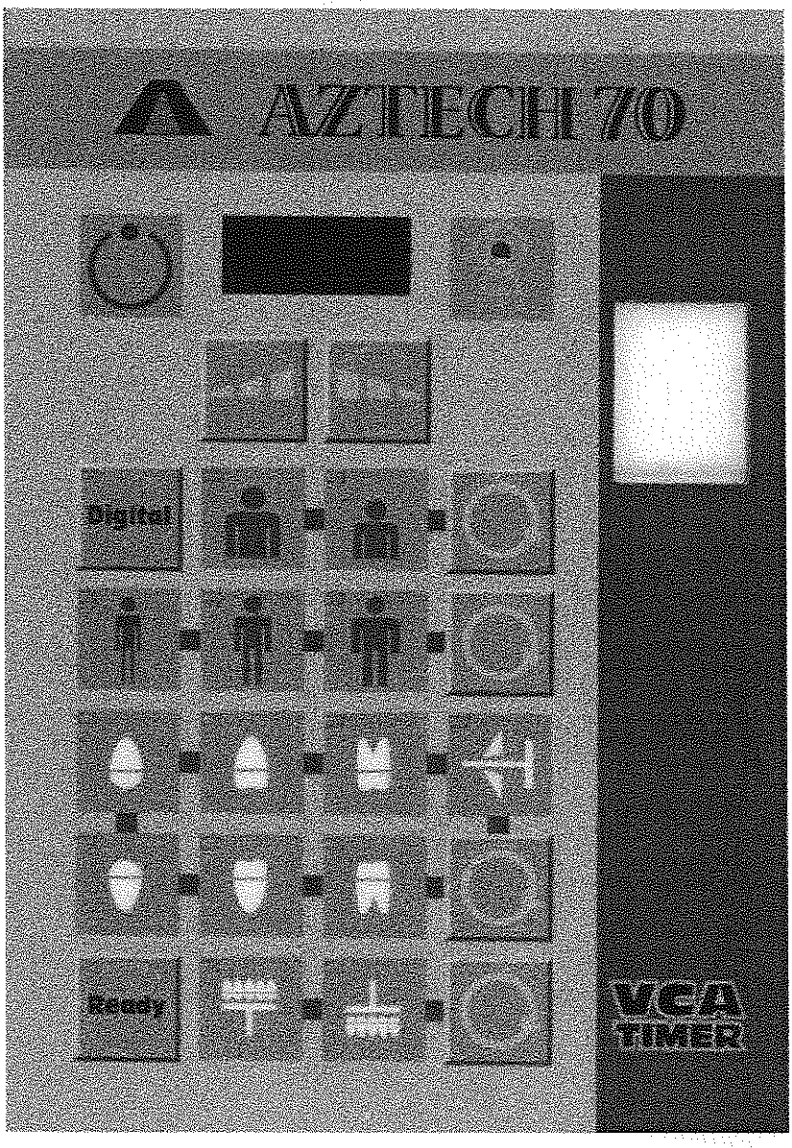
AZTECH 70

with VCA timer



Service Manual

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1. INTRODUCTION

The intra-oral X-ray equipment Aztech 70 performs high-quality intra-oral radiographs, ensured by the repeatability of examination combined with reduced exposure times and with the small focal spot.

Aztech 70 is intended to perform only intra-oral X-ray.

The equipment displays the following features:

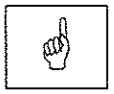
- high-quality radiographs
- easy to use

The functioning of the system is microprocessor controlled, thus ensuring high repeatability of exposure times, and is composed of the following parts:

1. Timer : VCA timer with 16" on center wall plate
2. Oval extension arm (with differents lengh); not present in mobile stand configuration
3. Oval scissors arm
4. 70kV 8mA tubehead

This manual is intended to assist the user in the safe and efficient operation of the equipment described.

ICONS present in the manual:



Indicates a "NOTE"; the utmost attention shall be devoted to the reading of paragraphs marked by this icon.

Indicates a "WARNING"; paragraphs marked with this icon cover patient and/or operator safety aspects

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2. SAFETY PRECAUTIONS

WARNING:
Read this chapter very carefully

This equipment has been designed and manufactured in compliance with safety requirements; moreover, it provides all the necessary information for correct utilisation as well as warnings related to risks associated to X-ray generators.

The Aztech Group, Inc., shall not be responsible for:
- any use of the Aztech 70 equipment different from that for with it has been designed,
- any damage to the equipment, the operator or the patient caused either by incorrect installation and maintenance not compliant with the procedures contained in the relevant user's and installation manuals provided with the equipment, or by incorrect operation techniques,
- any mechanical and/or electrical changes effected during or after installation, different from those reported in the service manual.

Only qualified service personnel, authorised by The Aztech Group or its dealers is allowed to perform technical interventions on the equipment.

Only authorised personnel is allowed to remove the tubehead from its support and access the internal components.

2.1 WARNINGS

This equipment complies with DHHS performance standard 21 CFR Subchapter J.

The equipment must be used in compliance with the procedures contained in the present manual and shall never be used for purposes different from those envisaged by it.

To protect the patient from X-ray, radiation protection accessories, such as standard leaded aprons, must be used.

Aztech 70 is a dental imaging equipment and must therefore be used only under the supervision of qualified dental staff, having the necessary knowledge in the field of protection against radiation.

The user bears legal responsibility related to the possession, installation and use of the equipment.

Electrical shock hazard. Do not remove panels.

Risk of explosion. Do not use in presence of flammable anesthetics.

For continued protection against risk of fire, replace only with same type and rating of fuse.

2.2 SAFETY PRECAUTIONS

Before performing any maintenance intervention, the equipment must be disconnected from the input line voltage by means of the relevant circuit breaker at the main panel.

The equipment has not been designed to be used in the presence of flammable anaesthetic.

Do not allow water or other liquids to penetrate inside the equipment so as to avoid short circuits and corrosion.

Although the x-ray doses provided by modern equipment are reduced as low as reasonale achievable, during exposure the operator must take all the necessary precautions and/or protection measures for the patient and for himself, in compliance with existing regulations.

Although the equipment has been designed to ensure a satisfactory degree of protection against electromagnetic interference, installation must be made at an adequate distance from electric power transformation plants, UPS, amateur and cellular telephone transmitters and receivers. The use of cellular telephone communication devices is allowed only at a distance larger than 6ft (1.5m) from any element of the equipment.

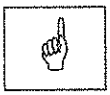
Aztech 70 must be switched off during the use of High Frequency surgical device or similar instruments placed near the equipment.

WARNING:
For safety purposes, it is forbidden to overload the extension arm and the scissors arm in an anomalous way, e.g. by hanging down from them.

NOTE:
The scissors arm has been designed to work correctly with a minimum operating angle of 20 degree; therefore the arm has to be used with an aperture angle grater than 20 degree.

2.3 ENVIRONMENTAL RISK AND DISPOSAL

The equipment contains - in some of its parts - solid and liquid substances which must be disposed at the recycling centres appointed by local regulations at the end of the equipment's life cycle.
In particular, the equipment contains the following materials and/or components:
Tubehead: non-biodegradable plastic materials, metal, glass, dielectric oil, lead, tungsten.
Other parts of the equipment: non-biodegradable plastic materials, metal, printed circuits, iron and plastic materials



NOTE:
The Aztech Group, Inc., is not responsible for eventual disposal of the apparatus or parts thereof and for the related expenses.

2.4 SYMBOLS USED

Besides the symbols present on the keyboard (see Chapter 6), in this manual and on the Aztech 70 the following symbols are used:

Equipment with Type B applied parts

~ AC

N Connection to neutral conductor

L Connection to line conductor

Protection grounding

Functional grounding

OFF ; equipment not connected to power line

ON ; equipment connected to power line

Exposure enabling; enabled exposure status is revealed by the glowing of the relevant green symbol.

Focal spot in compliance with IEC 336

X-ray emission

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3. DESCRIPTION

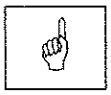
3.1 FUNCTIONS, MODELS AND VERSIONS

The Aztech 70 intra-oral x-ray equipment is composed of the following parts:

a) **OVAL EXTENSION AND SCISSORS ARMS**
b) **TUBEHEAD WITH BEAM LIMITING DEVICE**
c) **VCA TIMER**

EXTENSION ARM AND SCISSORS ARM

This is an arm with double joint, enabling linear and upward extension. The tubehead remains balanced in all positions.



NOTE:
The scissors arm is intended to operate correctly with a minimum angle of 20°; hence, its use requires an opening angle larger than 20°.

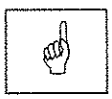
A horizontal extension arm can also be added; it is available in different sizes to meet all possible reach configurations.

TUBEHEAD

Its 70 kVp voltage and 8 mA current reduce exposure times and the amount of radiation absorbed by the patient. The tubehead is equipped with a beam limiting device with a 20 cm (8") focus to skin distance and a 6 cm (2 3/8") beam diameter at the output. The tubehead is connected to the arm by means of a sliding contact, allowing 360° horizontal rotation and 290° vertical rotation.

TIMER:
The Aztech 70 is equipped with *VCA timer.*

VCA is a microprocessor-controlled digital timer allowing both manual selection and 6 automatic selections of exposure times.
Automatic selection allows to choose among 54 pre-set times according to the type of patient (adult or child), his/her size (small, medium, large) and to the type of tooth.
Fixed times available for manual selection are 33 and may range from 0.02 seconds minimum to 3.20 seconds maximum.
The key feature of this timer is automatic time compensation according to input line voltage variations within a range of 120 V ± 10%.



NOTE:
A configuration with remote x-ray switch, outside the examination room, is also available.

3.2 CONFIGURATIONS

Standard configuration

1. Tubehead
2. Scissors arm
3. Extension arm
4. Wall plate + Timer
5. X-ray button
6. 16" on center wall plate

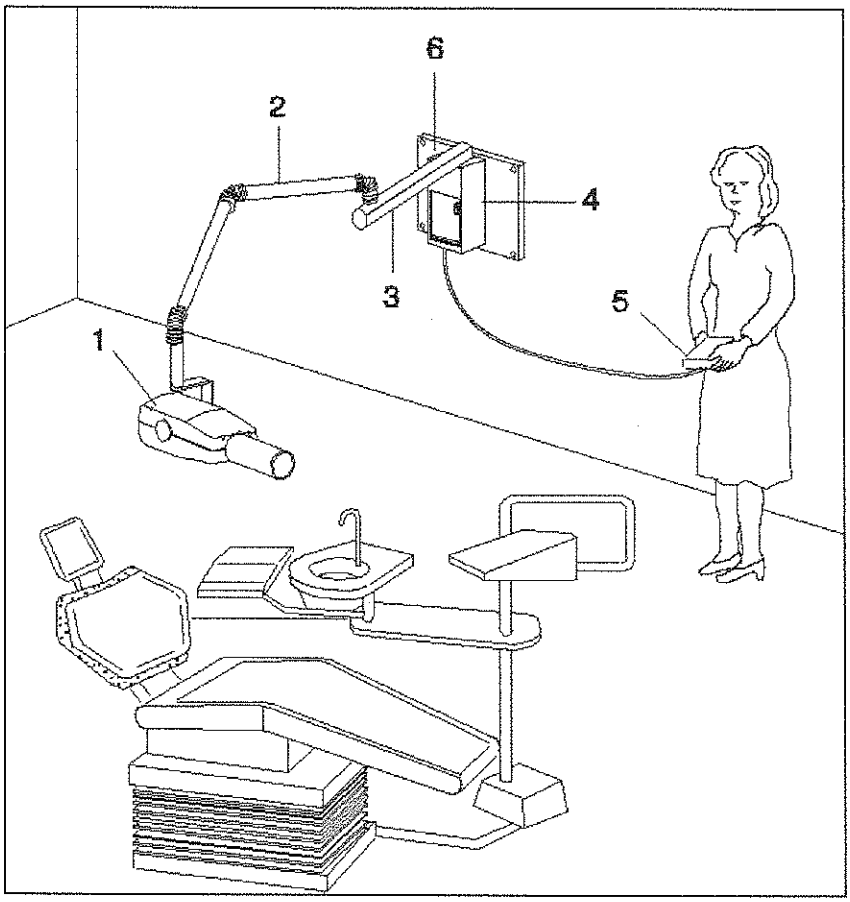


Figura 3-1

Remote timer configuration

1. Tubehead
2. Scissors arm
3. Extension arm
4. Wall plate
5. Remote timer
6. X-ray button
7. 16" on center wall plate

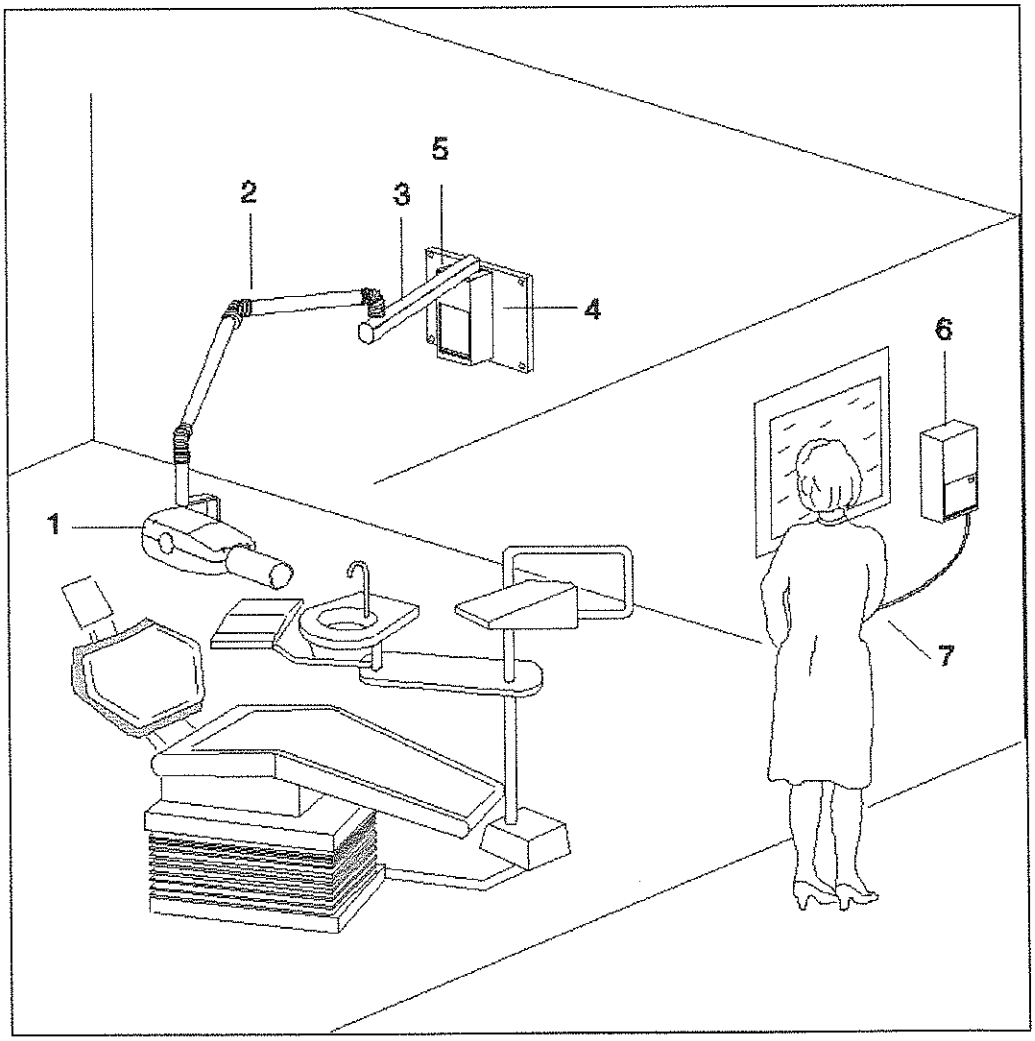


Figura 3-2

Configuration with remote X-ray button

1. X-ray button

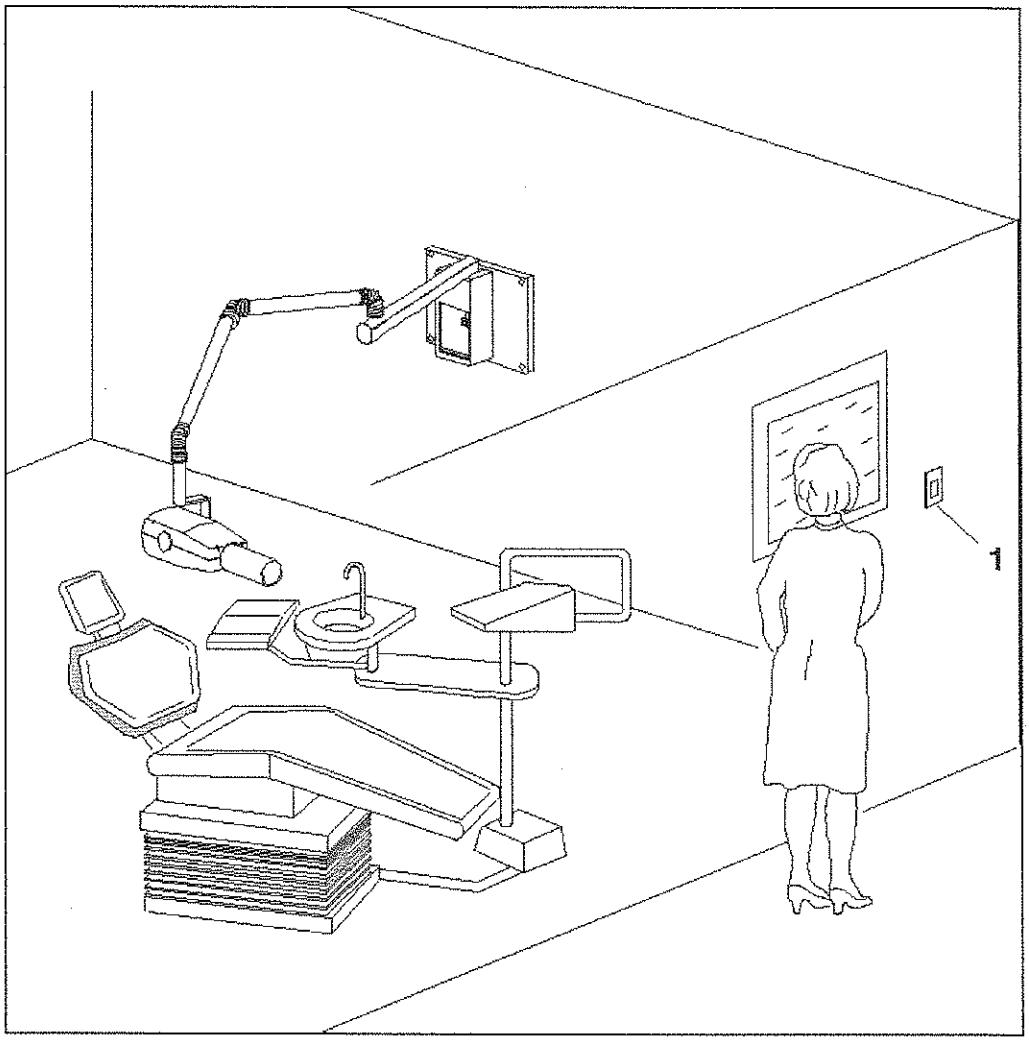


Figura 3-3

Mobile stand configuration

1. Tubehead
2. Mobile stand scissors arm (the extension arm is not available in this configuration)
3. Mobile stand
4. Timer
5. X-ray button

