo - Interrupteur manuel rayons sans fil - Commutador de mano sin cable		4519 190 01461
Q7-d		<b>Coiled cable</b> - Cordone spiralato - Cordon spiralé Cable enrollado		4519 190 01511
Q7-e		<b>Operator front panel</b> - Pannello comandi - Panneau des commandes - Panel delantero del operador		4519 105 02341
Q7-f		<b>Cover</b> - Coperchio - Couvercle - Tapa		4519 128 02121
Q7-g		<b>On-Off switch</b> - Interruttore di accensione - Interrupteur On-Off - Interruptor On-Off	230V - 16A	4519 190 02091

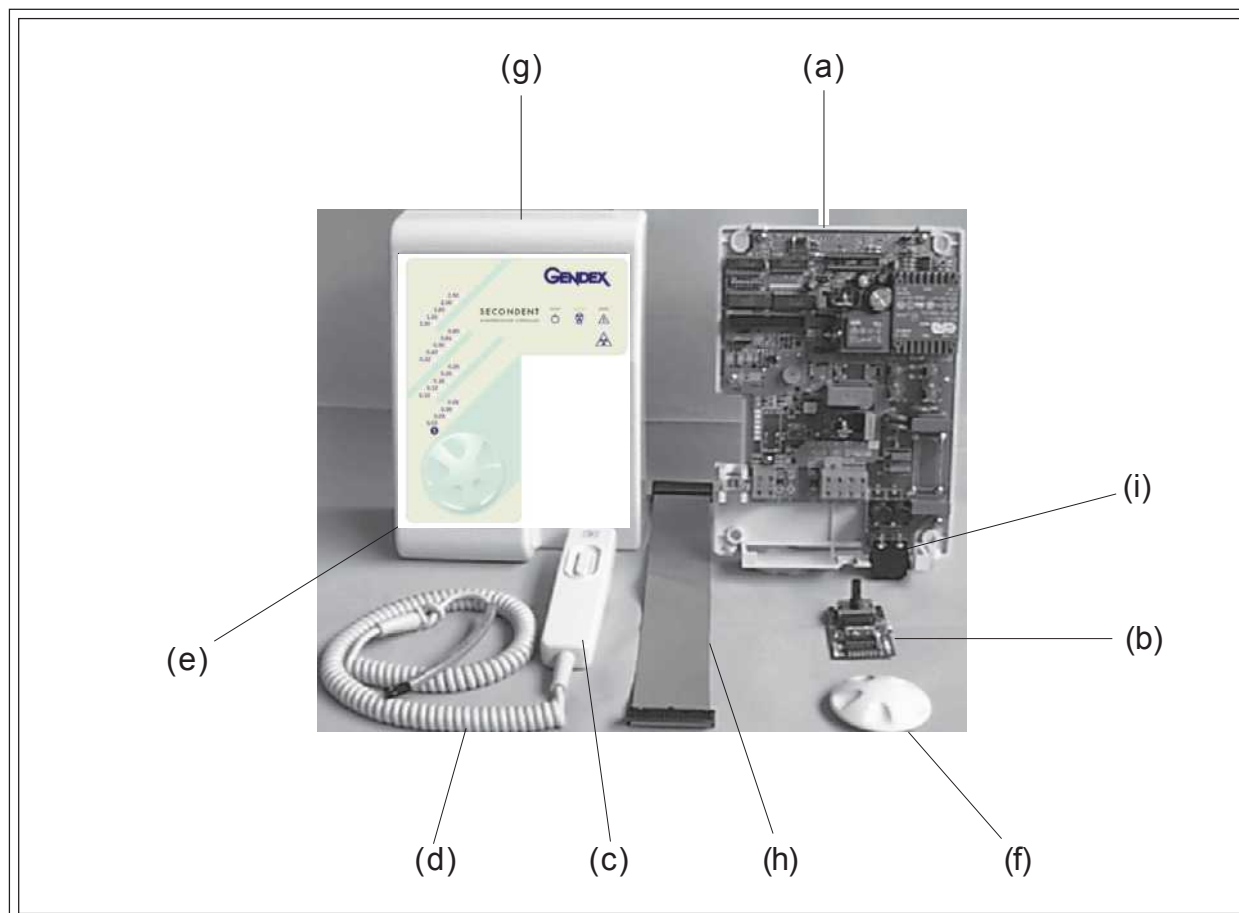




## SECONDENT AC

### Type 9869 002 00202

1	2	3	4	5
		<b>DESCRIPTION - DESCRIZIONE</b> <b>DESCRIPTION - DESCRIPCION</b>		<b>CODE - CODICE</b> <b>CODE - CODIGO</b>
Q8-a	TC1()	<b>P.C.B. Power</b> - P.C.B. con alimentatore <i>P.C.B. avec alimentateur - P.C.B. con alimentador</i>	C	(4519 101 02902)
	F1/2()	<b>Fuse</b> -Fusibile di rete -Fusible de réseau	C	4519 101 02903
	F3/4()	<i>Fusible de red</i>	D T50mA-250V-5x20 2x	2422 551 00013
Q8-b	TA3	<b>Encoder</b> - Codificatore - Codificateur - Codificador	D F6.3A-250V-5x20 2x	2432 089 01036
Q8-c		<b>Exposure handswitch without cable</b> <i>Comando raggi senza cavo - Interrupteur manuel rayons sans fil - Commutador de mano sin cable</i>		4519 101 02801
