

PROVECTA V

Veterinary X-Ray System with Remote Control

Operator's Manual



 **ALLPRO IMAGING**

**AIR
TECHNIQUES**
INC.

ISO
9001
ISO 13485
FDA-GMP COMPLIANT

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INTRODUCTION

Congratulations, your new PROVECTA V Veterinary X-ray (hereafter referred to as PROVECTA V) has been engineered to provide you with years of reliable service. The PROVECTA V will create radiographs of excellent quality. It will perform equally well using digital or film-based imaging media. Review and follow the guidelines included in this Operator's Manual to thoroughly become familiar with the operating and safety procedures. This will ensure that your PROVECTA V gives you the highest level of service.

Your PROVECTA V Intraoral X-Ray model A2000RV contains the following components:

ITEM	PART NUMBER	
Straight Arm	16 Inches Long	A2140-3
(one only)	24 Inches Long	A2140-2
	35 Inches Long	A2140-1
Scissor Arm		A2120
70kVp 8mA Tubehead		A2250V
16-Inch on Center Wall Mount Plate		A2570
Mounting Hardware		A2020
16 Inch on Center Wall Plate Template		A2691
Single Post Mount Plate Template		A2077
Remote X-ray Control Panel		A2290V
X-ray Arm Support Connection Enclosure		A2500
Service Manual		A2501V
Users Manual		A2507V
Warranty Registration Information Card		9922-190
Form FDA 2579		A2012
Installation Accessory Kit		A2372R

WARRANTY

The PROVECTA V Veterinary X-Ray is warranted to be free from defects in material and workmanship from the date of installation for a period of twenty-four (24) months.

Any item returned to our factory through an ALLPRO Imaging Authorized Dealer, will be repaired or replaced at our option at no charge provided that our inspection shall indicate it to have been defective. Dealer labor, shipping and handling charges are not covered by this warranty.

This warranty does not apply to damage due to shipping, misuse, careless handling or repairs by other than authorized service personnel. Warranty void if installed or serviced by other than Authorized ALLPRO Dealer service personnel. ALLPRO, Inc. is not liable for indirect or consequential damages or loss of any nature in connection with this equipment.

This warranty is in lieu of all other warranties express or implied. No representative or person is authorized to assume for us any liability in connection with the sale of our equipment.

ON-LINE WARRANTY REGISTRATION

Quickly and easily register your new PROVECTA V on-line. Just have your product model and serial numbers available. Then go to the ALLPRO website, www.allproimaging.com, click the **warranty link** and complete the registration form. This on-line registration ensures a record for the warranty period and helps ALLPRO keep you informed of product updates and other valuable information.

KEY FEATURES

1. Microprocessor controlled.
2. Exposure compensation over input AC voltage range.
3. User selectable exposure time in seconds/pulses.
4. 30 preset exposure times.
5. 44 Manually selectable exposure times.
6. Programmable Size ratios.
7. Programmable Film setting.
8. Programmable Digital setting.
9. Two memorized exposure settings.
10. Stable positioning.
11. Remote Mounted X-ray Control Panel.
12. Optional Remote Exposure Switch that is also settable to use in a location where two switches are required to be activated simultaneously.
13. Single 4 x 4 post mount and 16" on center plate mounting.
14. Designed for ease of installation and use. Printed circuit boards are hinged to allow unit to be easily installed.
15. Built in tubehead simulator for training and testing the X-Ray Control operation.

SAFETY NOTICE

ATTENTION USERS:

MANUFACTURING DATE CODE ON SERIAL NUMBER LABEL IS IN THE FORMAT Month YYYY.



Alerts users to important Operating and Maintenance instructions. Read carefully to avoid any problems.



Warns users that uninsulated voltage within the unit may be of sufficient magnitude to cause electric shock.



Indicates type B equipment in accordance with IEC 601-1



MEDICAL ELECTRICAL EQUIPMENT

WITH RESPECT TO ELECTRICAL SHOCK, FIRE, MECHANICAL AND OTHER SPECIFIED HAZARDS ONLY
IN ACCORDANCE WITH UL-60601-1, CAN/CSA C22.2 NO.601.1
66CA

DO NOT ATTEMPT INTERNAL SERVICE

The interior of the Main Assembly is only accessible by removing hardware with tools and should only be opened and serviced by an authorized ALLPRO Dealer Service representative. Call your authorized ALLPRO dealer for service. Since the interior of the unit contains high voltage components, failure to heed this warning may result in equipment damage, personal injury and/or death.

SAFETY NOTICE

GENERAL SAFETY PRECAUTIONS

This equipment has been designed and manufactured in compliance with applicable safety requirements; moreover, this manual provides all the necessary information for correct and safe utilization. It provides warnings related to risks associated with the PROVECTA V and should be read very carefully. ALLPRO Imaging Inc. shall not be responsible for:

- any use of PROVECTA V equipment different from that for which it was been designed,
- any damage to the equipment, the operator or the patient caused either by incorrect installation or 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 made during or after installation, different from those specified in the service manual.

Only qualified service personnel, authorized by ALLPRO Imaging, Inc., or its dealers are allowed to perform repairs on the equipment.






PROTECTION AGAINST RADIATION WARNING:

Radiation protection is generally prescribed or regulated by local, State or Federal regulatory agencies. These regulations are beyond the scope of this manual. Operation and use of the device should be limited to trained personnel in accordance with local, state and federal regulations.

- a. The film, phosphor plate or sensor must be introduced in the patient's mouth either manually or by means of appropriate holders; it must never be held by the operator.
- b. During radiation exposure, the operator must not be in contact with the tubehead or the collimator.
- c. During radiation exposure, the operator must keep at a certain distance from the X-ray source (at least 6-1/2 feet), in a direction opposite to that of X-ray emission.
- d. During radiation exposure, no one other than the operator and the patient must be present in the room.

SYMBOLS USED

The following symbols are used on the PROVECTA V and in this manual.

~	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
	X-ray Emission

KNOWLEDGE OF WARNINGS

Users must exercise every precaution to ensure personnel safety, and be familiar with the warnings presented throughout this manual and summarized below.

WARNINGS:

Federal law restricts this device to sale by or on the order of a Veterinarian.

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

This equipment complies with the requirements of IEC 60601-2-7, and UL 60601-1.

The X-ray Tubehead Assembly P/N A2250 complies with IEC 60601-2-28 (1993).

The equipment must be used in compliance with the procedures contained in this manual and shall not be used for purposes different from those described in this manual.

PROVETA V is classified as veterinary dental imaging equipment and must therefore be used only under the supervision of qualified veterinary staff, having the necessary knowledge in the field of radiation.

The user bears legal responsibility related to the possession, installation and use of this device. *Do not remove panels.* Removing panels would create an electric shock hazard.

Equipment is not suitable for use in the presence of flammable anesthetic mixture with air or with oxygen or nitrous oxide.

For continued protection against risk of fire, replace only with the same type and rating of circuit breakers and fuses.

Replace components only with authorized replacement parts identified in this manual.

Before performing any maintenance, the equipment must be disconnect from the AC power source.

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

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

PROVETA V must be switched off during the use of High Frequency surgical devices or similar instruments placed near the equipment.

Do Not place ANY additional weight on the scissor arms.

Note: ALLPRO Imaging, Inc., is not responsible for disposal of the apparatus or parts thereof and for the related expenses.

ENVIRONMENTAL RISK AND DISPOSAL

The equipment contains - in some of its parts - solid and liquid substances which must be disposed of at appropriate recycling centers conforming to all local, state and federal regulations.

In particular, the equipment contains the following materials and/or components:

Tubehead: non-biodegradable plastic materials, metals, glass, dielectric oil, lead, tungsten.

Other parts of the equipment: non-biodegradable plastics, metals, printed circuits, and electronic components.

CLEANING & DISINFECTING

CLEANING AND DISINFECTING PROCEDURES

In order to ensure proper hygiene and cleaning of the equipment, the following procedures must be followed thoroughly:

Warning: Disconnect the branch circuit breaker or AC power source before performing cleaning procedures. Active internal circuits remain connected to main voltage even when main power switch is turned off.

Exterior Surfaces: Wipe the outside surfaces with a paper towel dampened with a disinfectant solution or household, non-abrasive cleaner. DO NOT SPRAY SOLVENTS OR LIQUID DIRECTLY ON THE X-RAY UNIT. BE CAREFUL NOT TO ALLOW SOLVENTS TO RUN OR DRIP into the PROVECTA V. This could cause damage to the PROVECTA V. Allow to air dry before plugging in or turning back on.