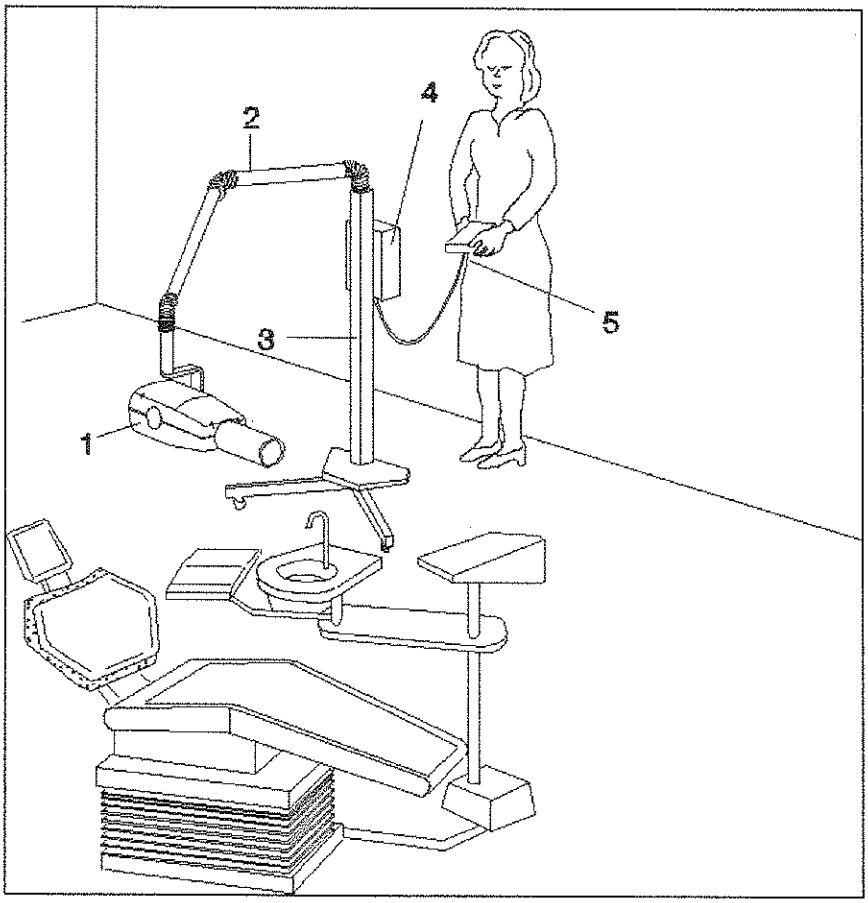


Figura 3-4

Optional configuration - single stud

1. Tubehead
2. Scissors arm
3. Extension arm
4. Wall plate + Timer
5. X-ray button
6. Single-stud center wall plate

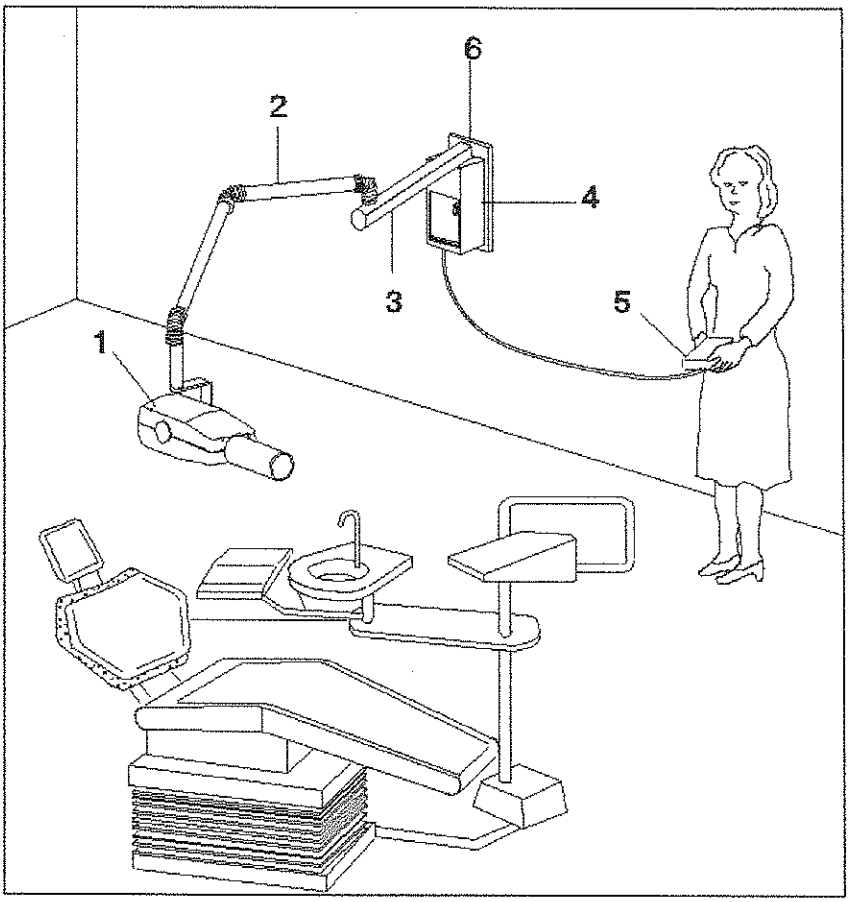
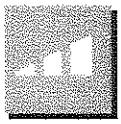


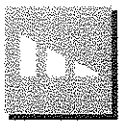
Figura 3-5

3.3 DESCRIPTION OF THE CONTROL PANEL FUNCTIONS

NOTE:
All automatic selections are revealed by the switching on of the relevant light signal, placed to the left of the symbol.

The VCA Timer is equipped with a Stand By function, by which - if no key on the keyboard is pressed for at least 5 minutes - the timer turns to a stand-by mode (low consumption), revealed by the presence of only the decimal point on the right hand side of the display. Press any key to return to operating conditions.

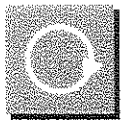
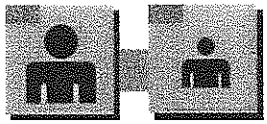
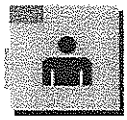
Exposure times **INCREASE KEY** 

Exposure times **DECREASE KEY** 

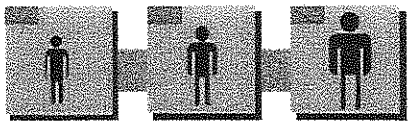
By depressing one of the above keys, it is possible to switch from automatic to manual selection. This way, all signals related to automatic selection (Adult/Child, Patient Size, Tooth or Occlusal Selection) are switched off. Selection of times shall therefore take place in manual mode.
When the key is pressed once, the time set as default is displayed; to change it, release the key and depress it again; rapid selection is also possible, by keeping the key depressed; this way, the variation is effected rapidly.

To go back to automatic time selection, press one Selection key (Size, Adult/Child, Tooth, Occlusal).

"ADULT/CHILD" SELECTION KEY

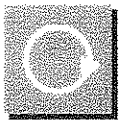
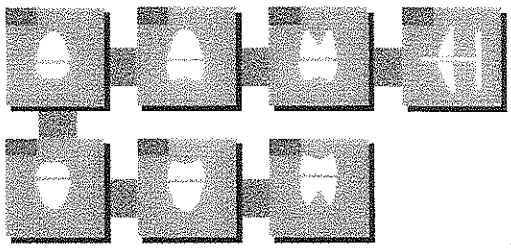
By depressing the  key placed beside the  symbols, the rotation switch between Adult  and Child  mode is effected; thus exposure times may be changed.

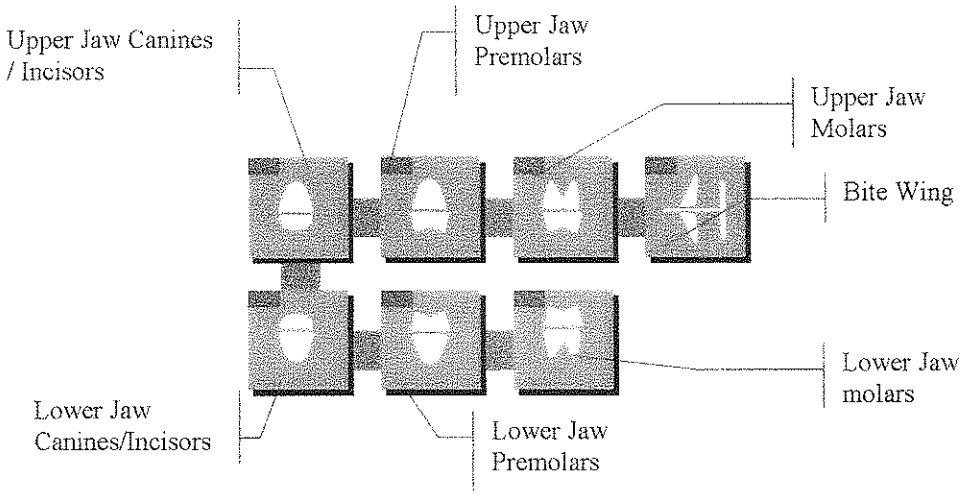
"PATIENT SIZE" SELECTION KEY

By depressing the  key placed beside the  symbols, rotation selection between the different patient sizes - small, medium and large (left to right) is effected. Exposure times are changed in this case as well.

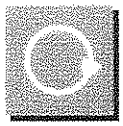
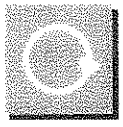
A sound signal lasting abt. ½ sec is heard every time a key is depressed, and the led related to the selected function is switched on.

"ANATOMIC TOOTH" SELECTION KEY

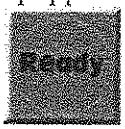
By depressing the  key placed beside  , rotation selection among the exposure times pre-set for the different teeth is effected. The meaning of symbols is explained in the following paragraphs.



Upper- or Lower-jaw "OCCLUSAL" SELECTION KEY

By depressing the  key placed beside the  symbols, upper- or lower-jaw occlusal exposure selection is effected; the selection is displayed by the glowing of the relevant LED, whereas all signals related to the tooth type are switched off. The Adult/Child and Size selections remain active. To go back to tooth anatomic selection, depress the  key placed beside tooth symbols.

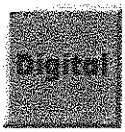
SYSTEM ENABLING KEY

The VCA Timer is equipped with the "Exposure Enabling" function. X-ray emission can take place only after the 

button has been depressed; the enabled status of the system is displayed on the keyboard by the glowing of the relevant green signal. Such enabling lasts for a time that can be configured in set-up between 10 and 30 seconds. X-ray emission starts only if the user presses the X-ray button during the enabling time interval. After the 'enabling time' expires the possibility to start emission is disabled and the pressing of the exposure button does not cause X-ray emission.

During the 'enabling time' the display of the timer indicates the corrected exposure time that will be used, becasue the internal voltmeter of the system reads the line voltage value and applies the internal algorithm to establish the exposure time that will grant the same level of dose selected by the user by the pre-selection of the exposure time at 120V.

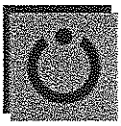
DIGITAL SELECTION KEY

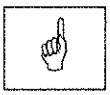
The 

key enables automatic exposure for Digital Radiology, reducing exposure times to values suitable for the use of digital sensors.

3.3.1 VISUAL SIGNALS

SYSTEM ENABLING SIGNAL

When switched on, the green signal  , placed in the right top corner of the keyboard, indicates the "Ready for X-ray" condition, in which pressing the X-ray button marks the starting of exposure. Such exposure enabling condition lasts between 10 and 30 second depending on the configuration value selected dyuring set-up (default advised value 15 sec).



NOTE:
the pressing of the X-ray button with enabling function not active does not generate any exposure.

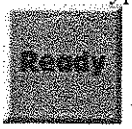
"ACTIVE X-RAY EMISSION" SIGNAL

The yellow light  , active in case of x-ray emission, marks actual emission. Moreover, the emission is made evident by an sound signal of a buzzer.

EXPOSURE TIMES VISUALISATION DISPLAY

The display  , placed in the upper central part of the keyboard, has multiple functions.

1. During the exposure preparation phase, it displays the preselected exposure time pre-selected in automatic or manual mode; the automatic mode consists in the selection of the type of tooth to be examined and the type of patient size.

2. Once the 

button has been pressed and the system is enabled the display shows the actual corrected exposure time that the system will use for the exposure according to the line voltage present at that moment and read by the internal voltmeter of the timer. For example if the line voltage is currently 120 V no change in the exposure time will be apparent on the display once the system has been enabled; if on the contrary the line voltage is for example 115V the display will show the corrected time that will result longer with respect to the pre-selected one, according to the algorithm designed to grant the same level of dose that would be obtained having 120V of line voltage.
The corrected exposure time is adjusted two times a second so that, in case the line voltage is drifting, the user can always have clear pre-indication of the exposure time that will be used, in case he decides to start it by the X-ray button.

3. During the exposure phase, the display maintains the corrected exposure time used for that specific exposure, whereas at the end of exposure after the X-ray button has been released, it displays the time remaining before the end of the tubehead cooling phase.

4. Finally, if the X-ray button is pressed when the system is disabled, the display shows the last actual exposure time, allowing in any case to review the actual time used during the last exposure, even after a long time from the completion of the exposure.

4. TECHNICAL FEATURES

4.1 TECHNICAL SPECIFICATIONS

Technical features	
Equipment	Aztech 70
Manufacturer	VILLA SISTEMI MEDICALI Buccinasco (MI) Italy
Class	Class I with type B applied parts (IEC 601-1 classification); Class II according to 21 CFR 
Line voltage	120V~ ± 10%
Line frequency	60 Hz
Rated current	6 Arms @ 120V~
Power consumption	0.8 kVA @ 120V~
Line Voltage Regulation	≤ 3%
Main fuse	10 A F
Preset exposure times	from 0.02 to 3.2 s in 33 steps
Anatomic selection	54 pre-set times
Exposure control	Microprocessor controlled exposure times, with automatic compensation of line voltage fluctuations.
TIMER ACCURACY on the CORRECTED EXPOSURE TIME (This is the actual time of exposure, preindicated on the VCA timer during the enabled status and during emission and determined by the internal algorithm as a function of the line voltage) **see note below!!!**	±5% or 30ms (whichever is greater)
TIMER ACCURACY on the PRE-SELECTED EXPOSURE TIME (This is the value of the timer setting the operator pre-selects)	The absolute maximum deviation can be +150%; -100% when the line voltage changes within the rated voltage range: it includes intrinsic inaccuracy and correction due to line voltage changes. **see note below!!!** The inaccuracy at 120V is ±5% or ±30ms (whichever is greater)
Timer dimension	12 x 7 x 4 inches (310 x 170 x 100 mm)

Tubehead features	
Manufacturer	VILLA SISTEMI MEDICALI Buccinasco (MI) Italy
Rated output voltage	70 kVp ±15%
High voltage circuit type	Single phase, self-rectifying
Tubehead current	8 mA
Tubehead power	0.8 kW
Total filtration	2 mm Al eq. @ 70 kV
Transformer insulation	Oil bath
Cooling	Convection
Maximum deviation of output current	± 2 mA
Pre-heating time	90 ms
Interval between exposure / duty cycle	60 times X-ray time / 1 : 60

Minimum focus to skin distance	7 7/8" (20 cm)
X-ray beam diameter (@ 20 cm focus)	2 3/8" (6 cm)
Radiation leakage at 1 m	<50 mR/h, duty cycle 1 : 60
Technical factors for radiation leakage	70 kV 8 mA 1s

X-ray tube features	
Manufacturer	CEI- Bologna- Italy
Type	OCX/70-G
Focal spot	0.8 (IEC 336)
Inherent filtration	0.5 mm Al equivalent
Anode thermal capacity	6 kJ

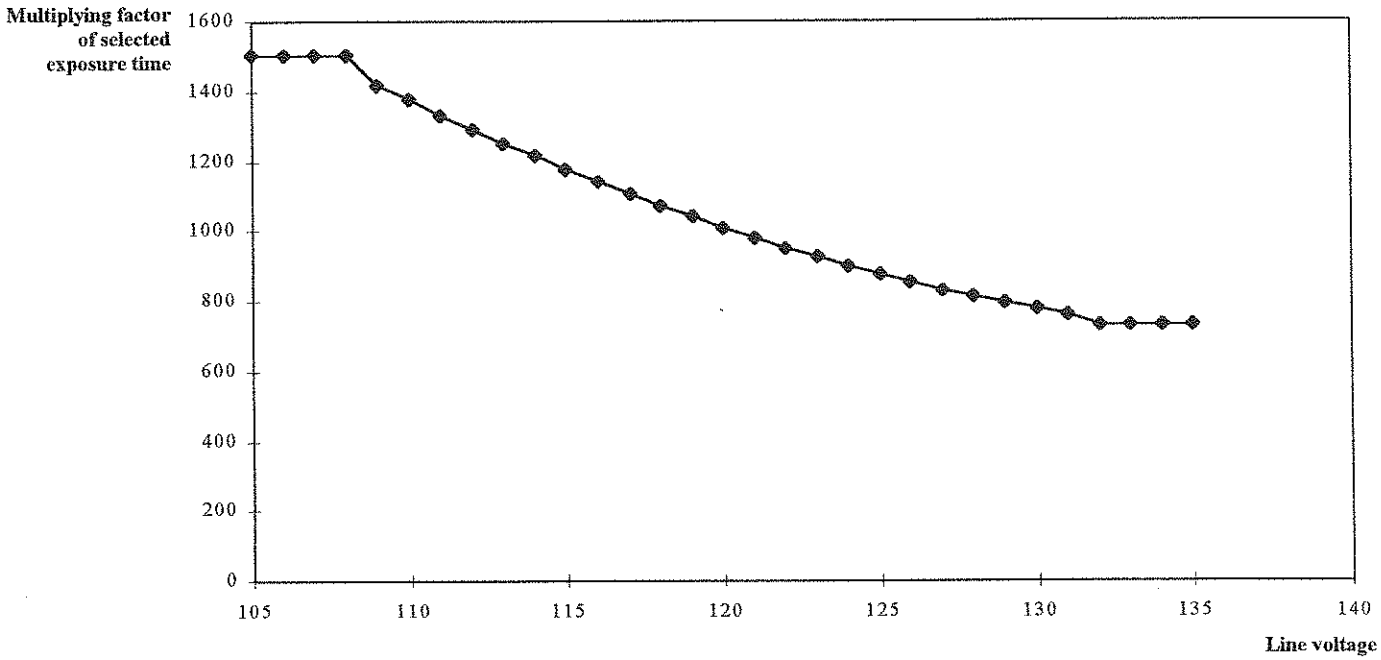
Environmental conditions	
Operating temperature range	+50°F ÷ +104°F (+10°C ÷ +40°C)
Operating relative humidity range	30% ÷ 75%
Temperature range for transport and storage	-4°F ÷ +168°F(-20°C ÷ +70°C)
Max. relative humidity for transport and storage	<95 % non condensing
Min. atmospheric pressure for storage and transport	630 hPa

Apparatus and detachable parts weight	
Gross weight including packing	35 kg
Net apparatus weight in standard configuration	30 kg
30 cm extension arm	2.9 kg
60 cm extension arm	4.3 kg
75 cm extension arm	5 kg
90 cm extension arm	5.7 kg
Scissors arm	8.5 kg
Timer plus wall plate	8.3 kg
Tubehead	7.5 kg

NOTE: ***Selected Exposure time and 'corrected actual exposure time'.*** The Aztech 70 VCA timer carries a special feature which allows to automatically correct the selected exposure time in case the line voltage has drifted from 120V. A change in the line voltage affects the peak voltage applied to the X-Ray tube and the value of high voltage affects significantly the spectrum of the radiation, which finally affects the optical density of the image on the film. Purpose of the VCA correction is to provide basically the same optical density on the film in front of any variation of the line voltage, within the standard accepted limits of rated voltage (120V +/-10%). This feature allows the user to get basically the same quality of the image without caring about possible variations of the line voltage, which are quite common in many areas, and very difficult to monitor.