Q8-d		<b>Coiled cable</b> - Cordone spiralato - Cordon spiralé <i>Cable enrollado</i>		4519 190 01461
Q8-e		<b>Operator front panel</b> - Pannello comandi <i>Panneau des commandes - Panel delantero del operador</i>		4519 190 01511
Q8-f		<b>Knob</b> - Manopola selettore - Sélector rotatif <i>Selector rotatorio</i>		4519 105 02352
Q8-g		<b>Cover</b> - Coperchio - Couvercle - Tapa		4519 105 02361
Q8-h		<b>Flat cable</b> - Cavo piatto- Cable plat - cable chato		4519 128 02121
Q8-i		<b>On-Off switch</b> - Interruttore di accensione - <i>Interrupteur On-Off - Interruptor On-Off</i>	230V - 16A	4519 103 01551
				4519 190 02091



# SECTION Z

## DRAWINGS - DISEGNI - DESSINS - DIBUJOS

### CONTENTS *Contenuto - Contenu*

#### PRINCIPLE DIAGRAMS *Schemi di principio - Principle diagramme - Esquema funcionales*

##### **Principle diagram Densomat** **Z - 3**

*Schemi di principio Densomat*  
*Principle diagramme Densomat*  
*Esquema funcional Densomat*

##### **Principle diagram Secondent** **Z - 4**

*Schemi di principio Secondent*  
*Principle diagramme Secondent*  
*Esquema funcional Secondent*