Parts in Contact with the Patient's Skin: To ensure proper cleaning of these parts, periodic disinfection with an approved EPA Non Corrosive Surface Disinfectant such as Birex® se is recommended.

PRODUCT DESCRIPTION

KEY COMPONENTS

The PROVECTA V is comprised of the following components:

a. STRAIGHT ARM AND SCISSOR ARM

Horizontal straight arms are available in 16, 24, or 35-inch lengths to meet all possible reach requirements. The scissor arm has a double joint, enabling linear and upward extension. The tubehead remains balanced in all positions.

b. TUBEHEAD WITH BEAM LIMITING DEVICE

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 inches) source to skin distance and a 6 cm (2 3/8 inches) beam diameter at the output. The tubehead is connected to the arm by means of a rotating contact, allowing 360-degree horizontal rotation and 285-degree vertical rotation.

c. X-RAY ARM SUPPORT CONNECTION ENCLOSURE

The X-ray Arm Support Connection Enclosure mounts to the Wall Mount Plate providing support for the straight and scissor arms and tubehead. the enclosure also provides electrical connection points for the PROVECTA V.

d. WALL MOUNT PLATE - 16-INCH ON CENTER

The Wall Mount Plate is designed to span two 2 by 4 wall studs that are spaced 16 inches apart to provide a secure wall-mounted surface for the installation of the PROVECTA V.

e. REMOTE X-RAY CONTROL PANEL

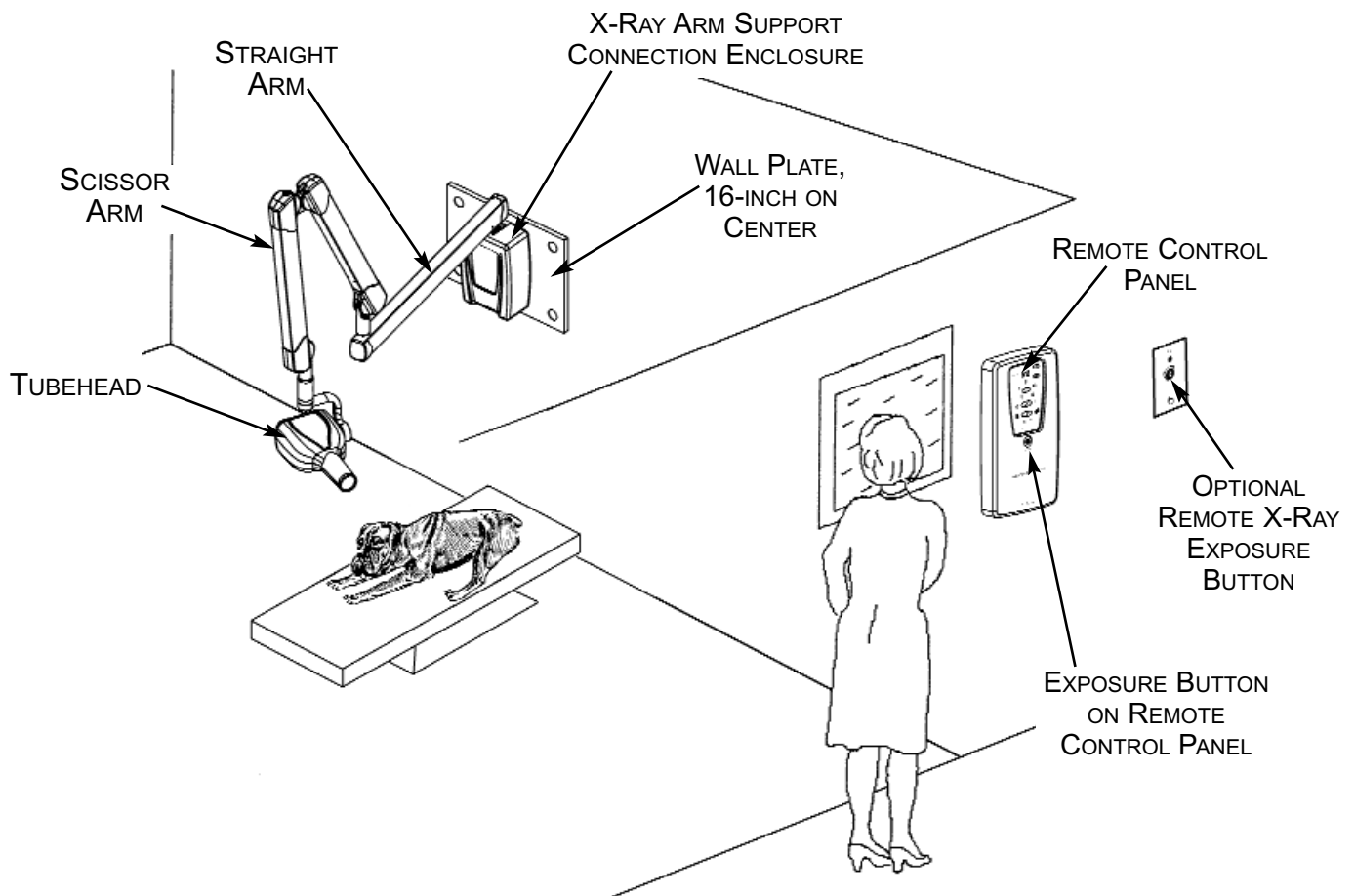
The Remote X-ray Control Panel is a microprocessor-controlled digital timer allowing both manual selection and 5 automatic selections of exposure times. Automatic selection further allows the operator to choose among 30 pre-set times according to the type of patient (Small, Medium or Large), the type of tooth and digital or film type. 44 fixed times can be selected manually and ranges from 0.02 seconds to 3.20 seconds. The timer automatically compensates for input line voltage variations within a range between 110 and 132V.

PRODUCT DESCRIPTION

AVAILABLE OPTIONS: The following lists additional configurations options available for the PROVECTA V.

A2000V-16	PROVECTA V X-Ray System with 16" Straight Arm
A2000VR-16	PROVECTA V X-Ray System with Remote Control Assembly and 16" Straight Arm
A2000V-24	PROVECTA V X-Ray System with 24" Straight Arm
A2000VR-24	PROVECTA V X-Ray System with Remote Control Assembly and 24" Straight Arm
A2000V-35	PROVECTA V X-Ray System with 35" Straight Arm
A2000VR-35	PROVECTA V X-Ray System with Remote Control Assembly and 35" Straight Arm
A2290V-1	Kit,X-Ray Remote Control with Wall Mount & Cover (for outside examination room)
A2090	Kit,X-Ray Remote wall plate exposure switch (for outside examination room)
A2210	Mount Plate Assembly 16" center to center exterior dimensions

PROVECTA V System Parts Identification



TECHNICAL SPECIFICATIONS

Technical Features

Equipment Manufacturer	Air Techniques Inc.
IEC 60601-1 Classification	Class I with type B applied parts
Degree of protection against ingress of water	Ordinary
Equipment is not suitable for use in the presence of flammable anesthetic mixture with air or with oxygen or nitrous oxide.	
Mode of operation	Continuous operation with intermittent loading
FDA 21 CFR Classification	Class II
Line voltage	110V to 132V
Line frequency	60Hz
Rated current	8.2 Amps
Power consumption	0.8 kVA @ 120V
Line Voltage Regulation	<3%
Apparent Resistance of Supply Mains	0.43 ohms
Circuit Breakers	10 Amp
Circuit Board Fuses	10A 250V Ceramic Fast Acting (0.25 x 1.25 IN) and 630mA 250V Fast Acting (5 mm x 20 mm)
Preset exposure times	from 0.02 to 3.20 seconds in 44 steps
Anatomic selection	30 pre-set times
Exposure control	Microprocessor controlled exposure times, with automatic compensation for line voltage variations.

See Selected Exposure Time and Corrected Actual Exposure Time note on page 11.