The automatic correction of the exposure time works with the following sequence: the internal voltmeter of the VCA timer monitors continuously the line voltage while the user selects the desired exposure time. Once the user has selected the exposure time that is thought adequate to obtain the proper quality of the image for that specific test, the user presses the READY button to enable the system and the VCA timer displays the corrected actual exposure time that is calculated by the VCA timer itself, on the basis of the line voltage measured every half a second by the internal voltmeter. When the user will press the X-ray button the exposure will start implementing the last displayed pre-indicated time and the display will maintain the indication of the actual exposure time until the X-ray button is released. The actual exposure time of the last exposure can be retrieved any time by pressing the X-ray button without having enabled the system; in this case no x-ray emission is generated and the last exposure time is displayed.

The corrected exposure is calculated applying a correction factor to the selected exposure time, based on an empirical law that correlates the dose with the high voltage peak and consequently with the line voltage.The qualitative relationship between the multiplying factor and the line voltage is shown in the following picture:



The following table allows to establish pre-indicated times and final real exposure times as a function of preselcted time and line voltage variation.

line voltage	108V		112V		116V		124V		128V		132V	
	corrected exposure time (on the basis of current line voltage) (1)	max/min exposure time due to intrinsic inaccuracy	corrected exposure time (on the basis of current line voltage) (1)	max/min exposure time due to intrinsic inaccuracy	corrected exposure time (on the basis of current line voltage) (1)	max/min exposure time due to intrinsic inaccuracy	corrected exposure time (on the basis of current line voltage) (1)	max/min exposure time due to intrinsic inaccuracy	corrected exposure time (on the basis of current line voltage) (1)	max/min exposure time due to intrinsic inaccuracy	corrected exposure time (on the basis of current line voltage) (1)	max/min exposure time due to intrinsic inaccuracy
line voltage correction factor:	1,5		1,3		1,14		0,94		0,79		0,73	
preselected time (ms)												
30	45	75	39	69	34	64	28	58	24	54	22	52
		15		0		0		0		0		0
60	90	120	78	108	68	98	56	86	47	77	44	74
		60		48		38		26		17		0
100	150	180	130	160	114	144	94	124	79	109	73	103
		120		100		84		64		49		43
200	300	330	260	290	228	258	188	218	158	188	146	176
		270		230		198		158		128		116
400	600	630	520	550	456	486	376	406	316	346	292	322
		570		490		426		346		286		262
800	1200	1260	1040	1092	912	958	752	790	632	664	584	614
		1140		988		866		714		600		554
1000	1500	1575	1300	1365	1140	1197	940	987	790	830	730	767
		1425		1235		1083		893		751		694
1200	1800	1890	1560	1638	1368	1436	1128	1184	948	995	876	920
		1710		1482		1300		1072		901		832
1500	2250	2363	1950	2048	1710	1796	1410	1481	1185	1244	1095	1150
		2138		1853		1625		1340		1126		1040
2000	3000	3150	2600	2730	2280	2394	1880	1974	1580	1659	1460	1533
		2850		2470		2166		1786		1501		1387
2500	3750	3938	3250	3413	2850	2993	2350	2468	1975	2074	1825	1916
		3563		3088		2708		2233		1876		1734
3000	4500	no exposure	3900	no exposure	3420	3591	2820	2961	2370	2489	2190	2300
		no exposure		3705		3249		2679		2252		2081
(1) IT IS THE PREINDICATED VALUE OF EXPOSURE TIME DISPLAYED BY THE TIMER DURING THE ENABLE STATUS												
no exposure = the timer does not allow exposure times longer than 4 sec												

4.2 TECHNICAL FACTORS MEASURING METHOD

kVp The kVp is defined as the stationary high voltage value which settles under load after pre-heating time.
The kV_p is assessed with a non-invasive instrument having a ± 2% accuracy, at a nominal input line voltage.
A direct measurement of the high voltage can only be carried out by specialized technicians in a suitable testing laboratory which would require disassembling of the tubehead.

mA The output current is defined as the average value of the stationary current which settles after pre-heating time.
The output current is measured with a digital voltmeter by assessing DC voltage drop on terminals of 1k Ohm resistance (measurement accuracy ± 2%) mounted on the tubehead. To access the resistance, remove the tubehead plastic covers loosening the four recessed screws. The voltmeter has to be connected in parallel to the resistance (DC, 10V).

t The exposure time is defined as the time measured with non invasive kV_p/t meter. Accuracy is granted by using an RTI PMX II instrument, set with the following parameters:

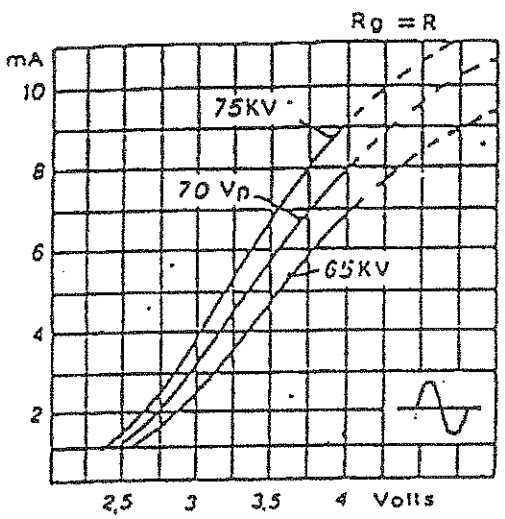
Parameter	:sec
LF.HF	:LF
SE/LO :	SE
Di	:2
CAl:	:1

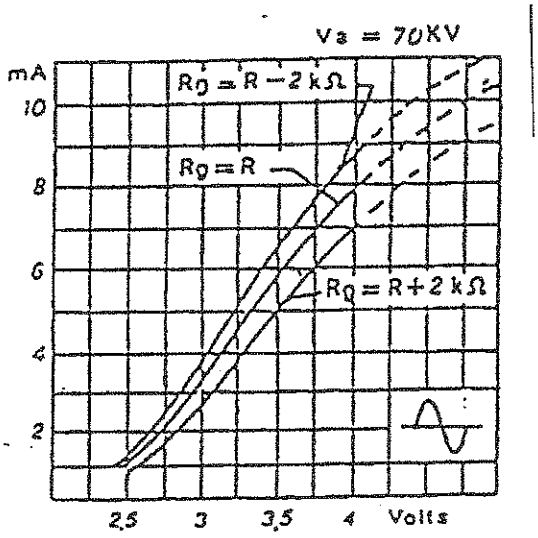
To perform the measurement, the "RAD" probe of the instruments has to be placed at the end of the beam limiting device (Focus to Detector Distance = 20 cm) in a manner to cover completely the sensitive area.