##### **TC1 Power Densomat** **Z - 5**

*TC1 Scheda Densomat*  
*TC1 Minuterie Densomat*  
*TC1 Densomat*

##### **TC1 Power Secondent** **Z - 6**

*TC1 Scheda Secondent*  
*TC1 Minuterie Secondent*  
*TC1 Secondent*

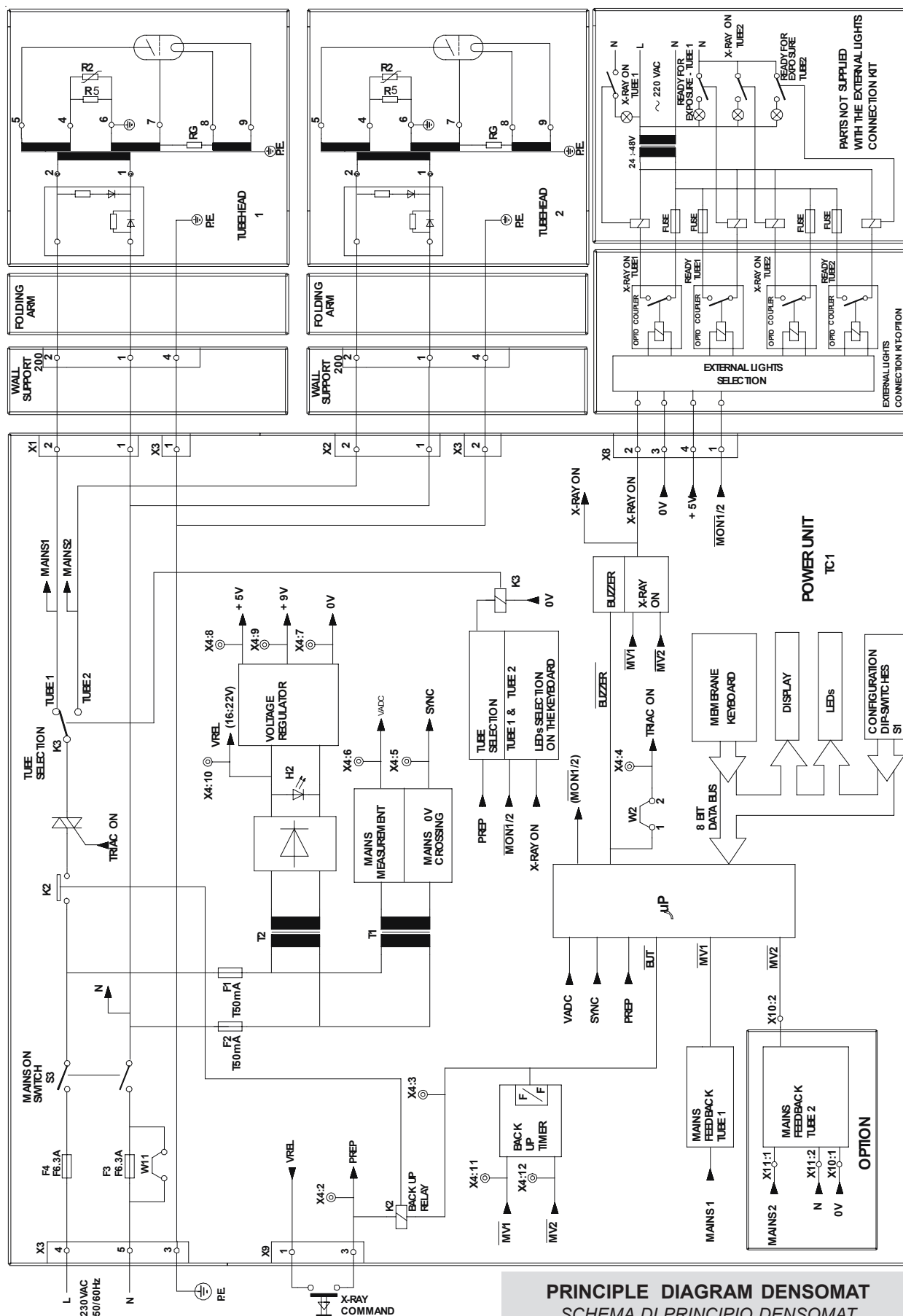
##### **TC5 Tubehead 2** **Z - 7**

*TC5 Scheda monoblocco 2*  
*TC5 Minuterie pour monobloc 2*  
*TC5 PCS monobloque 2*