Exposure Time at 120 Volts

Timer Accuracy on the selected Exposure Time (The value of the operator selected timer setting.)	+/- 5% or +/- 33ms of selected Exposure Time (whichever is greater) when the AC input is 120 volts.
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Corrected Exposure Time at Voltages Other than 120 Volts

Timer Accuracy on the Corrected Exposure Time (The actual time of exposure, indicated on the Control Panel during emission and determined by the internal algorithm as a function of the line voltage). The range of adjustment is 73% to 149% as the AC line voltage changes within the rated voltage range.	+/- 5% or +/- 33ms of Corrected Exposure Time (whichever is greater) when the AC input is other than 120 volts.
---	--

X-ray Arm Support Connection Enclosure dimensions	12.5" H x 9.75" W x 5" D
X-ray Remote Control dimensions	15.62" H x 9.00" W x 2.25" D

Tubehead Features

Rated output voltage	70 kVp +/- 15% over 110 to 132 VAC
High voltage circuit type	110 to 132 VAC Single phase, self-rectifying
Tubehead current	8 mA +/- 2 mA
Tubehead Power	0.8 kw
Total filtration	2mm Aluminum equivalent @70 kVp
Transformer insulation	Oil bath
Cooling	Convection
Pre-heating time	100ms
Interval between exposure / duty cycle	32 times X-ray time / 1: 32
Beam Limiting Device	Incorporated in Tubehead Assembly (non-removable)
Tubehead Assembly dimensions (less yoke)	5" H x 7.5" W x 15" D

TECHNICAL SPECIFICATIONS

Minimum source to skin distance	20 cm (8")
Maximum symmetrical radiation field @ 20 cm (X-ray beam diameter)	2 3/8" (6 cm)
Radiation leakage at 1 m	<50 mR/h, duty cycle 1: 32
Technical factors for radiation leakage	70 kVp, 8mA, 3 seconds

X-ray Tube Features

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

Environmental Conditions

Operating temperature range	+50°F to +104°F (+10°C to +40°C)
Operating relative humidity range	30% - 75%
Temperature range for transport and storage	-4°F to +158°F (-20°C to +70°C)
Max. relative humidity for transport and storage	<95 % non condensing
Min. atmospheric pressure for storage and transport	0.6 atmospheres

Apparatus and Detachable Parts Weight

Gross weight including packaging	100 lbs.
Net apparatus weight in standard configuration	95 lbs.
16" fixed arm	5 lbs.
24" fixed arm	7 lbs.
35" fixed arm	9 lbs.
Scissor arm	24 lbs.
X-ray Remote Control	7.6 lbs.
X-ray Arm Support Connection Enclosure	9.6 lbs.
Tubehead	18.5 lbs.
16" on center plate	17.2 lbs.

Selected Exposure time and Corrected Actual Exposure Time -

The ALLPRO X-ray Control Timer incorporates a special feature which automatically corrects the selected exposure time when the line voltage varies from 120 V. A change in the AC line voltage affects the peak voltage applied to the X-Ray tube and the value of high voltage significantly affects the spectrum of the radiation that ultimately affects the optical density of the imaging media. The purpose of the X-ray Control timer correction is to obtain the same nominal optical density on the imaging media independent of the AC line voltage variations from 110-132 Volts.

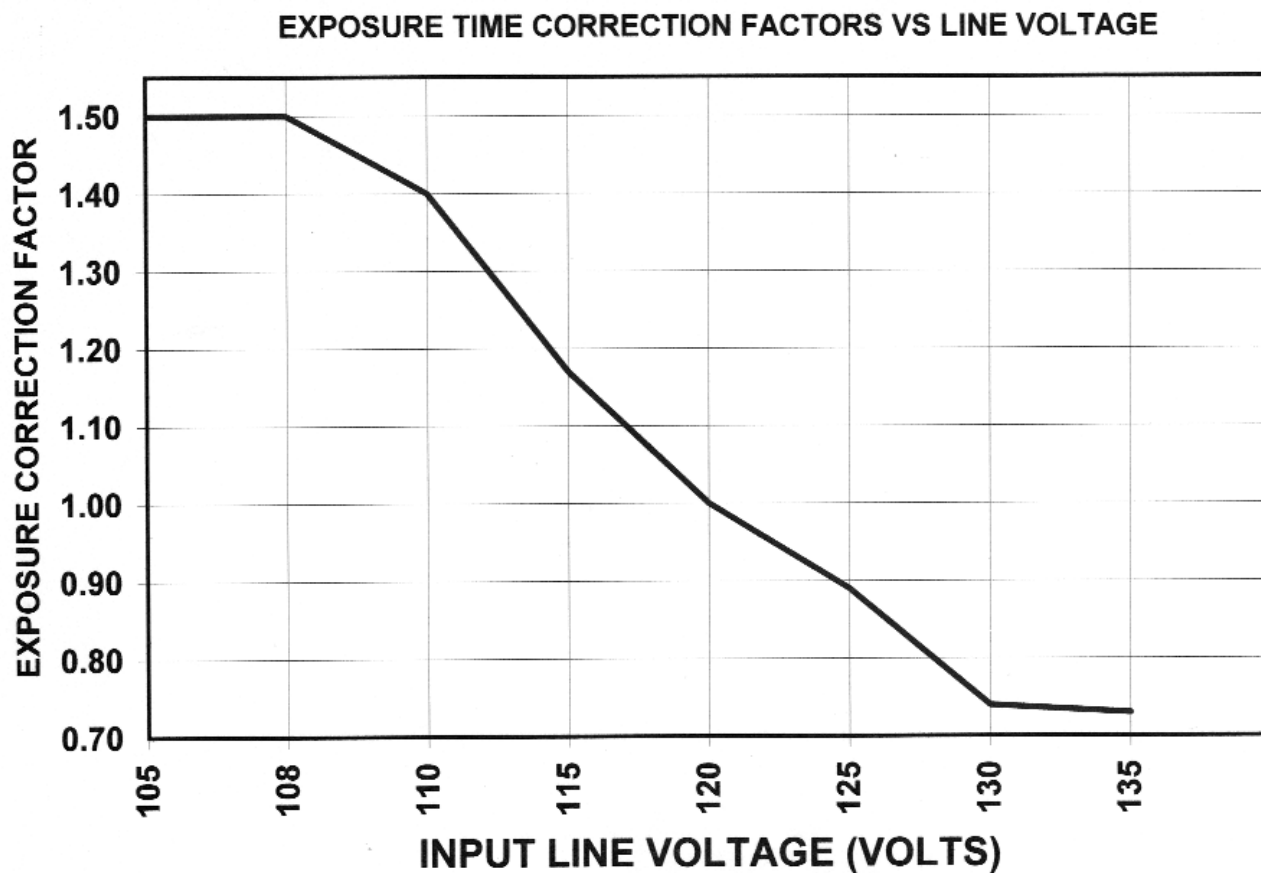
The automatic correction of the exposure time works as follows:

The internal voltage measuring circuit in the X-ray Control Timer continuously monitors the AC line voltage. When the user selects the desired exposure time and presses the X-ray Exposure button, the exposure time will be automatically adjusted based upon the measured AC line voltage. The corrected actual exposure time will be displayed until the X-ray Exposure button is released.

NOTE: Electromagnetic interference between the equipment and other devices can occur. Do not use the equipment in close conjunction with sensitive devices, or devices creating high electromagnetic disturbances.

TECHNICAL SPECIFICATIONS

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 graph:

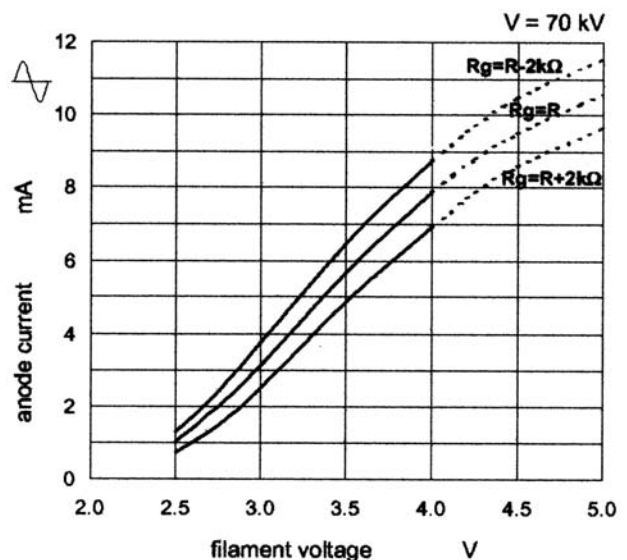
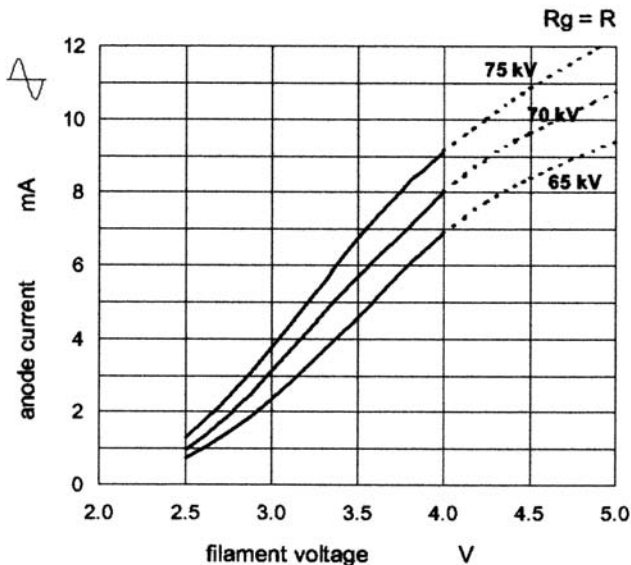