4.3 X-RAY TUBE CURVES

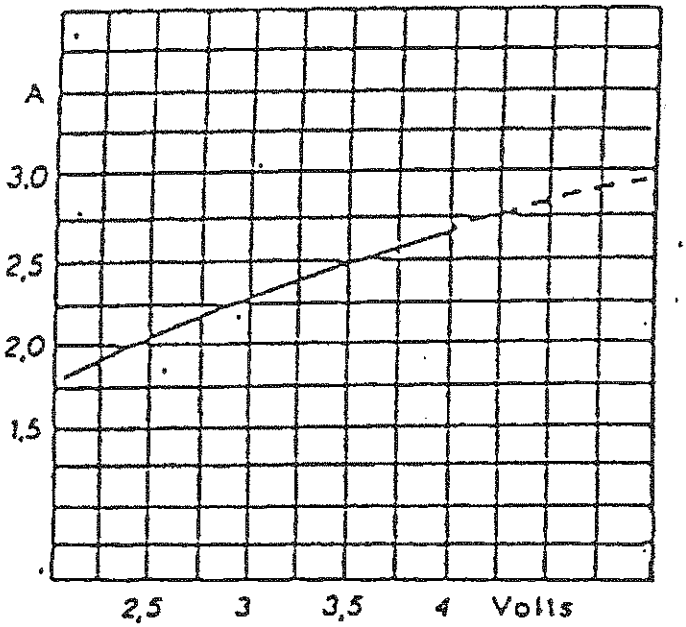
OCX / 70-G

Emission characteristics

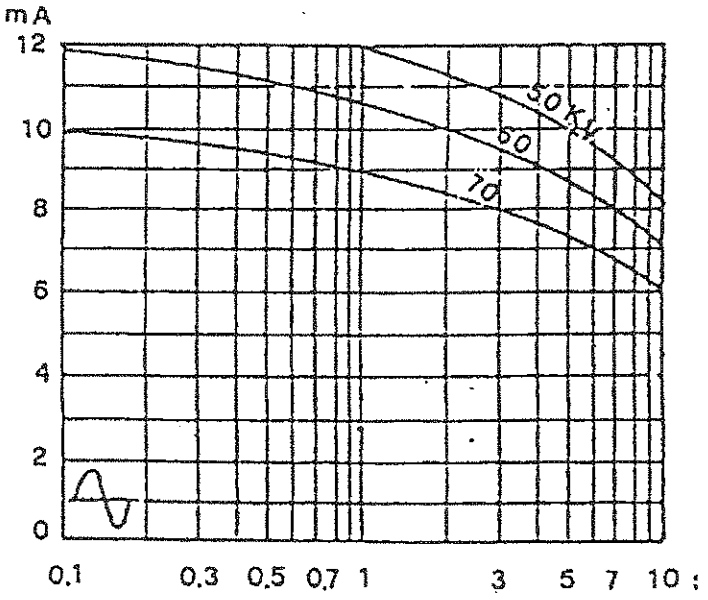




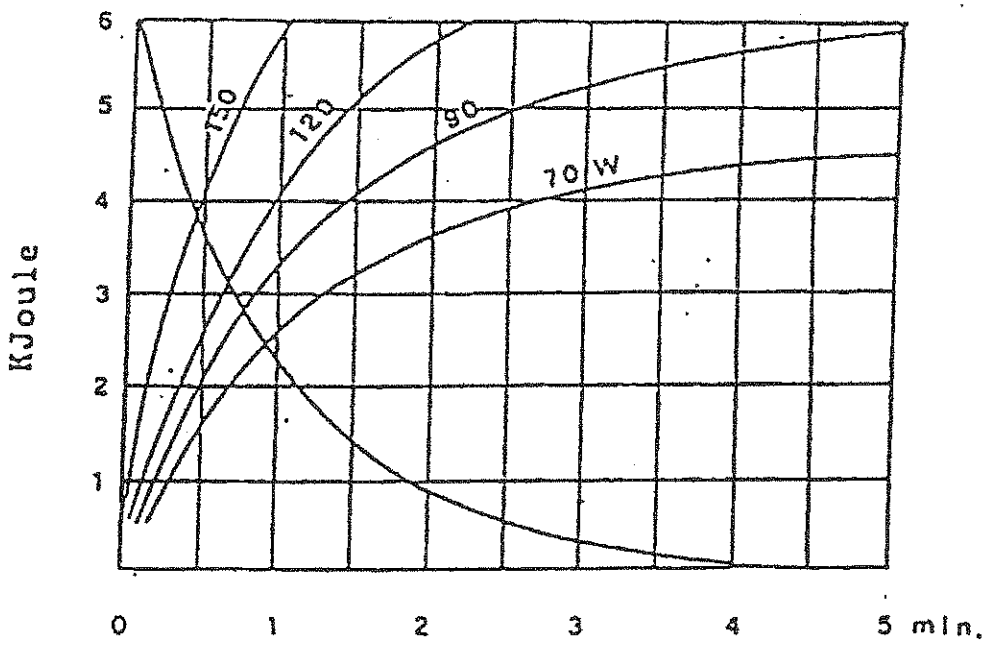
Filament Characteristics



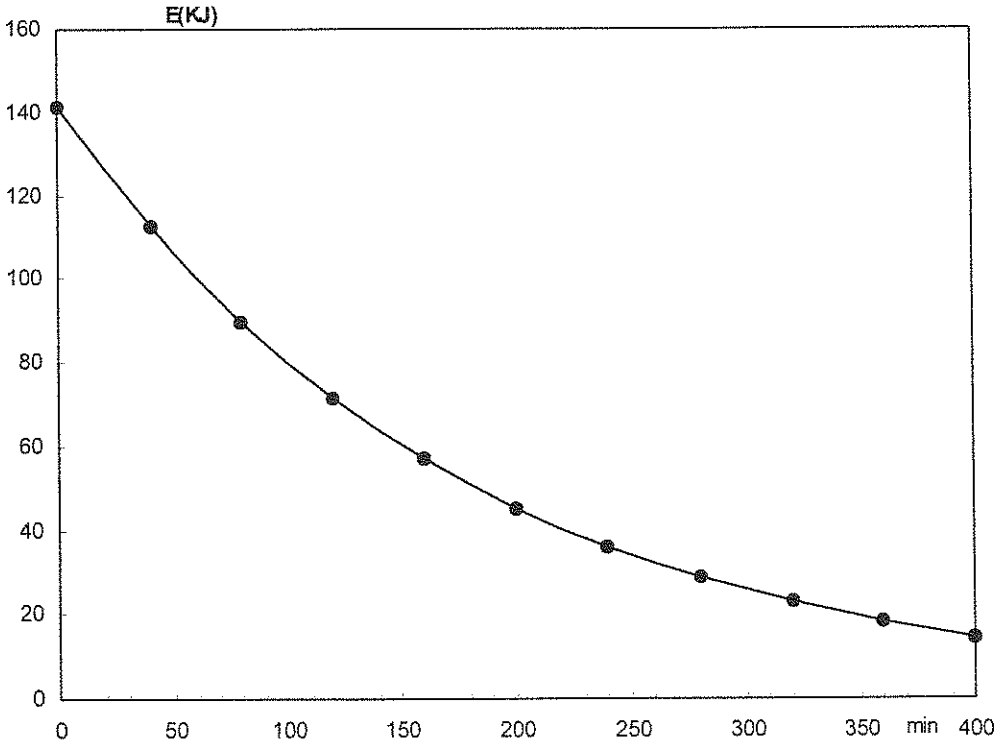
Loading



Cooling



Cooling curve of Tubehead



4.4 DIMENSIONS

Wall mounting configuration - Oval arms

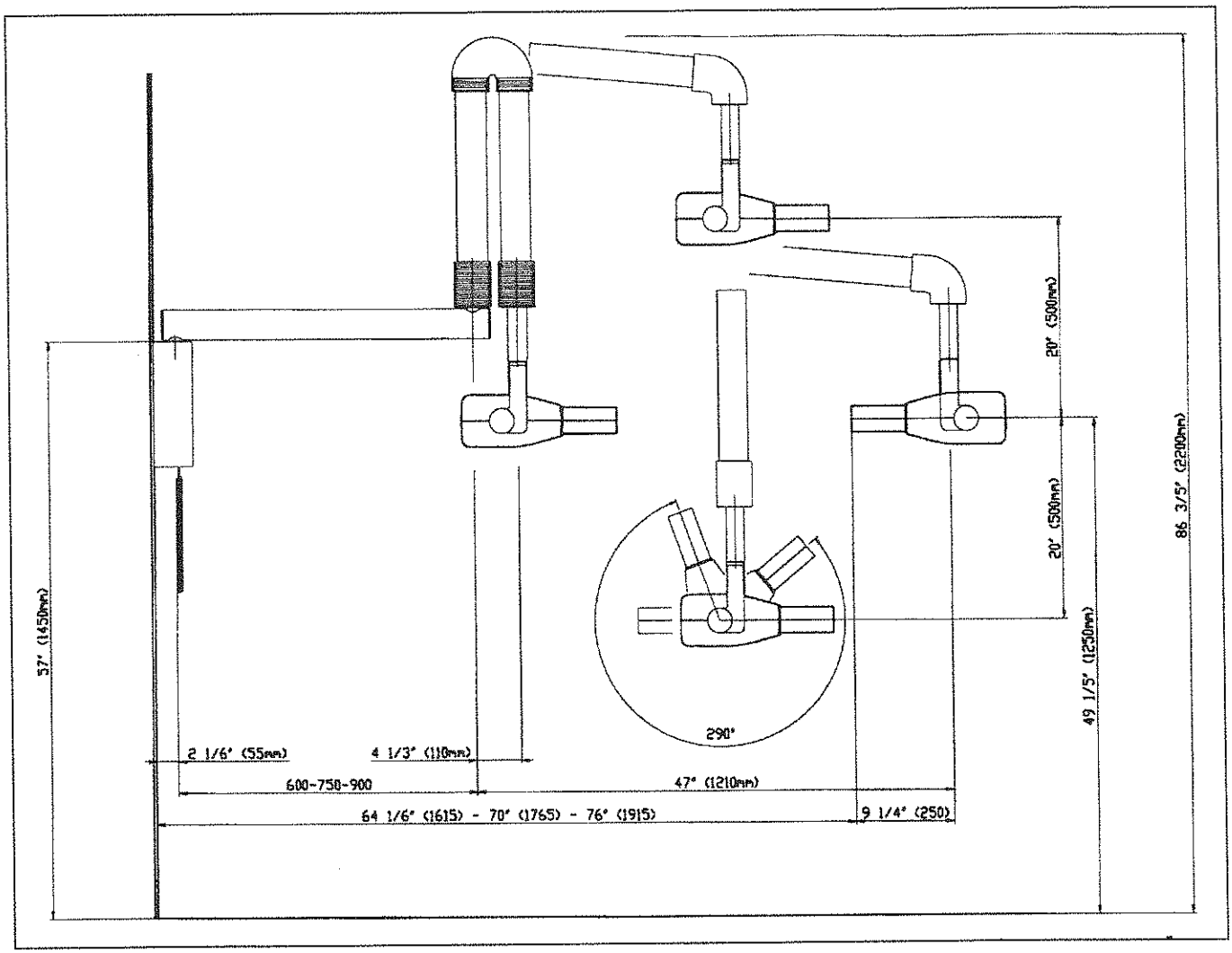


Figure 4-1

Mobile stand configuration

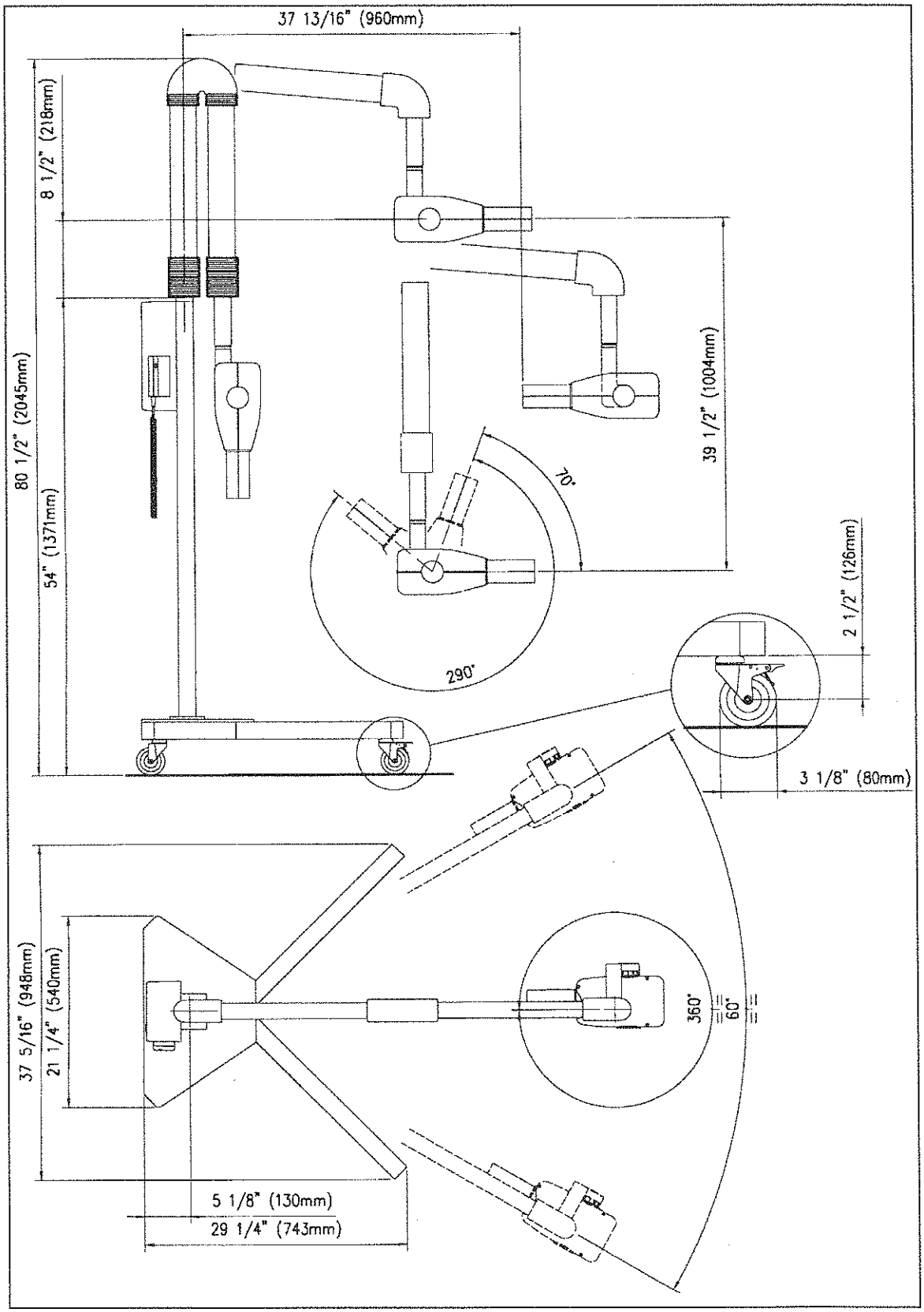


Figure 4-2

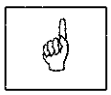
5. PRE-INSTALLATION

AZTECH 70 does not require specific pre-installation procedures: compliance with the rules stated in Chapter 5.1. is the sole requirement.

Should you wish to effect subtrace connections for the AZTECH 70, these must be carried out before the intra-oral X-ray equipment installation phase, considering dimensions and suggested distance from floor as stated in Chapter 4.4.

The manufacturer is able to ensure the necessary technical assistance and advice since the pre-installation phase; wall building and pre-installation are at the customer's charge.

5.1 FIXING METHODS



NOTE:
This chapter applies to Wall, Remote Timer (only for the arm support plate). Mobile Stand version do not require any assessment of wall solidity.

Assessment of wall solidity is left to the person in charge of installation.
The extraction load on each boss is 528 lb (240kg) for the wall mounting version.
For each type of wall, use the most suitable fixing method according to the following specifications.

1 wooden studs: 8x70 A 4.8 self-threading screws (provided in installation kit)
2 paviors or R250 cement bricks: expansion iron bosses (provided in installation kit) in M8 or optional WURTH chemical bosses (code VSM 66601320) (see Chapter 6.5.3)
3 hollow bricks: in-wall support (not provided by The Aztech Group, Inc.) which must support different weight and momentum as shown in the following table.

	Remote/Wall version
Weight	264 lbS (120 kg)
Momentum	1324 Nm (140 kgm)

WARNING:
The Aztech Group, Inc. shall bear no responsibility for installations not complying with the above instructions and specifications.

5.2 ELECTRICAL FEATURES

The supply line must comply with the following values:

Single-phase mains voltage + ground	120V ±10%
Line Frequency	60Hz
Absorbed current	6A
Apparent line resistance	0,2Ω max,

Connection of the equipment requires a magnetic-thermical switch having the following features:

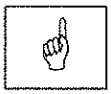
Nominal current	10A
Differential sensibility	30mA

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

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

	Distance	
Supply	0-15m	15-22.5
120V / 60Hz	12 AWG (4mm$^{2)}$	10 AWG (6.3mm$^{2)}$

Table 5-1



NOTE:
For 120V supply, we recommend to use wires whose section is not lower than 12 AWG (4mm^2).
For standard configuration (Figure 4-1) and mobile stand configuration (Figure 4-5), the supply terminal block is the same as the Timer's; for the other configurations, the Timer's supply terminal block is only a "link" between the electrical panel and the arms support terminal block.

5.3 ENVIRONMENTAL CONDITIONS

For optimum performance of this equipment, the room environment must be treated in such a way as to ensure a relative humidity of between 50% and 75 % and a temperature of between 64 - 82°F (18° and 28°C)

6. INSTALLATION

SUMMARY OF PARAGRAPHS FOR QUICK REFERENCE

	Timer and wall-mounting supports installation			Extension arm with scissors arm installation
	See Paragraph			See Paragraph
CONFIGURATIONS	6.5.1	6.5.2	6.5.3	6.6
Standard	●			●
Remote Timer		●		●
Mobile stand			●	

	Arms mounting on support (thimble)		Tubehead Mounting	Options			Electrical connection		Final functioning tests
	See Paragraph		See Paragraph	See Paragraph			See Paragraph		See Paragraph
CONFIGURATIONS	6.7.1	6.7.2	6.8	6.9.1	6.9.2	6.9.3	6.10.1	6.10.2	6.11
Standard	●		●	●	●	●	●		●
Remote Timer	●		●	●	●	●		●	●
Mobile stand		●	●		●		●		●

NOTE:
Carefully read the notes on wall solidity requirements presented in Paragraph 5.1.

6.1 AZTECH 70 INSTALLATION BACKWIRED

Should the system require an electrical box, the installation must be done using a UL listed Junction Box.

Note:
The Junction box must always be placed behind the cutoff of the 16" on center wallplate (anchor plate) , as stated on the Figure 6-1 below.

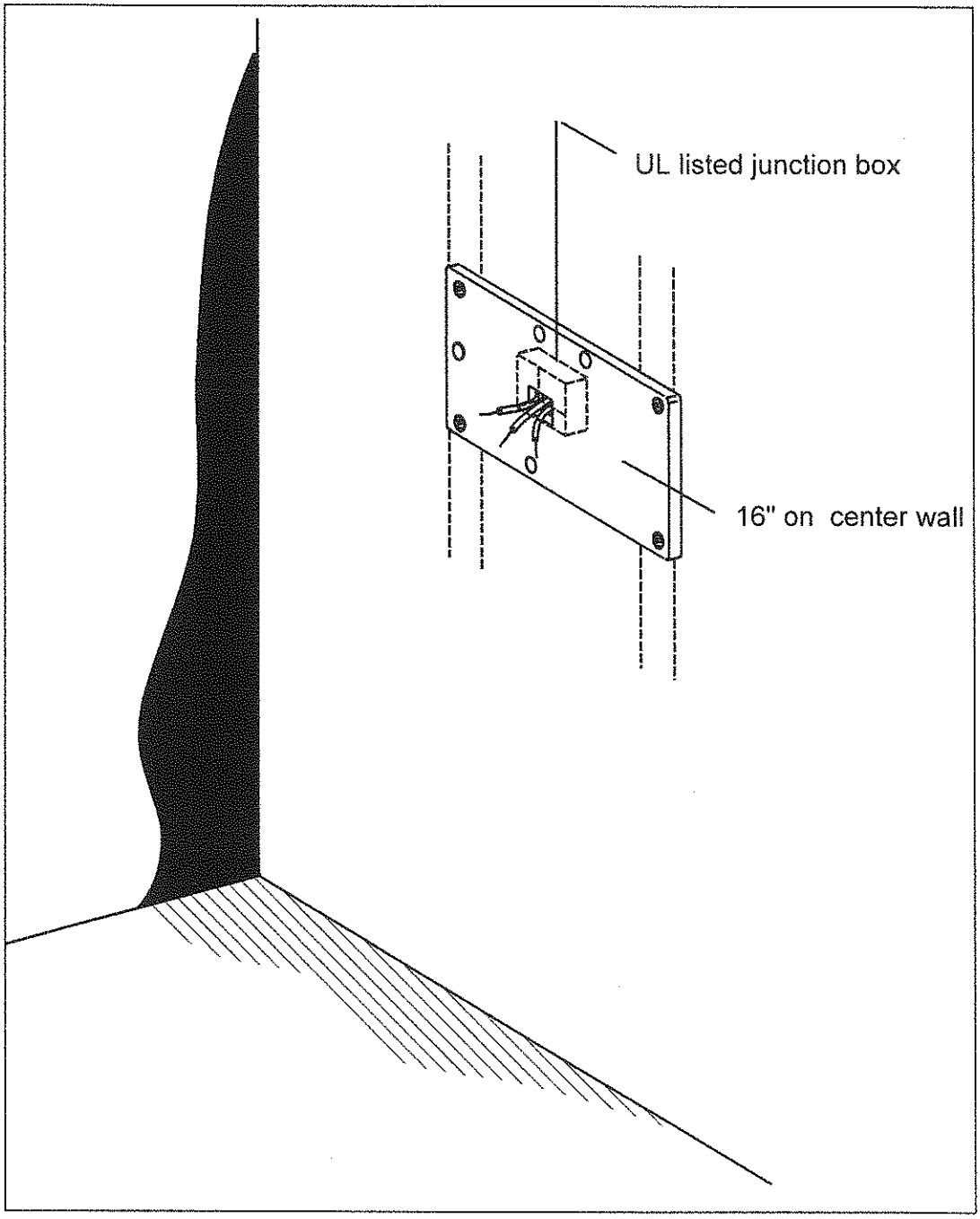


Figure 6-1 16" on center wall plate mounting

6.2 AZTECH 70 INSTALLED ON DRY WALL WITH WOODEN STUDS

Four lag bolts 5/16 x 2 - ½ inches are needed.

Note :

Make sure lag bolts penetrate center of the stud. See Figure 6-2 **6.2.**

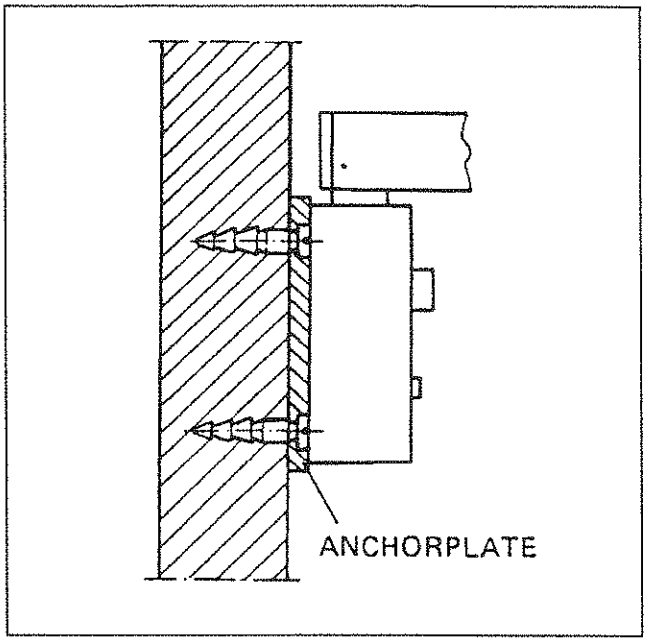


Figure 6-2 Dry wall with wooden stud mounting

6.3 AZTECH 70 INSTALLED TO A CONCRETE WALL

The Aztech 70 can be installed to a concrete wall. For this application, four 3/8" lead expansion shields are needed.

6.4 SINGLE STUD

The single stud option is usefull for pass through installation.

Note:
The Junction box must always be placed behind the cutoff of the single stud plate (anchor plate) , as stated on the Figure 6-3 Single stud below.

Should the system require an electrical box, the installation must be done using a UL listed Junction Box.

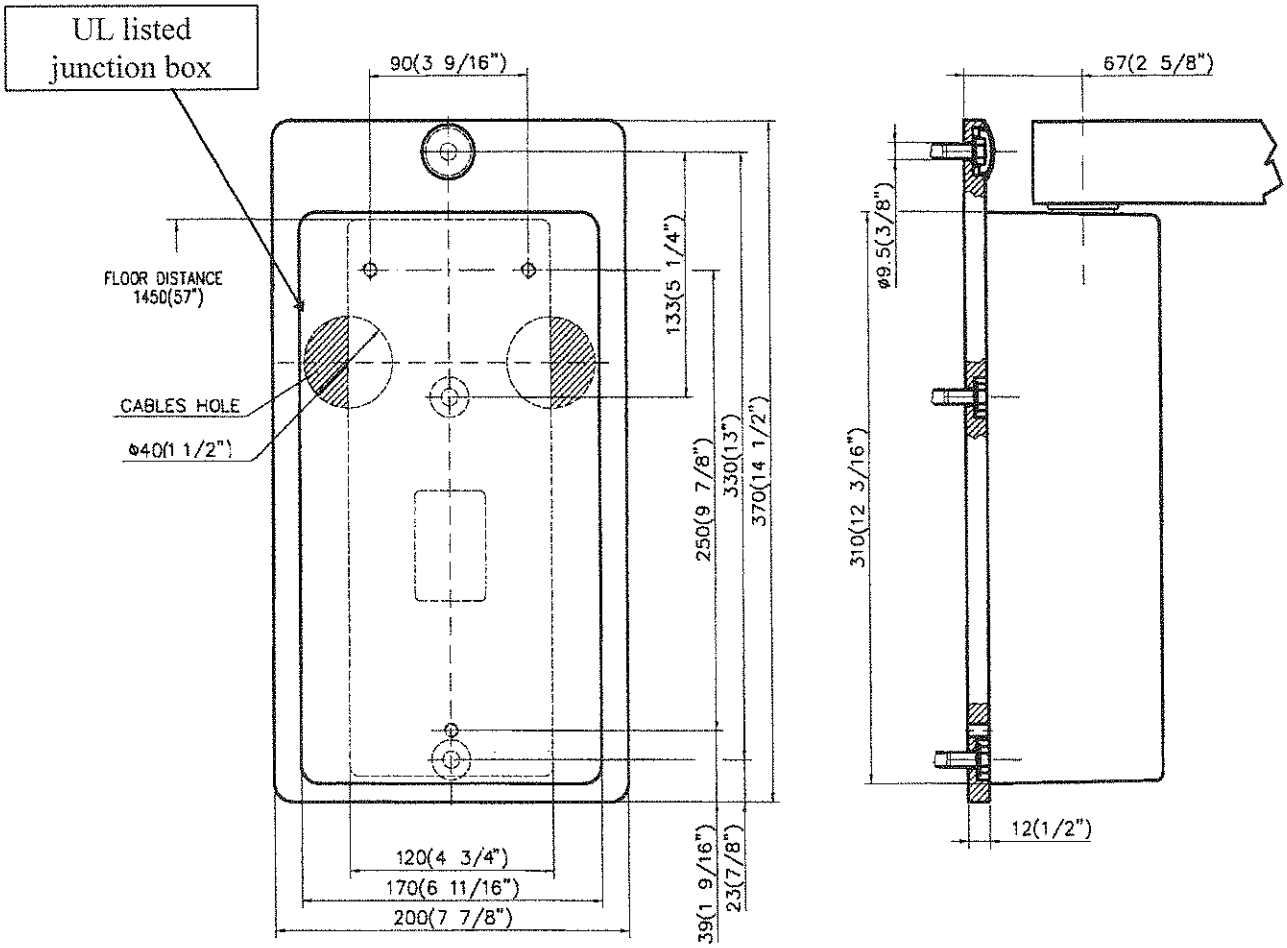


Figure 6-3 Single stud

The kind of installation needs 3 lag bolts 5/16 x 2 - ½ inches.