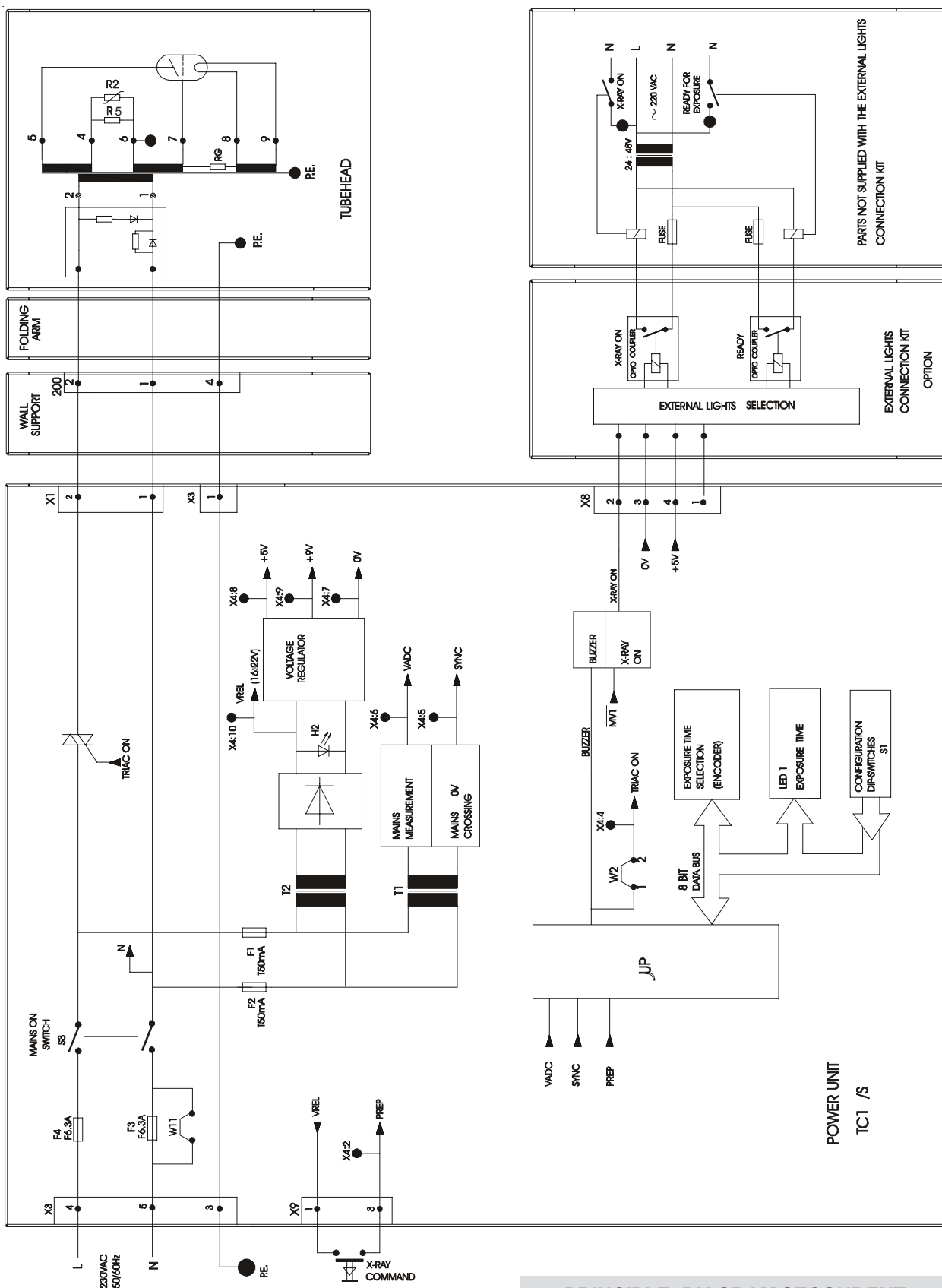
##### **TA3 Encoder Control Unit** **Z - 8**

*TA3 Encoder unità di controllo*  
*TA3 Minuterie encoder unité de controle*  
*TA3 Codificatör*