TECHNICAL FACTORS MEASURING METHOD

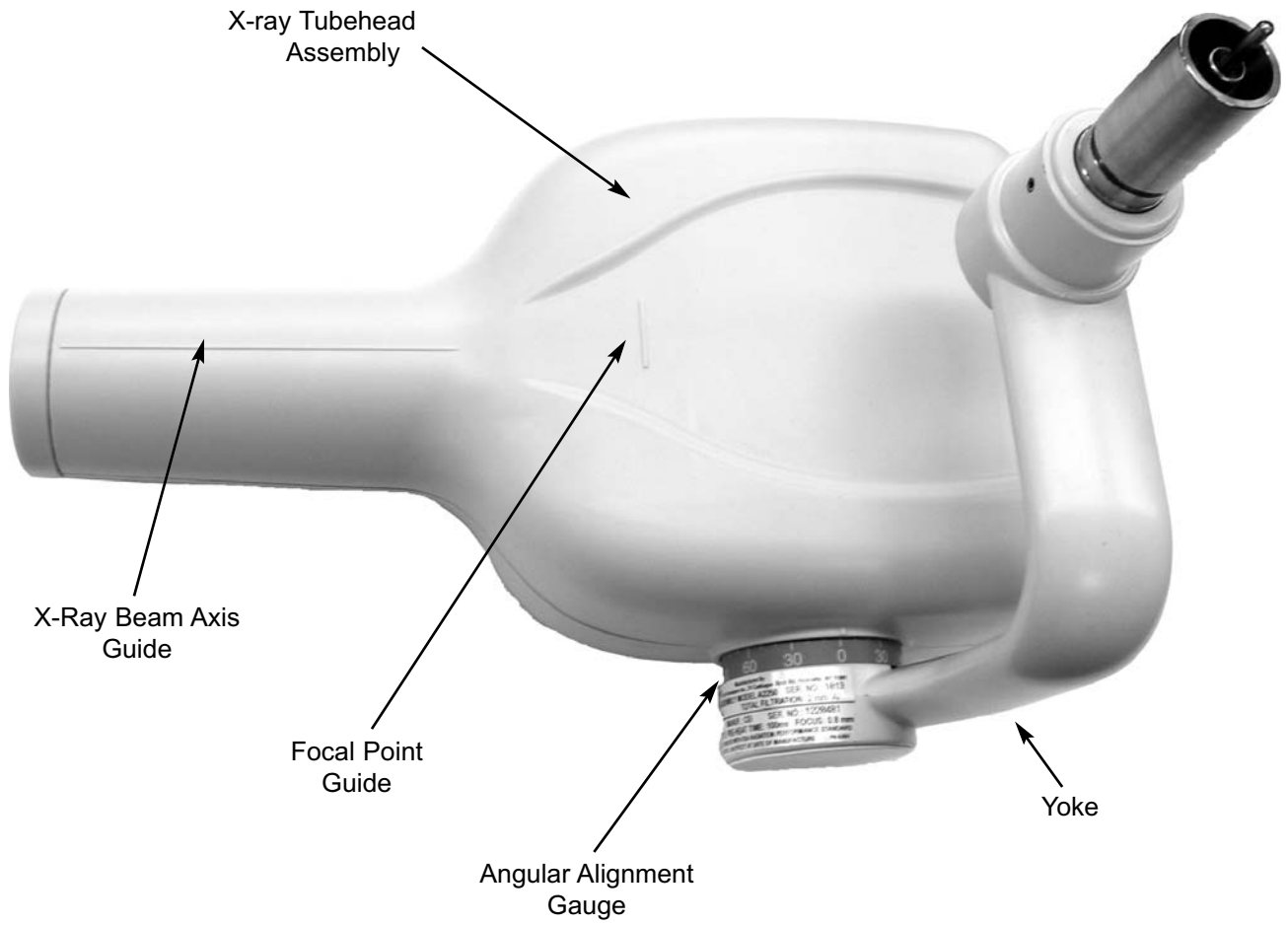
- kVp The kVp is defined as the average of the peak high voltage after pre-heating time and settling. The kVp is assessed with a non-invasive instrument having a $\pm 1\%$ accuracy at the nominal AC input line voltage.
- mA The output current is defined as the average value of the current after pre-heating time and settling. The output current can be measured by attaching a DC voltmeter (0-10 VDC) to the connections behind the circular cap on the side of the Tubehead yoke. The correlating relationship is 1 volt per mA of tube current.
- t The exposure time is defined as the time measured with a non-invasive meter. Accuracy is verified by using an Innovision 8000 mAx instrument.