- Installationfirst the single stud plate using the template (code 3960924500)
- The cable must exit from the wall by a UL listed Junction Box
- Latest install aluminium plate using the 3 screws.
- Follows instruction as for wall mount.

6.5 WALL MOUNTING INSTALLATION

The AZTECH 70 intra-oral X-ray unit is shipped in pre-assembled groups.
Mechanical mounting only consists of assembling these groups.
Registration of all mechanical elements is therefore effected prior to delivery; any intervention on these components is not required and may cause misfunctioning of the equipment; any operation must therefore be carried out by personnel authorised by the manufacturer.

6.5.1 Wall plate + Timer (standard configuration)

1. Referring to Figure 6-4 below, mark 4 holes "F" on the wall, 57" (1450 mm) from top of 16" on center wall plate to floor. Use template supplied (code 39609246).
2. Drill the holes as marked and insert the appropriate bolts or expansion plugs supplied with the apparatus depending on the backing available, as per instructions defined on paragraph 6.2 on page 31 or 6.3 on page 31.

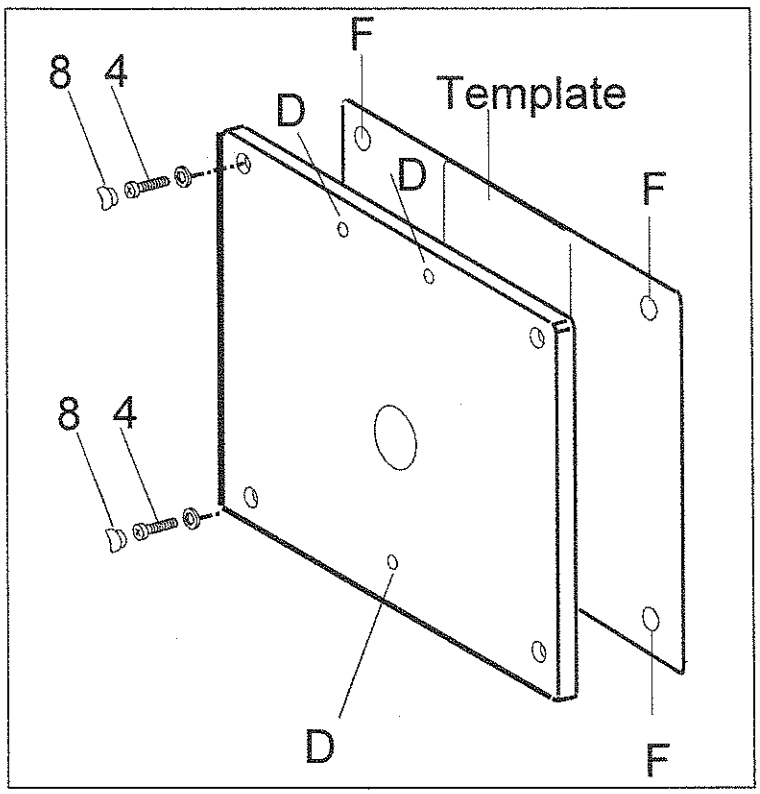


Figure 6-4

3. Referring to Figure 6-5 below, remove wall plate/Timer external cover by loosening the two screws (**1**) located in the bottom part of the plate.

4. Loosen the internal screw (**2**) fixing the components plate and rotate the support by 90°.

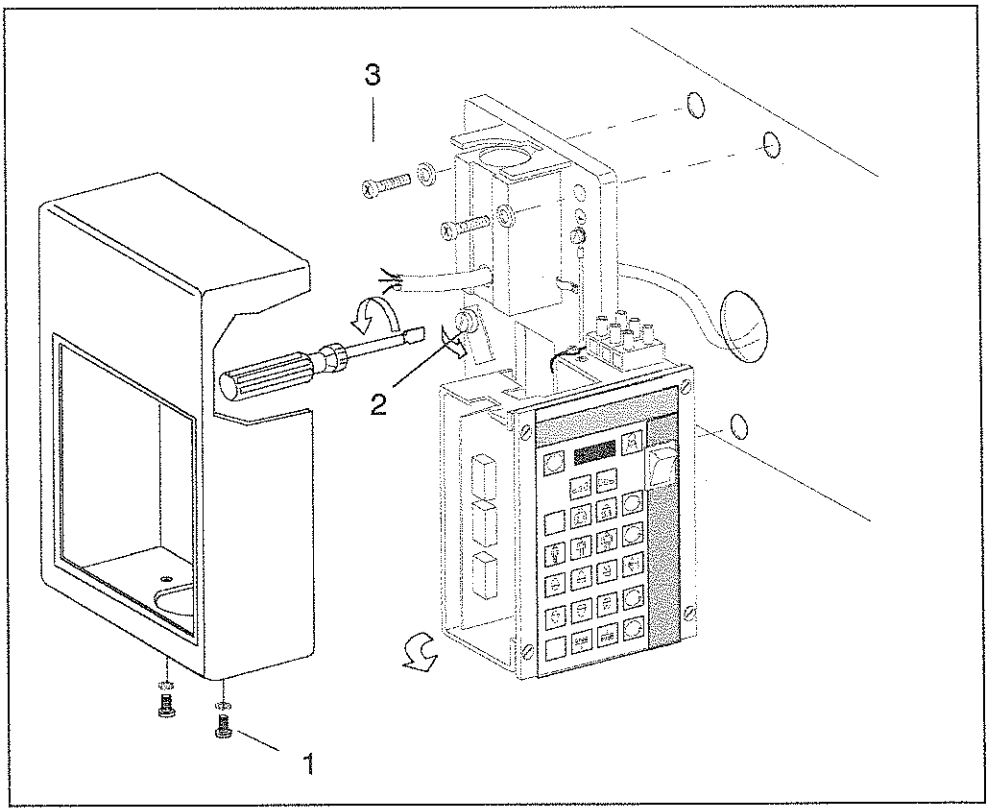


Figure 6-5

5. Secure the timer to wall plate to wall by means of the screws (**3**), inserting the counterplate (**4**) between the two and check that top plane is levelled (use a level).

6.5.2 Wall plate configuration with Remote Timer

Installation of the system with Remote Timer is marked by the presence of two seemingly similar elements. The first, having an arm support function, is made up of a wall plate complete with X-ray support block, (transit) terminal block and external cover. The second element, having a timer function, is made up of a support timer plate and external cover (with two boards and one control panel)

WALL PLATE

Mark the points for wall plate mounting by means of the enclosed template (code 39609246) following the instructions described on paragraph 6.5.1.

2. Mark the points for wall plate mounting by means of the enclosed template (code 39609247) and make the relevant holes having a diameter corresponding to that of the selected bosses.
3. Remove Timer external cover by loosening the two screws (**1**) located in the bottom part of the plate.
4. Loosen the internal screw (**2**) fixing the components plate and rotate the support by 90°.
5. Make holes in wall in the marked points and insert the expansion bosses provided in the installation kit.
6. Secure wall plate to wall by means of the screws (**3**), inserting the counterplate (**4**) between the two and check that top plane is levelled (use a level).

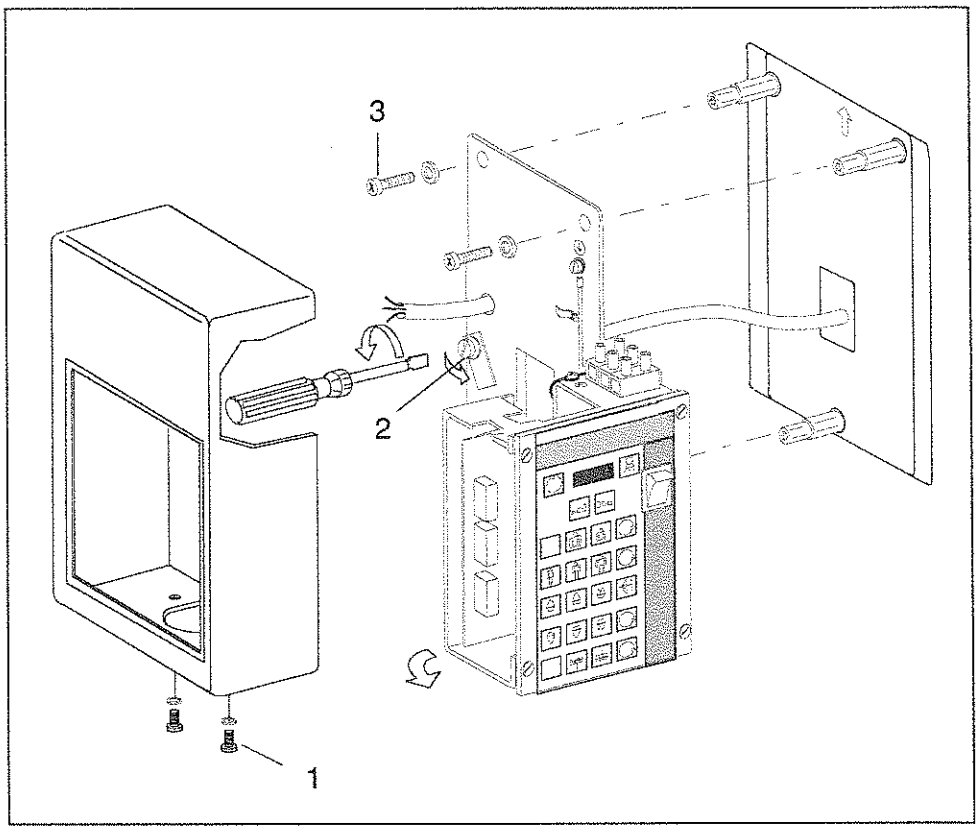


Figure 6-6

6.5.3 Mobile stand mounting and Timer installation

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

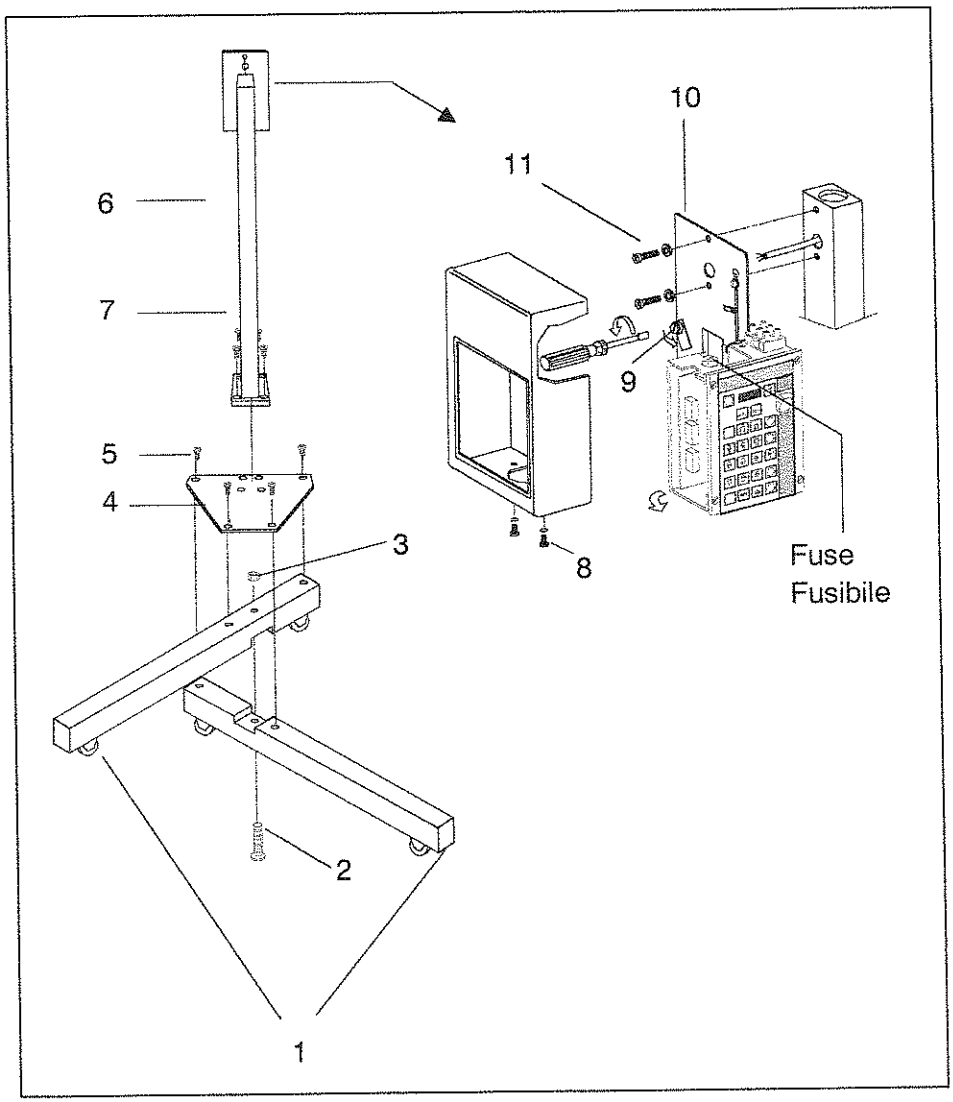


Figure 6-7

7. Connect the power cord to the timer as stated for standard version; please refer to paragraph 6.10.1.

6.6 SCISSORS ARMS AND EXTENSION ARMS MOUNTING

WARNING:
To ease this operation (and avoid any inconvenience), we recommend not to remove the part of packing holding the two sections of the scissors arm closed and to perform the whole phase on bench. Non-compliance with this procedure may cause damage to the equipment and to people.

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

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

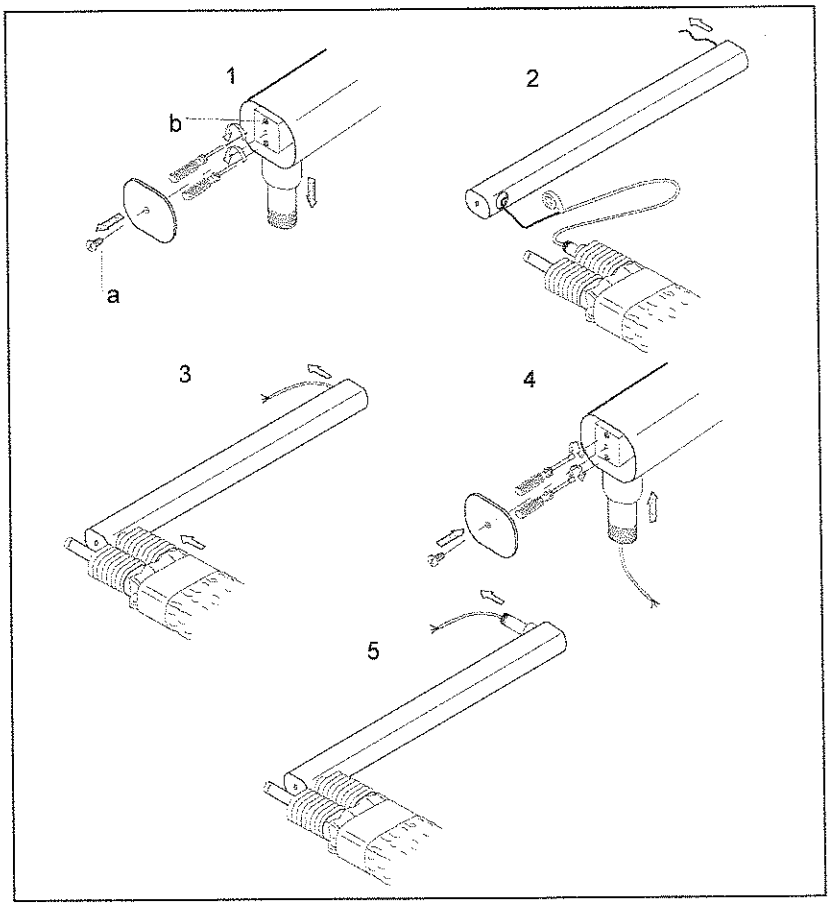


Figure 6-8

6.7 ARMS MOUNTING ON SUPPORT

6.7.1 Wall mounting of arms assembly

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

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

Do not free scissors arms from holding pack.

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

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

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

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

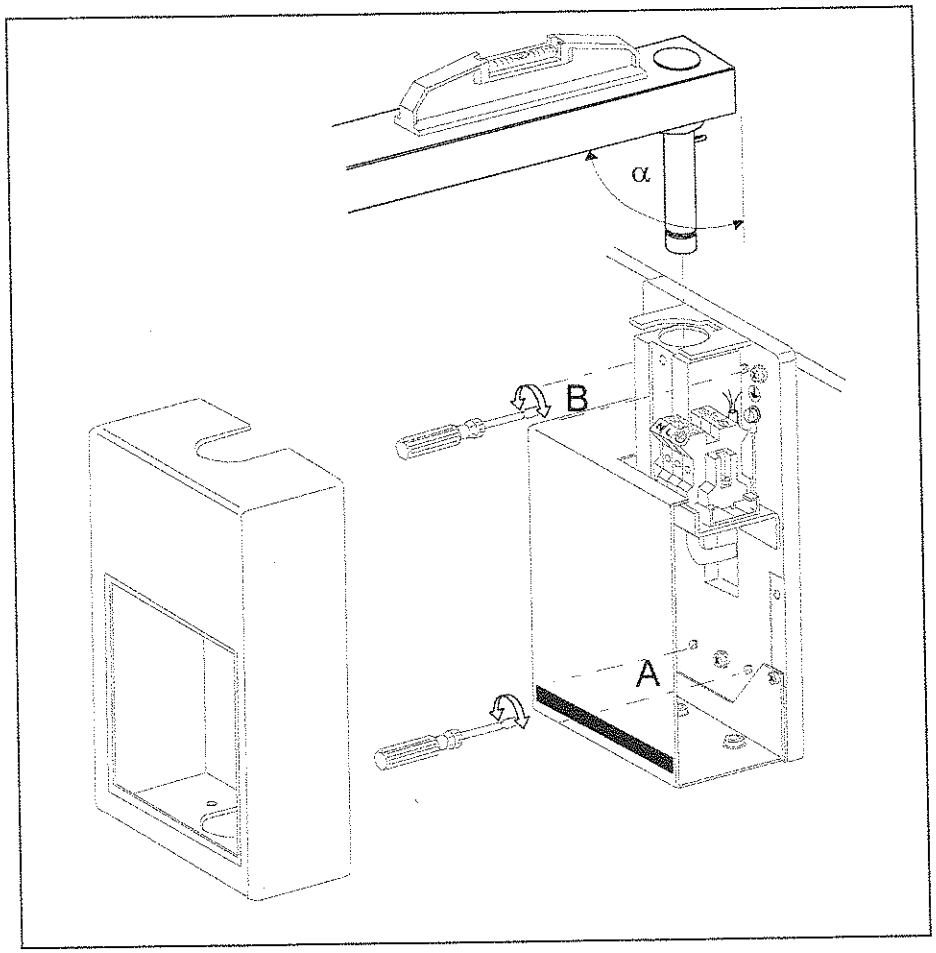


Figure 6-9

6.7.2 Mounting of arms assembly on mobile stand

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

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

Do not free scissors arms from holding pack.