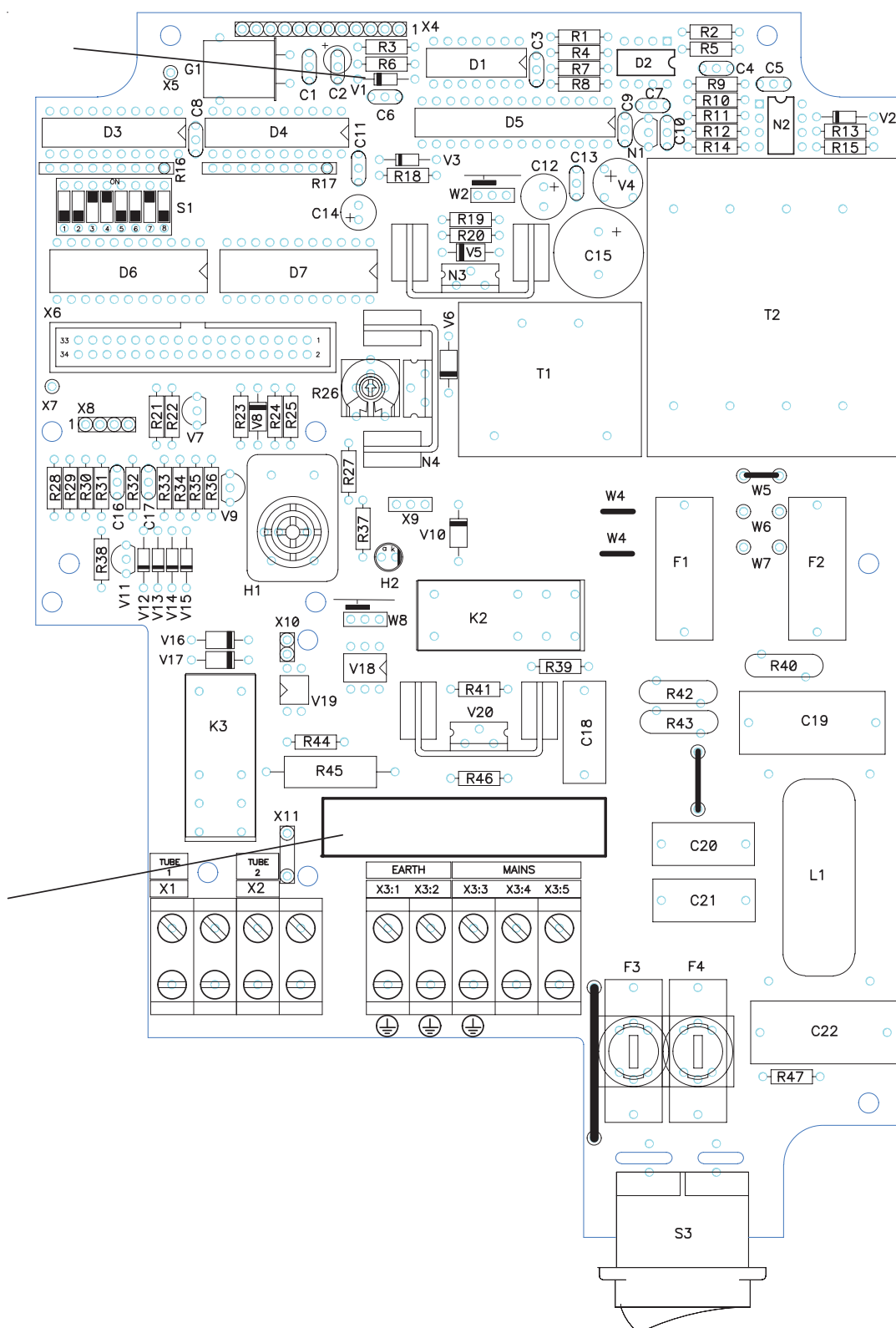




**PRINCIPLE DIAGRAM DENSOMAT**  
 SCHEMA DI PRINCIPIO DENSOMAT  
 PRINCIPLE DIAGRAMME DENSOMAT  
 PRINCIPLE DIAGRAM DENSOMAT



**PRINCIPLE DIAGRAM SECONDENT**  
 SCHEMA DI PRINCIPIO SECONDENT  
 PRINCIPLE DIAGRAMME SECONDENT  
 PRINCIPLE DIAGRAM SECONDENT



**TC1 Power Densomat**  
**4519 101 02203**