X-RAY TUBE CURVES

OCX / 70-G Emission characteristics

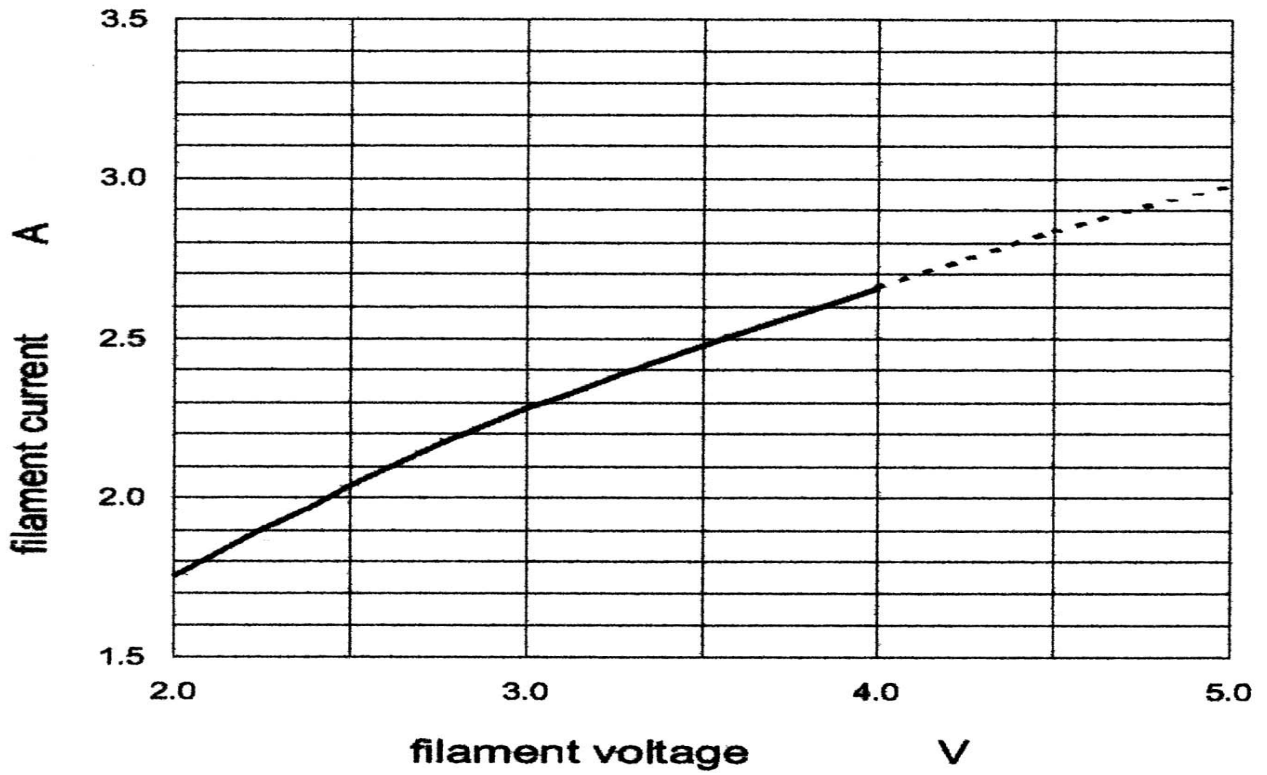


X-RAY TUBEHEAD KEY COMPONENTS

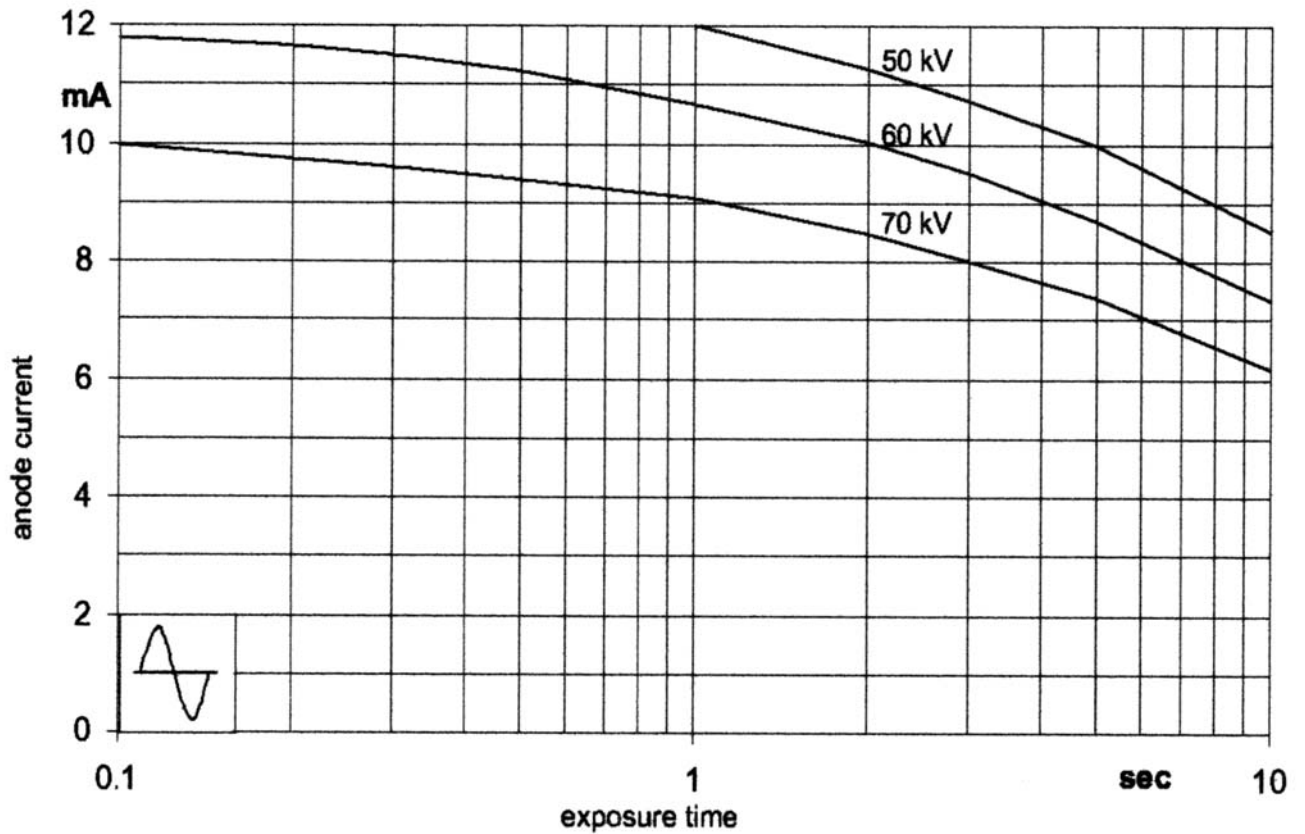


X-RAY TUBEHEAD SPECIFICATIONS

Filament Characteristics

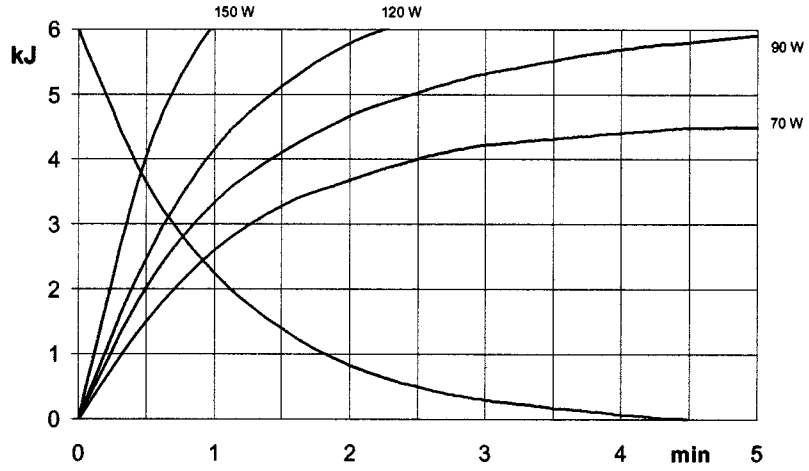


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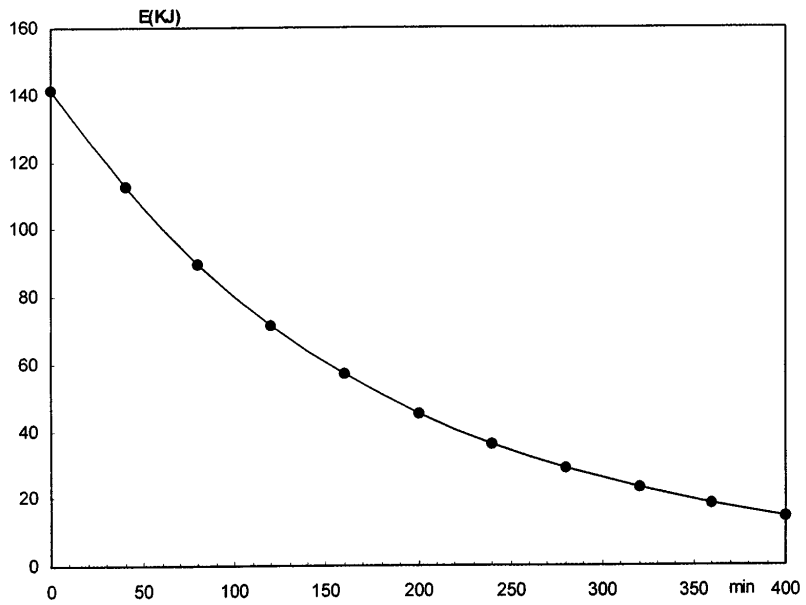


X-RAY TUBEHEAD SPECIFICATIONS

Cooling



Cooling Curve of Tubehead



PROVECTA V TURN-ON PROCEDURE:

Turn on the PROVECTA V by performing the following procedure:

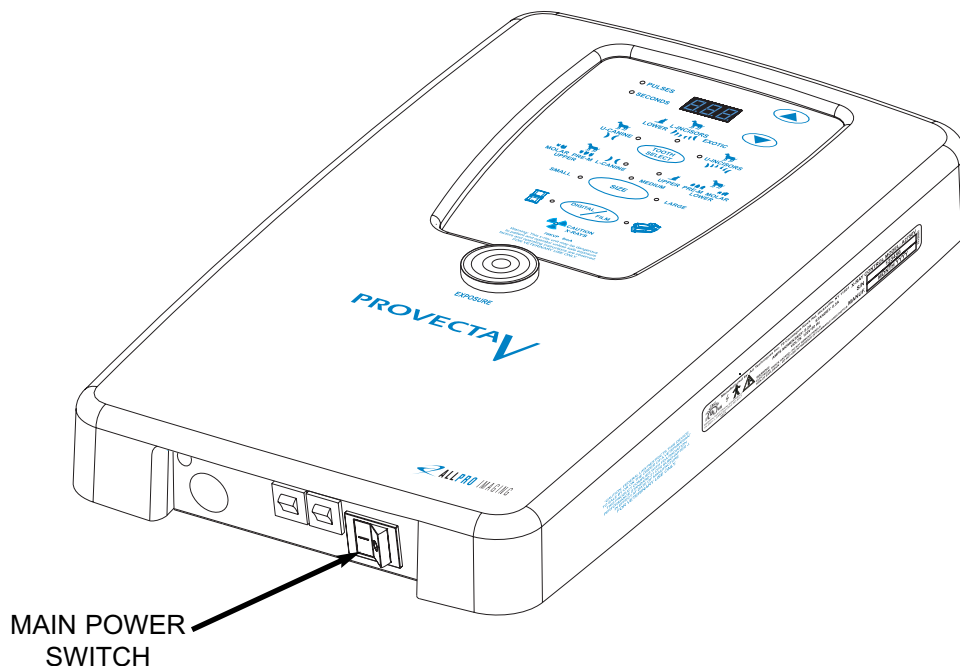
1. Place the Main Power Switch located on the bottom of the Remote X-Ray Control Panel in the ON (I) position.
2. Observe that the system self check function initiates and the digital display displays following sequence :
 - a. **API**
 - b. Display Test **8.8.8**.
 - c. Firmware Version (e.g. A)
 - d. Last setting e.g. (e.g. 0.25)

Note: See System Error Messages, pages 46 through 49, for a listing and description of possible start-up error codes.

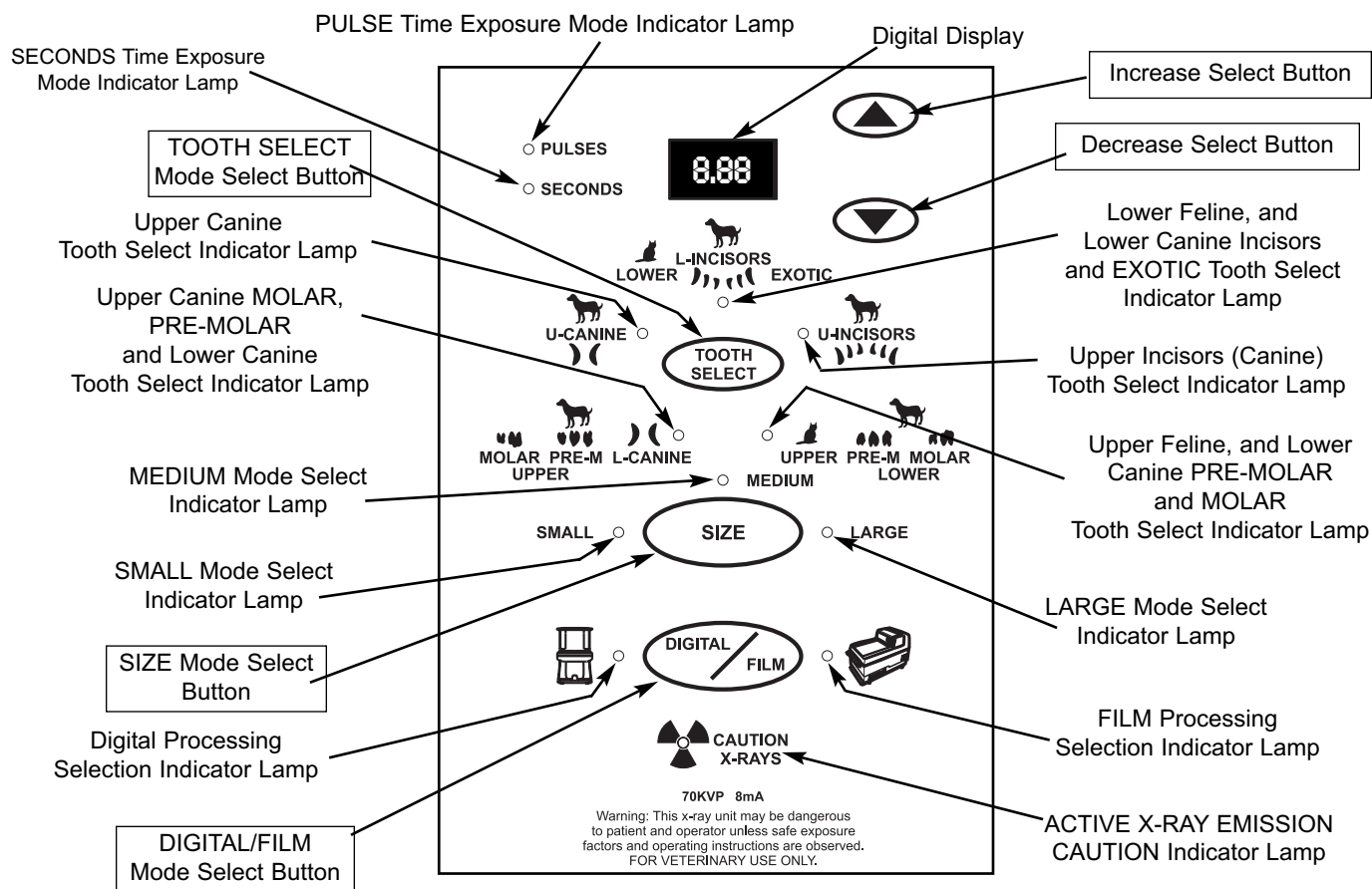
3. Once the self check function completes successfully, the system starts in the Lower Feline, and Lower Canine Incisors and Exotic, Medium and Film Processor modes and is ready for operation. Verify associated indicator illumination and exposure time display.

Note: When power is turned off, the system retains the last selected manual and preset modes. Upon turn on, the system resumes operation as set prior to turning off.

Remote X-Ray Control Panel






















REMOTE X-RAY CONTROL PANEL FUNCTIONS



Note: All automatic settings are confirmed by the corresponding LED illumination.

REMOTE X-RAY CONTROL PANEL FUNCTIONS

X-Ray Control Panel - All functional operating control of the PROVECTA V X-Ray is provided by the X-ray Control Panel allowing selection of both automatic and manual of exposure time modes. The 5 automatic selection functions allow the operator to further choose among 30 pre-set times according to the patient type (Small, Medium or Large), tooth type and media type (digital or film). An audible signal sounds during any X-ray emission. In addition, this signal is heard to confirm keypad button selection and when certain errors occur. The location of each panel control and indicator is shown in the preceding illustration, while the function of each is summarized below and described on the following pages.

DIGITAL DISPLAY Panel		A 3-character digital display that shows the selected time value (pulses or seconds) during operational phases as follows: <ol style="list-style-type: none"> 1. Exposure Preparation Phase - displays the selected exposure time in both automatic or manual modes. 2. Exposure Phase - displays the corrected exposure time adjusted to compensate for variations in the input AC line voltage. 3. Cooling Phase - displays remaining tubehead cooling time.
INCREASE Select Button		A membrane keypad switch that disables all automatic settings and allows the user to manually increase exposure time as necessary.
DECREASE Select Button		A membrane keypad switch that disables all automatic settings and allows the user to manually decrease exposure time as necessary.
PULSE TIME EXPOSURE MODE Indicator Lamp		An LED indicator lamp that illuminates green to confirm selection of the PULSE time mode for Digital Display operation.
SECONDS TIME EXPOSURE MODE Indicator Lamp		An LED indicator lamp that illuminates green to confirm selection of the SECONDS time mode for Digital Display operation.
TOOTH SELECT Mode Select Button		A membrane keypad switch that allows sequential mode selection of preset exposure time among five different teeth categories as follows:
Lower Feline, Lower Canine Incisors and Exotic Tooth Select Indicator Lamp		An LED indicator lamp that illuminates green to confirm selection of preset exposure time for the Lower Feline, Lower Canine Incisors and Exotic tooth categories.
Upper Incisor (Canine) Tooth Select Indicator Lamp		An LED indicator lamp that illuminates green to confirm selection of preset exposure time for the Canine Upper Incisor tooth category.
Upper Feline, and Lower Canine Pre-Molar and Molar Tooth Select Indicator Lamp		An LED indicator lamp that illuminates green to confirm selection of preset exposure time for the Upper Feline, Canine Lower Pre-Molar and Canine Lower Molar tooth categories.
Upper Canine Molar, Pre-Molar and Lower Canine Tooth Select Indicator Lamp		An LED indicator lamp that illuminates green to confirm selection of preset exposure time for the Canine Upper Molar, Canine Upper Pre-Molar and Lower Canine tooth categories.
Upper Canine Tooth Select Indicator Lamp		An LED indicator lamp that illuminates green to confirm selection of preset exposure time for the Upper Canine tooth category.
SIZE Mode Select Button		A membrane keypad switch that toggles between selection of preset exposure time for SMALL, MEDIUM and LARGE exposure modes as follows:
SMALL MODE Indicator Lamp		An LED indicator lamp that illuminates green to confirm selection of preset exposure time for the SMALL exposure mode.
MEDIUM MODE Indicator Lamp		An LED indicator lamp that illuminates green to confirm selection of preset exposure time for the MEDIUM exposure mode.
LARGE MODE Indicator Lamp		An LED indicator lamp that illuminates green to confirm selection of preset exposure time for the LARGE exposure mode.
DIGITAL/FILM Mode Select Button		A membrane keypad switch that toggles between selection of preset exposure time for DIGITAL and FILM exposure modes as follows:.
DIGITAL Processing Indicator Lamp		An LED indicator lamp that illuminates green to confirm selection of preset exposure time for the DIGITAL processing mode.
FILM Processing Indicator Lamp		An LED indicator lamp that illuminates green to confirm selection of preset exposure time for the FILM processing mode (D-speed film).
ACTIVE X-RAY EMISSION CAUTION Indicator Lamp		An LED indicator lamp that illuminates yellow to alert the user that x-ray radiation is present during PROVECTA V current operation.