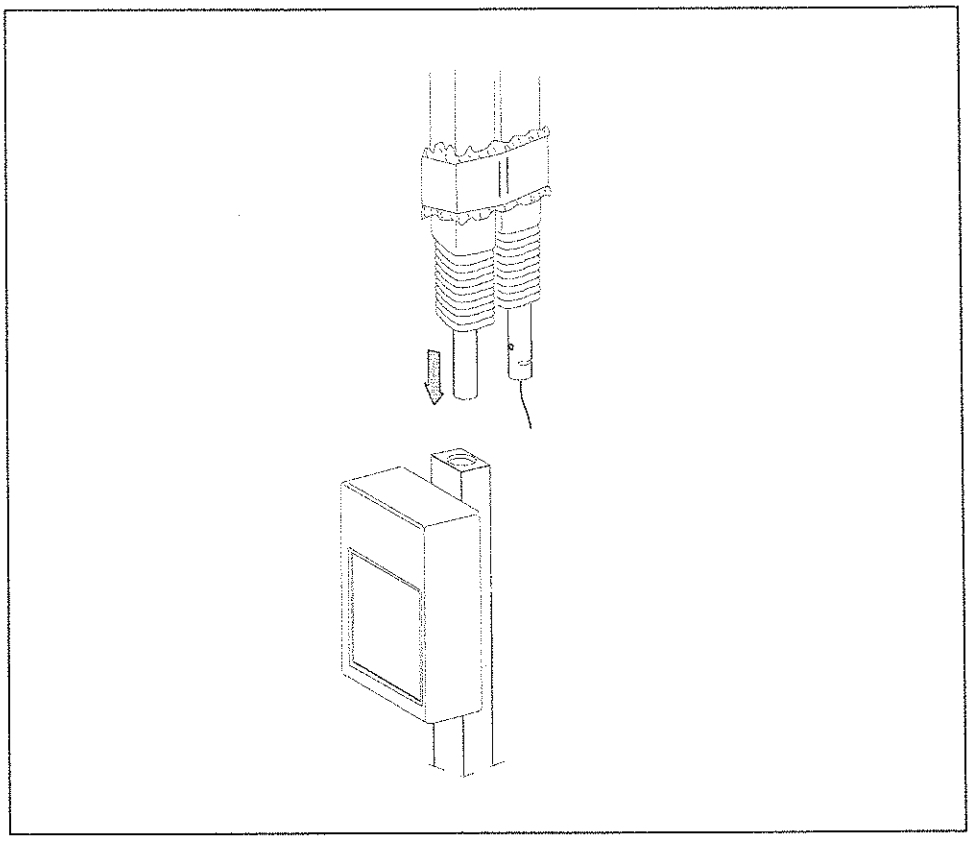


Figure 6-10

6.8 TUBEHEAD MOUNTING

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

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

4. Completely insert rotation pivot in the joint, secure it with safety ring (**3**) and lower protection cover (**2**). Only after this has been carried out, the scissors arms holding pack can be removed.
5. Lower cover on elastic ring and screw safety screw back (**1**).

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

All operations for extension arm friction regulation must be performed as described in paragraph 7.2.1 (page 50).

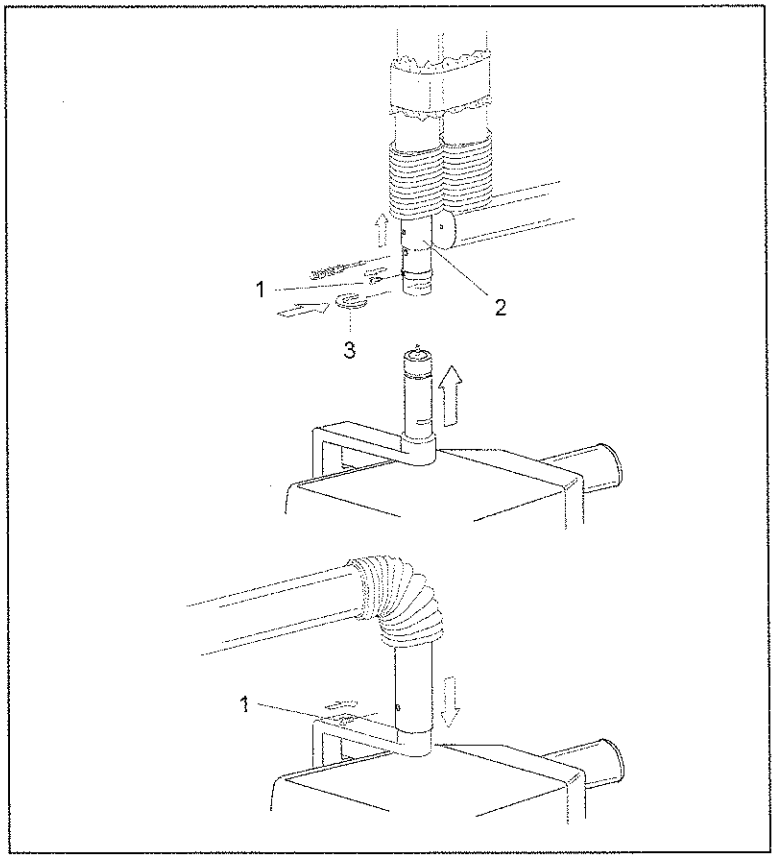


Figure 6-11

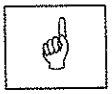
6.9 INSTALLATION OF OPTIONS

6.9.1 Single stud plate

The single stud plate is used in case of utilisation on pass through installation.
To use this option, please follow instruction on paragraph 6.5.1 using the template code 39609245; the single stud plate uses three aligned holes and the fixation is obtained by three wooden screws 5/16 x 2 ½ inches.

6.9.2 Remote X-ray button (door bell)

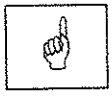
WARNING
The VCA timer as manufactured for The AZTECH Group, Inc. is in compliance with DHHS performance standards as set forth under 21 CFR.
The regulation requires that a visual indication of the technique factors be visible from the operator's position. The VCA timer, by itself, may easily be extended and used as a remote switch assembly to meet this criteria.
Occasionally, a need may arise to complement this switch with another single button or a combination thereof. Although a connection point is provided on the VCA timer, the manufacturer specially and expressly, by this warning, disclaims any responsibility, either expressed or implied as to the fitness and correctness of this remote installation in reference to the federal regulations as applicable. It is the installers responsibility to observe and abide by the rules.

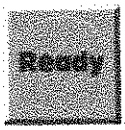


NOTE:
The cable connecting Timer and remote X-ray button, either external or subtrace, must always be inserted into an iron cable run to avoid disturbances to signals inside the cable.

The cable may have a maximum length of 40 feet and, consequently, the distance between Timer and hand remote control must be smaller than this length.

The cable must have a minimum section of 1mm^2 and has to be connected to connector X12 and X13 of the Logic Board (CPU board).
The hand remote control to be connected to the Timer is not supplied by The Aztech Group, Inc..
Safety regulations require the use of a key enabled by the relevant safety key.



NOTE:
Aztech 70 with VCA timer is equipped with an exposure enabling key 

. Nevertheless, we recommend installation of the external hand control enabled by the relevant safety device (key).

6.9.3 Remote X-ray button with signalling LED

WARNING
The VCA timer as manufactured for The AZTECH Group, Inc. is in compliance with DHHS performance standards as set forth under 21 CFR.
The regulation requires that a visual indication of the technique factors be visible from the operator's position. The VCA timer, by itself, may easily be extended and used as a remote switch assembly to meet this criteria.
Occasionally, a need may arise to complement this switch with another single button or a combination thereof. Although a connection point is provided on the VCA timer, the manufacturer specially and expressly, by this warning, disclaims any responsibility, either expressed or implied as to the fitness and correctness of this remote installation in reference to the federal regulations as applicable. It is the installers responsibility to observe and abide by the rules.

This optional part allow to install a remote X-ray button having a signalling LED that will light on during emission. The installation Kit is completed with the following parts:

- Remote X-Ray button with signalling LED and a 4 wires coilled cord.
- 8 spade connectors
- 1 terminal block

The kit does not include the 4 wires cable from the timer to the remote point of installation.

1. run the 4 wires cable from the timer to the point of installation of the push button; the wires must have a minimum section of $1mm^2$
2. install the spade connectors to the both end of the cable (4 on each side)
3. connect the wires to the VCA Timer recording numbers or colours of the wires connected to the following terminal on the VCA Timer:
   a) X-ray button # 1 to terminal X12
   b) X-ray button # 2 to terminal X13
   c) LED negative to terminal X14
   d) LED positive to terminal X15
4. at the other end of the cable connect the wires to cable coming from the X-Ray button with the following sequence and respecting the correspondence:

   the wire "a)" to the red wire of the push button

   the wire "b)" to the white wire of the push button

   the wire "c)" to the yellow wire of the push button

   the wire "d)" to the black wire of the push button

   This operation is made easiest using the special terminal block supplied with the kit.

6.9.4Installation of chemical bosses

Installation with chemical bosses is recommended for hollow bricks.
To install chemical bosses, follow the instructions enclosed in the installation kit.

6.10 ELECTRICAL CONNECTIONS

After completions of the mechanical installation of the timer (available in different versions), proceed to electrical connection referring to the electrical schematics presented in Chapter 9. The timer must be connected to a system equipped with adequate grounding, in compliance with existing local safety regulations

6.10.1 Electrical connection for standard versions

1. Perform connection between main switch and Timer terminal block by means of a bipolar cable + ground, whose minimum section must be of 2.5mm^2 (14 AWG); close cable on Timer side with the relevant prod terminals provided in installation kit. Secure cable to terminal block, respecting indicated positions (L = line - brown cable, N = neutral - blue cable, Ground = yellow/green cable). The three wires must be bundled together near terminal block.
2. Connect tubehead cable to supply board, closing cables with the relevant terminals provided in installation kit, **respecting the positions indicated in the following table:**

Signal	Tubehead wire	Power board Position	Cable colour
Line	L2	X3	Brown (Black)
Neutral	N2	X4	Blue (Black)
Ground	Ground	Ground	Yellow/Green

X3 and X4 wires must be bundled together near the relevant faston; it is also necessary to prevent the wires from running between the boards, and consequently the excess wire must be fixed to the upper part of the timer by means of a bent.

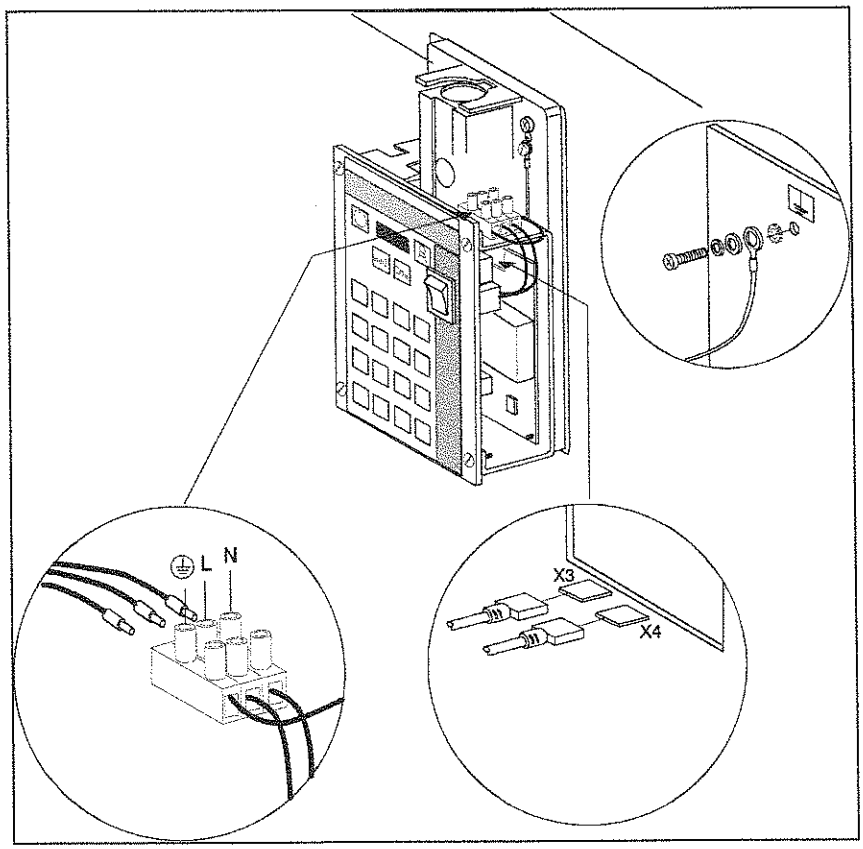


Figure 6-12

6.10.2 Electrical connection for versions equipped with remote Timer

1. Perform connection between main switch and remote Timer terminal block by means of a bipolar cable + ground, whose minimum section must be of 2.5mm^2 (14 AWG); close cable on Timer side with the relevant prod terminals provided in installation kit. Secure cable to terminal block, respecting indicated positions (L = line - brown cable, N = neutral - blue cable, Ground = yellow/green cable).
2. Connect X4, X3 and Ground Timer cables to terminal block L, N and Ground respectively on wall plate terminal block, using the terminals provided in the installation kit.
3. Connect tubehead cable to wall plate terminal block, attaching it with spade connector, respecting indicated positions (N2 = blue (black) cable, L2 = brown (black) cable, Ground = yellow/green cable on point of frame).

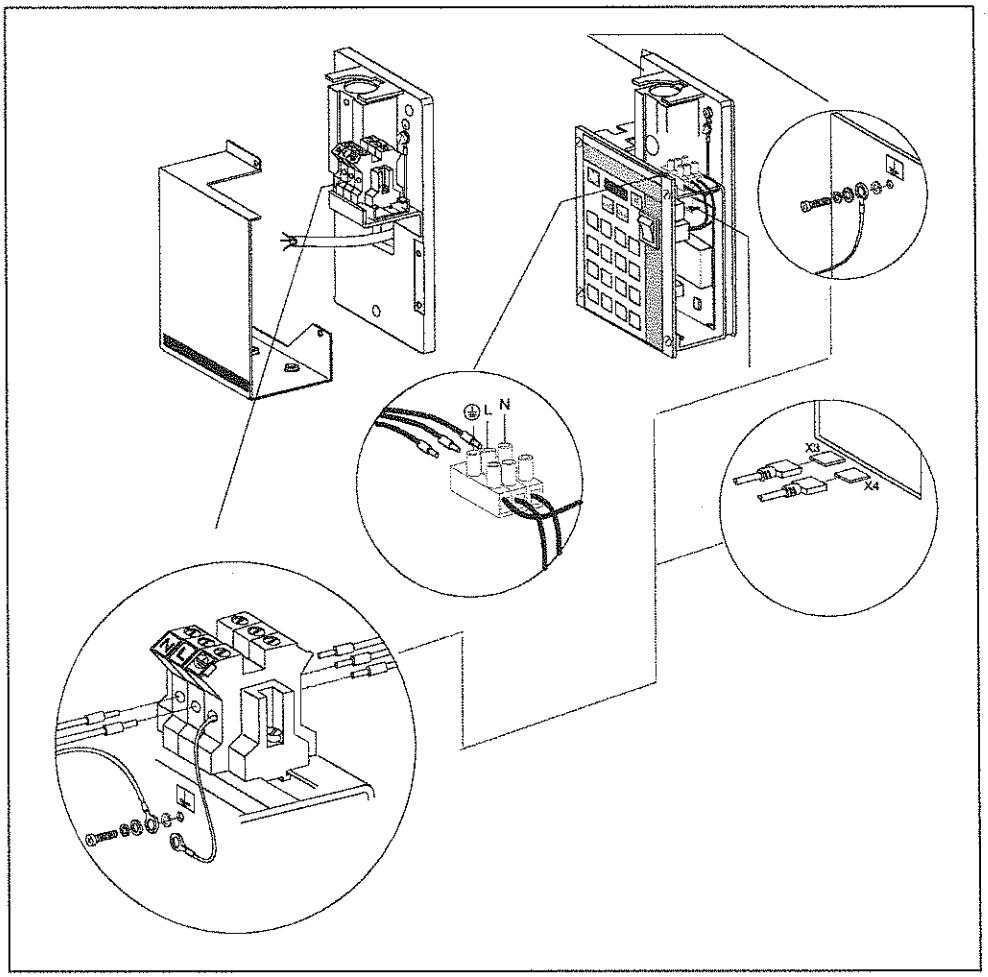
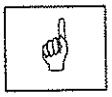


Figure 6-13

WARNING:
For all versions, tubehead connection to the supply board must be effected following the instructions provided, to ensure that the system functions at nominal values. Wrong connections may cause abnormal current absorption and consequent drop in tubehead performance and, in some cases, interruption of mains fuses.

6.10.3Connection of the remote X-ray button

The wires for remote X-ray button should be connected to the X2 terminals of the CPU board. The wires and push key are not supplied.



NOTE:
The cable have to be 2x 24AWG with a maximum lenght of 36 feet (10cm) and an external diameter of 4mm.

6.11 FINAL FUNCTIONING TESTS

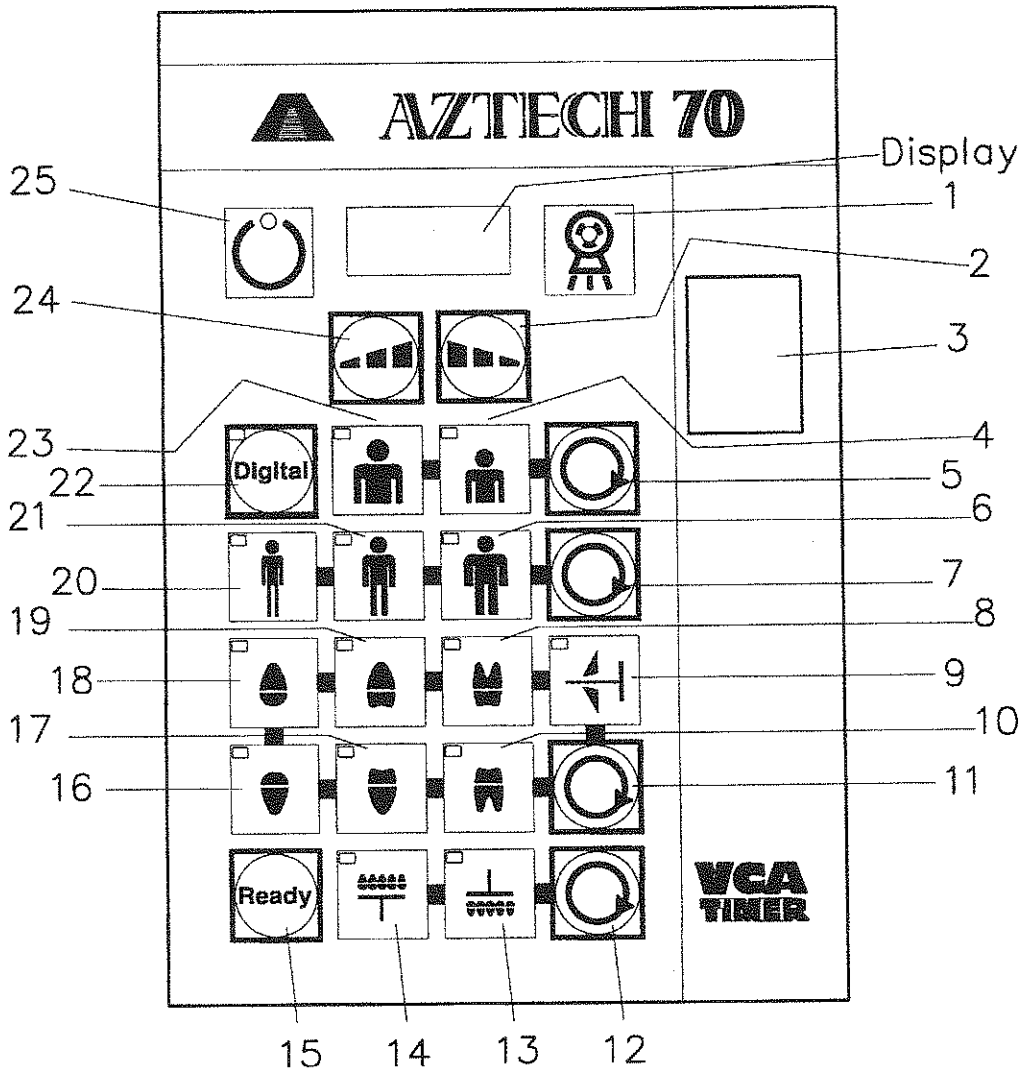


Figure 6-14

LEGEND

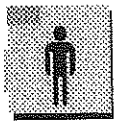
1	X-Ray emission LED
2	Decrease key
3	Power ON/OFF switch
4	Child LED
5	Adult /Child selection key
6	Large size LED
7	Size selection key
8	Upper Molar LED
9	Byte-wing LED

10	Lower Molar LED
11	Tooth type selection key
12	Occlusal selection key
13	Lower Occlusal LED
14	Upper Occlusal LED
15	Exposure enabling key
16	Lower incisor LED
17	Lower canine LED

18	Upper incisor LED
19	Upper canine LED
20	Small size LED
21	Medium size LED
22	Digital radiography selection key
23	Adult LED
24	Increase key
25	"Ready for X-Ray" Green LED

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

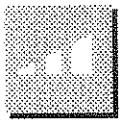
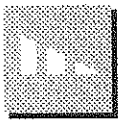
After equipment has been connected to network mains voltage, perform the following functional tests:

1. Turn unit ON by pressing main ON/OFF switch (**3** on page 47) on **ON** position and check that light on the switch turns on and that control is set on automatic function selection mode for keys  **23** (adult)  , **22** (medium size) and  **19** (upper jaw premolar) (the relevant LED's are on).

2. Check correct functioning in automatic mode by checking that the values displayed correspond to those reported in the table for all combinations of Patient, Size and Tooth type. Values reported in the table are calculated with multiplying factor "1" (see chapter 7.5.2 of the user manual)

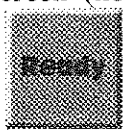
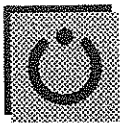
	0.32	0.50	0.70	0.18	0.25	0.36
	0.36	0.63	0.80	0.23	0.32	0.45
	0.25	0.32	0.50	0.12	0.16	0.23
	0.36	0.50	0.70	0.18	0.25	0.36
	0.30	0.40	0.60	0.12	0.16	0.23
	0.23	0.30	0.45	0.12	0.16	0.23
	0.25	0.32	0.50	0.12	0.16	0.23
	0.60	0.80	1.00	0.30	0.40	0.60
	0.45	0.60	0.90	0.23	0.30	0.45

Table 1

3. Select manual function by pressing key  **2** (increase) or  **24** (decrease) and check that display visualises the different manual exposure times by repeatedly pressing the relevant keys, as shown in the following table:

0.02 - 0.04 - 0.06 - 0.08 - 0.10 - 0.12 - 0.14 - 0.16 - 0.18 - 0.20 - 0.23 - 0.25 - 0.30 - 0.32 - 0.36 - 0.40 - 0.45 - 0.50- 0.54 - 0.60 - 0.63 - 0.70 - 0.80 - 0.90 - 1.00- 1.25 -1.30 - 1.40 - 1.60 - 2.00 - 2.50 - 3.00 - 3.20

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

4. Position fluorescent screen (not provided) for radiation visualisation at extreme end of collimator; press key  **15** and check simultaneous switching on of green LED  **25**, press X-ray button and check simultaneous switching on of the yellow LED  **1** and generation of acoustic signal accompanying X-ray emission.

Once these checks have been successfully completed,

EQUIPMENT IS READY FOR USE.

7. MAINTENANCE

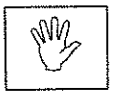
7.1 GENERAL FEATURES

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

Preventive maintenance consists of checks performed directly by operator and of periodical maintenance interventions to be performed by Service engineers only.

Checks directly effected by the operator may be:

- check that labels are intact and properly secured
- check that tubehead is free from oil residues
- check that the hand control cable is not broken or worn out
- check for external damage on the apparatus, which may prejudice protection against radiation
- check scissors arm balancing
- check centring of X-ray beam



WARNING:
Checks must be performed before any operating session.
In case of irregularities or failures, the operator shall contact Technical Service.

In order to preserve the equipment's original features, preventive maintenance must be effected once a year by a The Aztech Group, Inc. authorised engineer.

During this maintenance phase the equipment's functional performance is checked and repaired if required, following the instructions provided in Chapters 7.2 and 8.

WARNING:
Preventive and/or corrective interventions may be performed by The Aztech Group, Inc. authorised personnel.

WARNING:
In case of components replacement, use only original spare parts.

7.2 ARMS REGULATION

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

7.2.1 Oval arms

Arms regulation may be necessary in the following cases:

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

Extension arm friction regulation

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

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

4. Place cover and logo label back in the original position.

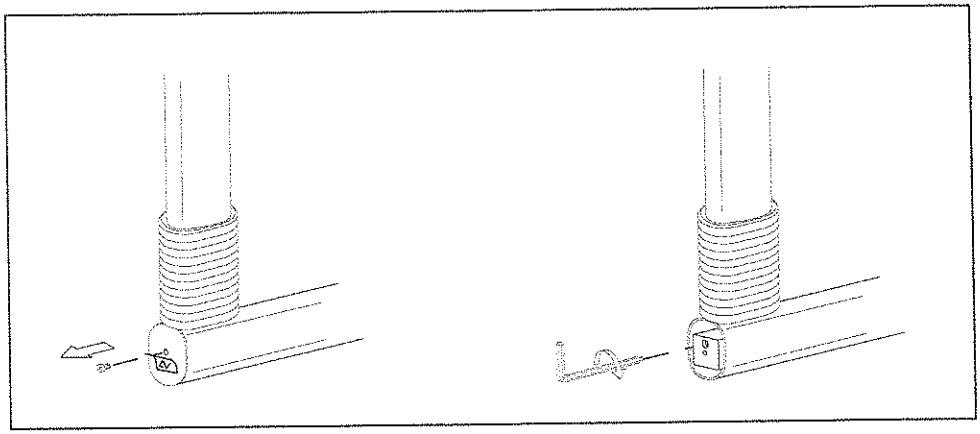


Figure 7-1

Scissors arm regulation: second arm

To proceed to scissors arm regulation, proceed as follows:

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

- Spring regulation (figure B)

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

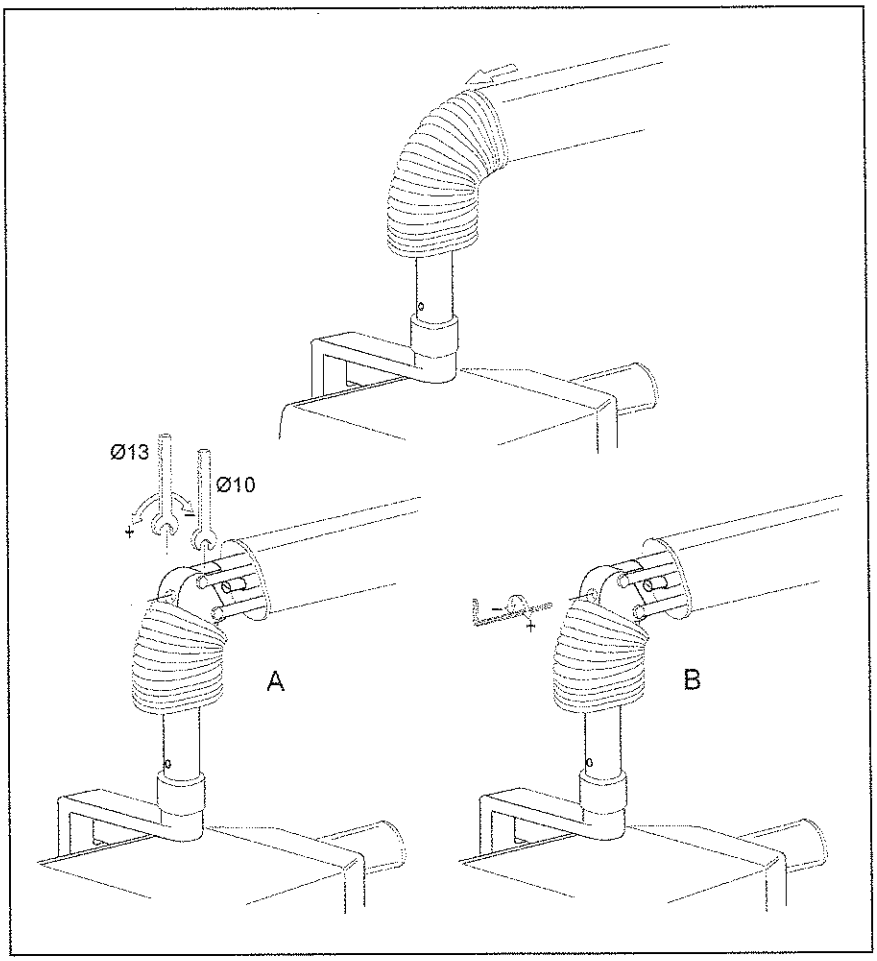


Figure 7-2

Doubble scissors arm: first arm adjustment

In case first arm regulation is required:

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

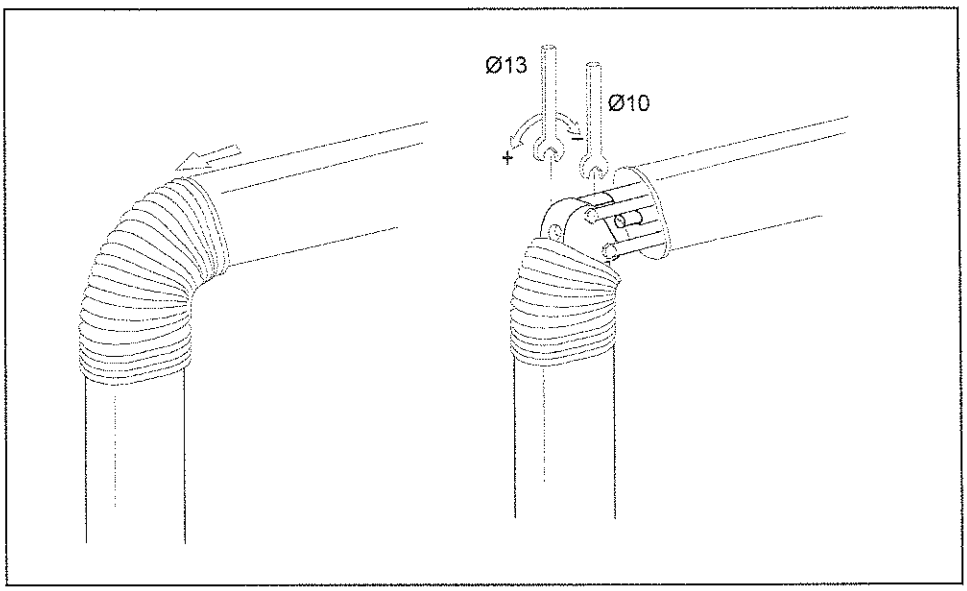
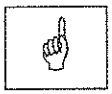


Figure 7-3

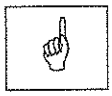
8. SET-UP AND ERROR MESSAGES (FOR TECHNICAL PERSONNEL ONLY)

8.1 SET-UP

In case of replacement of the electronic boards of the timer or of the whole tube-head, the system will require the re-adjustment of some parameters by means of the "SET-UP" procedure.



NOTE:
During the set-up procedure the LED's of the keyboard will not be activated.

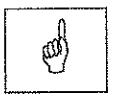


NOTE:
During the set up and programming procedures the storing of the selection is accomplished by pressing the 

button

1. Turn on unit using the illuminated on/off button. The first self-test is an 8.88 that will briefly appear. The unit will then automatically display a number such as "2.00".
2. When the number "2.00" appears you must immediately press **both** the *increase* and *decrease* buttons until you see "PRO" then release simultaneously.
3. The LED window will now read "PO1".

8.1.1 PROGRAMMING THE PARAMETERS FOR THE AZTECH 70.



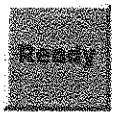
NOTE:
After each "Pxx" number you will access the program parameters value by briefly holding down the *increase* or *decrease* buttons. You will also use the same *increase* or *decrease* buttons to change the settings. Finally, to confirm each step you will press the 

button.

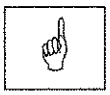
8.1.2 ACCESSING AND SETTING PARAMETERS

SELECTION OF THE LINE VOLTAGE:

1. Press *increase* or *decrease* button. The LED window will show 120, 220, 230, or 240. Using the same *increase* and *decrease* buttons adjust until the LED window reads 120. This is for our U.S. standard of 120 volts. Confirm by pressing the



button.

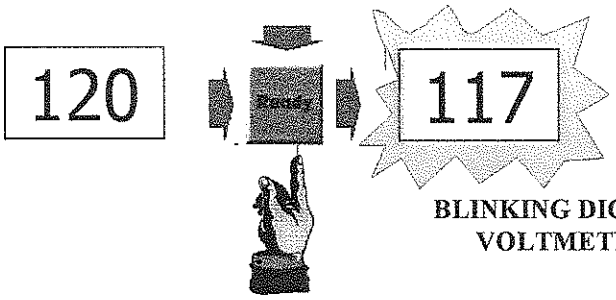


NOTE:
This parameter has never to be changed in order to protect system from damage.

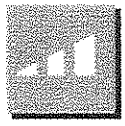
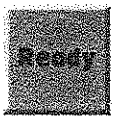
2. You will now see a blinking number, i.e., #117, which is the actual line voltage being read by the Aztech 70.
3. Connect a digital voltmeter to the input line voltage. Set the meter to VAC.
4. Using the *increase* and *decrease* button, adjust the Aztech 70 until the LED window displays the same number that is shown on your voltmeter. To perform this operation, please follow "Procedure to adjust voltage" below. Press the 

key to confirm.

DATA STORING



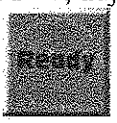
Procedure to adjust line voltage:

- Press at the same time the keys increase  and decrease  for at least two seconds to reset the offest eventually already present.
- Connect a digital voltmeter to the input line voltage connectors; set the meter to VAC autorange.
- Using increase or decrease key, set the value read by the timer equal to the one measured by the voltmeter.
- To store the value press the 

key. Now it moves to next setting P02.

P02 *RESERVED FOR FUTURE USE* **This must not be changed.**

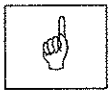
Use the *increase* buttons to display the value of P=1.
If you get P=0, adjust to P=1 using the *increase* or *decrease* buttons.

Press the 

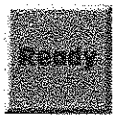
key to confirm and move to the next setting.

P03 *PRE-HEATING TIME* **This must not be changed.**

This value must be set at 0.09 (90 milliseconds). Press the *increase* button to view the preheat time. If it needs to be adjusted use the *increase* or *decrease* buttons to adjust it to "0.09".

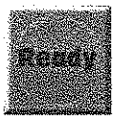


NOTE:
To guarantee proper functioning of the system, modification of the parameter P03 is forbidden, as different settings will affect the reliability of the tube-head.

Press the 

key to confirm and move to the next setting.

P04 *RESERVED FOR FUTURE USE*

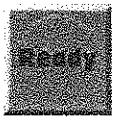
Press the 

key to move to the next settings.

P05 *MINIMUM EXPOSURE TIME :*

Press the *increase* button. Then proceed using the *increase* or *decrease* to adjust the minimum exposure time to 0.02".

0.02 / 0.04 / 0.06 / 0.08 / 0.10 / 0.12 / 0.14 / 0.16 / 0.18 / 0.20

Press the 

key to confirm and move to the next setting.