KEYPAD OPERATION

INCREASE SELECT BUTTON



DECREASE SELECT BUTTON



The INCREASE and DECREASE Select Buttons are membrane keypad switches that allow the user to disable the automatic operating mode default settings (Time Units, Media Type, Patient Size, and Tooth Selection) and manually increase or decrease exposure time as necessary to any of the 44 values shown below in seconds or pulses.

When a manual exposure time setting is desired, press the associated button (Increase or Decrease) once to display the last manually set exposure time. Manually change the time setting in one increment or decrement by releasing the button and then pressing once. Rapid advancement through the 44 time values is accomplished by keeping the button depressed. Release button to set desired exposure time. Return to the last automatic mode default time settings by pressing any Mode Selection Button (Digital/Film, Size, Tooth Select).

TIME VALUES IN SECONDS										
0.02	0.04	0.05	0.06	0.08	0.10	0.12	0.14	0.15	0.16	0.18
0.20	0.22	0.23	0.25	0.27	0.28	0.30	0.32	0.33	0.35	0.36
0.38	0.40	0.42	0.43	0.45	0.47	0.50	0.55	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

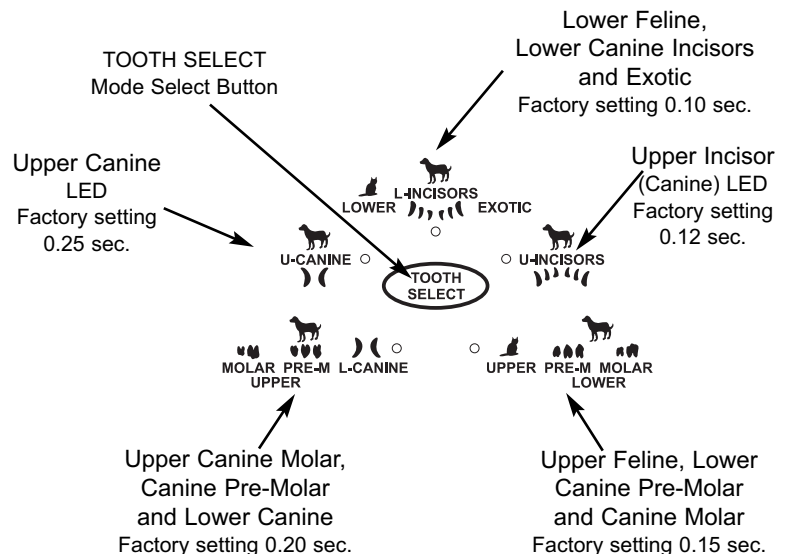
TIME VALUES IN PULSES										
1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	30	33	36	38	42
48	54	60	75	78	84	96	120	150	180	192

TOOTH SELECT MODE SELECT BUTTON

A membrane keypad switch located in the center of the tooth symbols allows sequential mode selection of preset default exposure times for each of the five indicated teeth types. Each time the TOOTH/SELECT Mode Select Button, shown below, is pressed, the associated LED lamp illuminates and an audible signal sounds to indicate selection. Default preset times are based on D-speed film.

The five selectable default preset exposure times correlating to tooth categories are as follows:

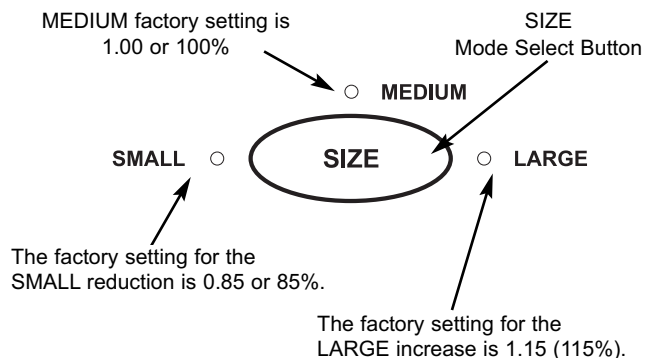
- Lower Feline, Lower Canine Incisors and Exotic 0.10 seconds
- Upper Incisor (Canine) 0.12 seconds
- Upper Feline, Lower Canine Pre-Molar and Canine Molar 0.15 seconds
- Upper Canine Molar, Canine Pre-Molar and Lower Canine 0.20 seconds
- Upper Canine 0.25 seconds



KEYPAD OPERATION

SIZE MODE SELECT BUTTON

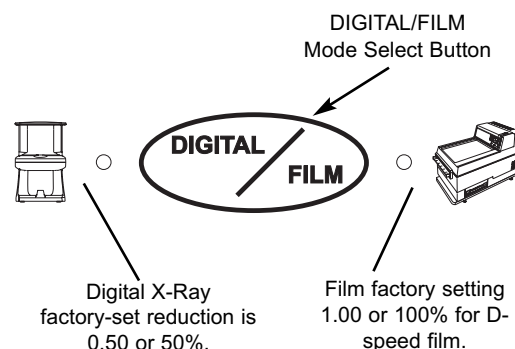
A membrane keypad switch that switches among the selection of SMALL, MEDIUM and LARGE preset exposure time exposure modes. Each time the SIZE Mode Select Button is pressed, the selection of Small, Medium and Large modes is made with the resulting change in exposure time. The associated LED lamp illuminates and an audible signal sounds to indicate selection.



DIGITAL/FILM MODE SELECT BUTTON

A membrane keypad switch that toggles between automatic exposure settings for specific media types commonly used with the PROVECTA V. The user can select between D-speed film and digital radiology processing. When the FILM mode is selected the system is set to process film at 100% exposure time of D-speed film. When set in the DIGITAL mode, the exposure time is reduced to values suitable for the use of digital phosphor plate scanners such as A/T ScanX.

An audible signal is sounded each time the DIGITAL/FILM Mode Select Button is depressed and the associated LED is illuminated to indicate selection.



DEFAULT EXPOSURE TIME SETTINGS

The following table lists the factory-set default setting combinations available by the operation of the TOOTH SELECT, SIZE and DIGITAL/FILM Mode Select Buttons.

PROVECTA V Available Preset Exposure Time Setting Combinations

TOOTH SELECT	SMALL				MEDIUM				LARGE			
	SECONDS	PULSES	SECONDS	PULSES	SECONDS	PULSES	SECONDS	PULSES	SECONDS	PULSES	SECONDS	PULSES
L-INCISORS EXOTIC LOWER	0.04	3	0.09	5	0.05	3	0.10	6	0.06	3	0.12	7
U-INCISORS 	0.05	3	0.10	6	0.06	4	0.12	7	0.07	4	0.14	8
UPPER PRE-M MOLAR LOWER	0.06	4	0.13	8	0.08	5	0.15	9	0.09	5	0.17	10
MOLAR PRE-M L-CANINE UPPER	0.09	5	0.17	10	0.10	6	0.20	12	0.12	7	0.23	14
U-CANINE	0.11	6	0.21	13	0.13	8	0.25	15	0.14	9	0.29	17

KEYPAD OPERATION: CUSTOM PROGRAMMING

Note: When power is turned off, the system retains the last selected manual and preset modes. Upon turn on, the system resumes operation as set prior to turning off.