P06 *MAXIMUM EXPOSURE TIME* **This must not be changed**

These selection sets the exposure time to a maximum of 3.2 sec. Press the *increase* button to view maximum exposure time. You must use the setting of "E=0" which is 3.20 seconds.

Press the Ready key to confirm and move to the next setting.

P07 *FIXED PARAMETER* **This must not be changed**

The set value must be **6** for Aztech 70.

Press the Ready key to move to the next setting.

P08 *FIXED PARAMETER* **This must not be changed**

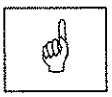
The set value must be **1** for Aztech 70.

Press the Ready key to move to the next setting.

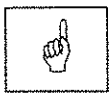
P09 *CONTROL OF THE TUBEHEAD COOLING TIME:*

This is the factor "X" (0 to 80) which when multiplied by the actual exposure time, results in the pause between exposures (0 = equals no cooling pause).

Adjust *increase* or *decrease* buttons to get desired time.
The default value is 60 (sixty times the exposure time)



NOTE:
To allow proper cooling of the tube-head between exposures, the minimum value to be set is 60.



NOTE:
Shorter cooling times may affect the tubehead life and warranty.

Press the Ready key to confirm and move to the next setting.

P10 *TIME BETWEEN READY AND EXPOSURE:* i

This is the time between "arming" the machine by pressing the READY button and the execution of the exposure. This ranges from 10 to 30 seconds.

Press *increase* the adjust "READY" time.

The default value is 15 seconds.

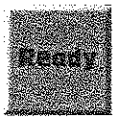
Press the 

key to confirm and move to the next setting.

P11 *SELECTION OF TUBE-HEAD VERSION (65/70KV):*

This is the selection of the proper setting of the unit. This selection must be set at 70 for the Aztech 70.

Press *increase* buttons. Using these *increase* or *decrease* buttons, select 70.

Press the 

key to confirm and move to the next setting.

P12 *PROGRAMMING FOR DIGITAL RADIOGRAPHY:*

This selection will activate the digital software which will automatically enable shorter exposure times when the digital button is selected.

Settings d=0 – non digital (x-ray film)

Settings d=1 – digital mode

Press the *increase* buttons and adjust to desired mode.

Press the 

key to confirm and move to the next setting.

P13 *SETTING OF THE DEFAULT EXPOSURE TIME:*

Setting Of The Default Exposure Time: This is the time displayed when the operator begins the manual timing mode.

0.14 / 0.16 / 0.18 / 0.20 / 0.23 / 0.25 / 0.30 / 0.32 / 0.36 / 0.40 / 0.45 / 0.50

Press *increase* using these buttons, *increase decrease*, select the selected time.

The default value is 0.30 seconds.

Press the 

key to confirm and move to the next setting.

P14 *RESETTING OF THE EXPOSURE COUNTER:*

This allows for the resetting of the exposure counter. The first number shown is in "thousands" then it shows the relative numbers, 0- 999.

To Reset:

- Press exposure button and the number shown on the display will blink.
- Within 5 seconds press again the exposure button and see the display stop blinking. It displays "xxx". This is the "thousand" digit, which has been reset. Then press the manual *decrease* key to reset the "hundreds" digits.
- Press the 

key to confirm and move to the next setting.

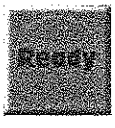
P15 *ENABLING OR DISABLING READY BUTTON:*

This programs the use/non use of the READY button.

*A=1 = use of READY button as programmed in P10.

*A=0 = disables READY button.

Press *increase* button then adjust *increase decrease* to desired program.

Press the 

key to confirm and move to the next setting.

This will also display END as programming is now complete.

NEXT TABLE SHOWS THE RANGES OF THE PROGRAMMABLE PARAMETERS

Parameter	Display	Range FROM	Range TO	Step	Unit	Default	Note
Selection of the line voltage	P01	120/220/230/240			Vac	120	
Selection of the driving mode of the tube-head	P02	P=0 (65kV)	P=1 (70kV)		//////////	P=1	*
Pre-heating time	P03	0.00	1.00	0.01	seconds	0.09	*
RESERVED	P04						
Minimum exposure time	P05	0.04	0.20	Table Man.	seconds	0.02	
Maximum exposure time	P06	E=0	E=1		//////////	E=0	
Selection of the compensation factors of the exposure times	P07	1	25	1	//////////	006	*
Selection of the compensation factors of the pre-heating time	P08	1	9	1	//////////	001	*
Activation of the pause	P09	0	80	1	unit	60	
Time between enabling of exposure and exposure	P10	10	30	1	seconds	15	
Selection of the tube-head version (65/70KV)	P11	65	70		kV	70	*
Enabling of digital radiography	P12	d=0	d=1		//////////	d=0	
Setting of the default exposure time	P13	0.14	0.50	Table Man.	seconds	0.30	
Resetting of the exposure counter	P14	//////////	//////////		//////////	//////////	
Enabling of the "System enabled" key	P15	A=0	A=1		//////////	A=1	

WARNING:
The parameter signalled by "*" on the previous table must be left unchanged to preserve system's functionality.

8.2 ERROR MESSAGES

The VCA is equipped with a self-diagnosis function which continuously monitors the machine and the relevant safety circuits.

In case a problem is encountered, the machine shows an error message, to alert the operator. There are three different cathegories of error messages:

- errors occured during the activation phase, which requires the intervention of the service,
- resettable errors occurred during the activation phase (do not require service),
- errors occured during the X-Ray emission phase.

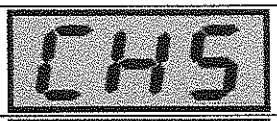
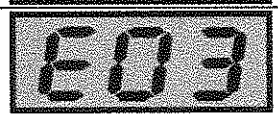
The first of the three tipologies of errors occurs at switch on; in this case the system is stopped in order to prevent any further action. This status can only be reset by switching off and then back on the machine or by following the instructions provided in the next pages. The corresponding error codes are from "E01" to "E09".

The error conditions that can be reset, usually inhibit some of the functions of the machine, leaving the others operative. The corresponding error messages are from E11 to E13.

Errors found during the X-Ray emission phase can bring the machine in a status where further exposures are not allowed. This tipology of anomalies has error codes from "E20" to "E25".

Refer to next tables for further details on any of the three cathegories of error messages mentioned above.

8.2.1 ERRORS OCCURED AT SWITCH ON, REQUIRING INTERVENTION OF SERVICE

Type of anomaly	Message on display	Emission of an acustic tone	Checks and actions to carry out
Checksum error of the memories (EEPROM + EPROM) and RAM test (1)		NO	Replace VCA Timer
X-Ray relay found activated (closed) at switch on		NO	Replace VCA Timer
Tube-head powered at switch on		***YES***	Replace VCA Timer
X-Ray "primary" push button found closed at switch on		NO	Check if the "primary" X-Ray push button is pressed or shorted; in this case replace it. Otherwise replace VCA Timer
X-Ray "remote" push button found closed at switch on		NO	Check if the "remote" X-Ray push button is pressed or shorted; in this case replace it. Otherwise replace VCA Timer
Both X-Ray push buttons found closed at switch on.		NO	Check if the both X-Ray push buttons are pressed or shorted; in this case replace them. Otherwise replace VCA Timer
"System enabling" key found pressed at switch on		NO	Check the control keyboard and replace the VCA Timer if necessary.
"Digital mode" key found pressed at switch on (3)		NO	Check the control keyboard and replace the VCA Timer if necessary.
"Increase" key found pressed at switch on		NO	Check the control keyboard and replace the VCA Timer if necessary.
"Decrease" key found pressed at switch on		NO	Check the control keyboard and replace the VCA Timer if necessary.

WARNING:

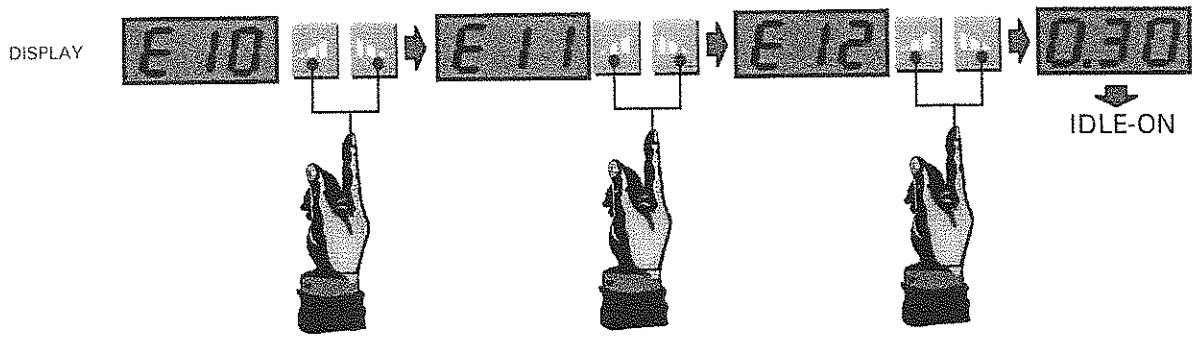
When the error message  is shown on the display, SWITCH OFF THE UNIT IMMEDIATELY as the system is emitting X-ray out of control.

8.2.2 RESETTABLE ERRORS AT SWITCH ON

If during the selftest automatically performed by the machine after switch on, a resettable error condition is met, the relevant error message remains on the display until the "Increase" or "Decrease" keys are pressed. This action brings the system to the IDLE-ON status and the display shows the defaut exposure time.

NOTE:
If more than one error condition is met at the same time, the different error messages can be scrolled on the display by pressing contemporaneously the keys "Increase" and "Decrease". The system will enter the IDLE-ON status only after that the last error message has been shown on the display.

EXAMPLE : Keys ADULT/CHILD, PATIENT SIZE and ANATOMIC found pressed at switch on:

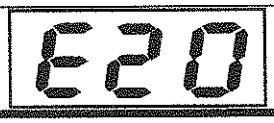


The system alerts the operator about an error condition in the following way :

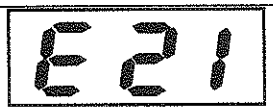
Type of anomaly	Message on display	Emission of an acustic tone
ADULT/CHILD selection key found pressed at switch on	E 10	NO
PATIENT SIZE selection key found pressed at switch on	E 11	NO
ANATOMIC key found pressed at switch on	E 12	NO
OCCLUSAL selection key found pressed at switch on	E 13	NO

8.2.3 ERRORS DURING EXPOSURE

X-RAY RELAIS DOES NOT CLOSE

Type of anomaly	Message on display	X-Ray emission	Checks and actions to carry out
The X-Ray relays does not close within the given time		Emission not started	Replace VCA Timer

X-RAY RELAIS DOES NOT OPEN

Type of anomaly	Message on display	X-Ray emission	Checks and actions to carry out
The X-Ray relais does not open within the given 50 msec time		Emission stopped by the safety timer **The acustic tone is activated**	Replace VCA Timer

THE DEVICE CONTROLLING THE X-RAY EMISSION DOES NOT CLOSE

Type of anomaly	Message on display	X-Ray emission	Checks and actions to carry out
The Triac controlling the X-Ray emission does not close within the given time (50 msec)		Emission not started	Replace VCA Timer

THE DEVICE CONTROLLING THE X-RAY EMISSION DOES NOT OPEN

Type of anomaly	Message on display	X-Ray emission	Checks and actions to carry out
The Triac controlling the X-Ray emission does not open within the given time (50 msec) ALTERNATE: No load connected to the board.		Emission stopped by the safety timer **The acustic tone is activated**	Replace VCA Timer

X-RAY RELAIS FOUND CLOSED WHEN ENABLING THE EXPOSURE CYCLE

Type of anomaly	Message on display	X-Ray emission	Checks and actions to carry out
X-Ray relais found closed when enabling the exposure cycle	E24	Emission not started	Replace VCA Timer

TRIGGERING OF HARDWARE TIMER

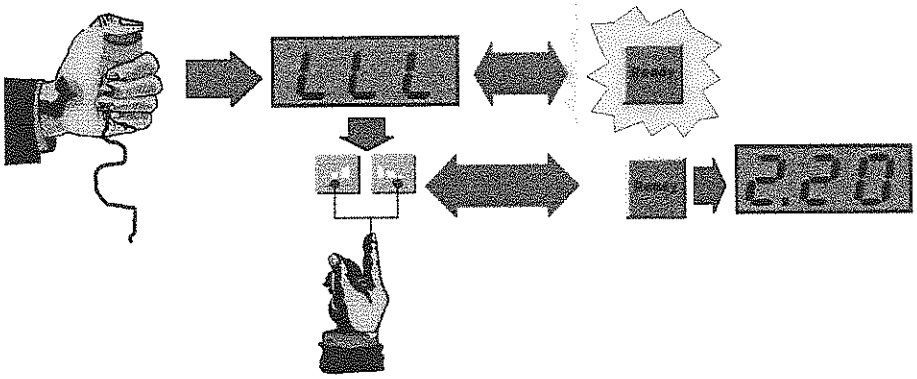
Type of anomaly	Message on display	X-Ray emission	Checks and actions to carry out
Triggering of the hardware timer	E25	Emission stopped by the hardware timer	Reset the system

CONDITIONS WHICH PREVENT EXPOSURES

The X-Ray emission is disabled or stopped when one of the following conditions is met:

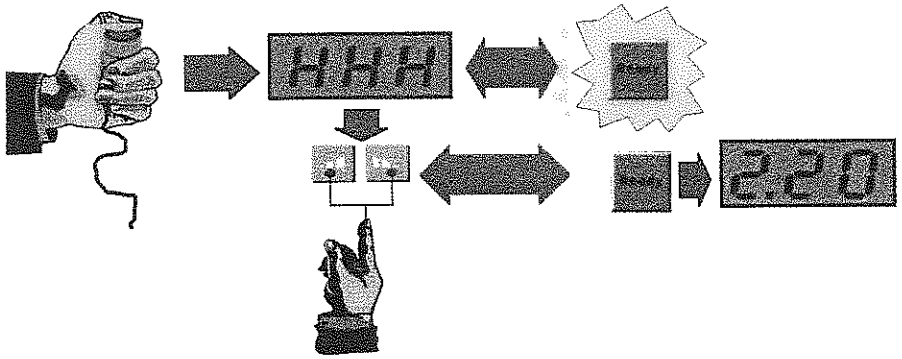
LINE VOLTAGE LOWER THAN THE 12.1% OF THE NOMINAL VALUE

Before starting the exposure, the system checks the line voltage. If the voltage is lower than the 12.1% of the nominal one, the display shows the message "LLL" and the green operation LED starts blinking. To reset this status press the "INCREASE" or "DECREASE" keys.



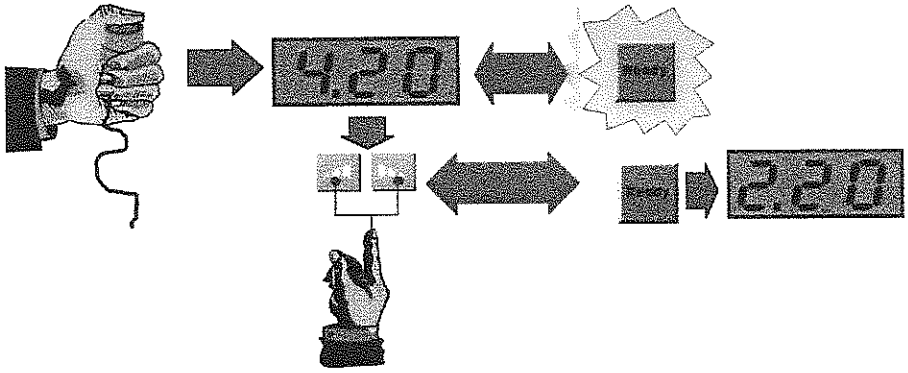
LINE VOLTAGE HIGHER THAN THE 12.1% OF THE NOMINAL VALUE

Before starting the exposure, the system checks the line voltage. If the voltage is higher than the 12.1% of the nominal one, the display shows the message "HHH" and the green operation LED starts blinking. To reset this status press the "INCREASE" or "DECREASE" keys.



CALCULATED EXPOSURE TIME LONGER THAN 4 SECONDS

When pressing the X-ray push button, the system reads the line voltage and compensates eventual fluctuations by correcting (increasing or decreasing) the exposure time accordingly. If the calculated time is longer than 4 seconds, the display will shows the calculated time (e.i. 4.20 seconds) and the operation green LED starts blinking. To reset this status press the "INCREASE" or "DECREASE" keys.



NOTE:
If the software of the machine locks up, the system has a safety timer which aborts the X-Ray emission after a maximum time of di 5,5 seconds.

8.3 REPLACING THE TUBEHEAD

WARNING:
Before proceeding to tubehead replacement operations, close and tie the two scissors arm sections together.
Non-compliance with these instructions leads to serious assembly difficulties as well as to possible damages to the installation engineer and the arm itself.

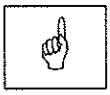
1. Remove safety screw on the joint

2. Lift joint protection cover until the hole for insertion of the safety elastic ring is visible. Insert a pivot - whose diameter must not exceed 3mm - into the safety screw hole, inserting it in the hole on the joint. The protection cover is consequently kept lifted, thus showing the safety ring.

3. Holding the tubehead with one hand, remove the safety ring.

4. Gently remove the tubehead, rotating it if necessary.

5. Install the new tubehead proceeding to the operations already described for tubehead mounting (paragraph 6.8 on page 40 for oval arms version).



NOTE:
Following tubehead replacement, it may be necessary to reset the exposures counting device (See Chapter 8 P14 parameter).

9. ELECTRICAL SCHEMES

General connection of timer VCA 120Va.c.	1 sheet	39609085/P
General connection of VCA timer for mobile	1 sheet	39609086/P
Layout of power board PCB timer VCA 120Va.c.	1 sheet	39609076/P
Power board schematic 120V timer VCA	1 sheet	39609082/P
Layout of CPU board timer VCA 120V	2 sheets	39609077/P
CPU board schematics timer VCA 120V	3 sheets	39609075/P

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10. FIXING TEMPLATES

The system is equipped with a set of templates, composed of the following elements:

Code	Description
3960914700	Template for (standard/)remote version timer
3960914600	Template for 16" on-center
3960914500	Template for single stud version

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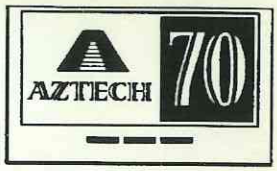

Code

6960924900 (Rev. 4 on 31.01.2000)