CHANGING DEFAULT SETTINGS TO CUSTOMIZE VALUES

The PROVECTA V factory default settings are based on D-speed film exposure with the digital display set to show time values in seconds. These defaults allow automatic operation of the system by the selection of the TOOTH SELECT, SIZE and DIGITAL/FILM Mode Select Buttons. Although this automatic operation is adequate for most applications, the PROVECTA V may be customized to meet the needs of a specific application or individual preference.

Customize one or all of the six default settings listed below as necessary by performing the procedures provided by the following paragraphs. When all changes have been accomplished, resume operation of the PROVECTA V per System Operation instructions provided on page 25.

1. Changing Display to Pulses
2. Changing Display to Seconds
3. Changing Default Tooth Setting
4. Changing Default Large and Small Multiplier Ratio
5. Changing Film Multiplier Ratio Settings
6. Changing Digital Multiplier Ratio Settings

CHANGING DISPLAY TO PULSES

The PROVECTA V is set at the factory to display exposure times in seconds. Perform the following procedure to change the Digital Display panel to show time values in pulses:

1. Turn the Power Switch OFF (0) and then to ON (1) again.
2. When **API** is shown in the Digital Display panel, press and hold the INCREASE (▲) Select Button until **PUL** (pulses) appears in the display window. Verify that the PULSES indicator illuminates on the control panel.
3. Release the INCREASE (▲) Select Button.

CHANGING DISPLAY TO SECONDS

When the PROVECTA V was changed to display in pulses and there is a need to change the time value back to seconds, perform the following procedure:

1. Turn the Power Switch OFF (0) and then to ON (1) again.
2. When **API** is shown on the Digital Display panel, press and hold the INCREASE (▲) Select Button until **SEC** (seconds) appears in the display window. Verify that the SECONDS indicator illuminates on the control panel.
3. Release the INCREASE (▲) Select Button.

KEYPAD OPERATION: CUSTOM PROGRAMMING

CHANGING DEFAULT TOOTH SETTINGS (0.02 to 3.20 Seconds)

The PROVECTA V provides 5 tooth settings and is factory set to start operation in the LOWER Feline, Canine L-INCISORS and EXOTIC tooth select mode. Perform the following procedure to change one or all of the default tooth settings:

1. Turn the Power Switch OFF (0) and then to ON (1) again.
2. Verify that upon device turn on, the firmware version (e.g. A) is displayed on the Digital Display panel as the second display item.
3. When the device firmware version (e.g. A) is displayed, press the **TOOTH SELECT** TOOTH SELECT Mode Select Button to enter the default tooth setting programming mode.
4. When **SEL** is shown on the Digital Display panel, press the INCREASE (▲) Select Button. One of the five tooth select indicator lamps will flash and the Digital Display panel will show the current programmed default exposure setting for the selected tooth.
5. Within **ten seconds**, repeatedly press the INCREASE (▲) Select Button until the desired tooth category is selected.
6. Press the **TOOTH SELECT** TOOTH SELECT Mode Select Button to confirm selection.
7. The Digital Display panel will flash together with the indicator lamp of the selected tooth to indicate the default setting can be changed.
8. Within ten seconds, press the INCREASE (▲) or DECREASE (▼) Select Button to the desired default setting.
9. Within ten seconds, press the **TOOTH SELECT** TOOTH SELECT Mode Select Button to exit the default tooth setting program.
10. Repeat steps 1- 9 until all desired tooth setting changes have been made.

CHANGING DEFAULT LARGE (1.00 to 2.00) AND SMALL (0.05 to 1.00) MULTIPLIER RATIOS

The PROVECTA V default Large setting is 115% (1.15) of the Medium setting while the Small setting is 85% (0.85)of Medium. Perform the following procedure to change the default LARGE and SMALL mode multiplier ratio settings:




1. Turn the Power Switch OFF (0) and ON (1) again.
2. Verify that upon device turn on, the firmware version (e.g. A) is displayed on the Digital Display panel as the second display item.
3. When the firmware version (e.g. A) is displayed on the Digital Display panel, press the **SIZE** SIZE Mode Select Button to enter the LARGE multiplier ratio programming mode.
4. When the **L** is shown on the Digital Display panel, press the **TOOTH SELECT** TOOTH SELECT Mode Select Button to confirm the LARGE mode selection. (See step 8 for SMALL mode.)
5. Verify that the Digital Display panel shows the factory setting of **1.15** for the LARGE mode multiplier ratio setting.
6. Within **10 seconds** press the INCREASE (▲) or DECREASE (▼) Select Button to set the desired multiplier ratio with respect to D-speed film.
7. Within **10 seconds** of selecting the desired multiplier ratio press the **TOOTH SELECT** TOOTH SELECT Mode Select Button to select change.
8. With the **L** shown on the Digital Display panel, press the INCREASE (▲) Select Button to confirm the SMALL mode selection (**S** is shown on the Digital Display panel).
9. When the **S** is shown on the Digital Display panel, press the **TOOTH SELECT** TOOTH SELECT Mode Select Button to confirm the SMALL mode selection and verify that the Digital Display panel shows the factory setting of **0.85** for the SMALL mode multiplier ratio setting.
10. Set the desired SMALL mode multiplier ratio with respect to D-speed film by performing steps 6 and 7 above.

KEYPAD OPERATION: CUSTOM PROGRAMMING

Note: If using film other than D-Speed film, change the film multiplier ratio as recommended by the film manufacturer prior to use.




CHANGING FILM MULTIPLIER RATIO SETTING (0.05 to 1.50)

The PROVECTA V default FILM setting is 100% (1.00) of D-speed film exposure time. Perform the following procedure to change the default film multiplier ratio setting:

1. Turn the Power Switch OFF (0) and ON (1) again.
2. When the firmware version (e.g. A) is displayed, press the  DIGITAL/FILM Mode Select Button to enter the DIGITAL/FILM multiplier ratio programming mode.
3. When **FIL** is shown on the Digital Display panel, press the  TOOTH SELECT Mode Select Button to confirm the film selection mode.
4. Verify that the Digital Display panel shows the factory setting of **1.00** (100% of D-speed film exposure time).
5. Within **10 seconds** press the INCREASE (▲) or DECREASE (▼) Select Button to set the desired multiplier ration with respect to D-speed film exposure time.
6. Within **10 seconds** press the  TOOTH SELECT Mode Select Button to select.

CHANGING DIGITAL MULTIPLIER RATIO SETTING (0.05 to 1.50)

The PROVECTA V default DIGITAL setting is 50% (0.50) of the FILM setting (D-speed film exposure time). Perform the following procedure to change the default digital media multiplier ratio settings:

1. Turn the Power Switch OFF (0) and ON (1) again.
2. When the firmware version (e.g. A) is displayed, press the  DIGITAL/FILM button to enter the DIGITAL/FILM multiplier ratio programming mode.
3. When **FIL** is shown on the Digital Display panel, press the INCREASE (▲) Select Button.
4. Verify that the Digital Display panel shows **DIG** to confirm the film selection mode.
5. Press the  TOOTH SELECT Mode Select Button to confirm selection.
6. Verify that the Digital Display panel shows the factory setting of **0.50**.
7. Within **10 seconds** press the INCREASE (▲) or DECREASE (▼) Select Button to set the desired multiplier ratio with respect to D-speed film exposure time.
8. Within **10 seconds** press the  TOOTH SELECT Mode Select Button to select.

FACTORY RESET

Performing factory reset returns all operating values and settings of the PROVECTA V to the values set at the factory during manufacture. Refer to the PROVECTA V Available Preset Exposure Time Setting Combinations table on page 21 for a listing of the factory-set default exposure settings. Make sure to write down all manually customized settings prior to performing the factory reset sequence. Any settings changed during operation will be lost upon completion of reset. Reset all operating values and settings by performing the following procedure.









1. Turn the Power Switch OFF (0) and then to ON (1) again.
2. When the initials **API** appear in the Digital Display panel, press and hold the DECREASE (▼) Select Button until **FAC** (Factory Reset) appears in the display.
3. Verify that the display shows 0.10 seconds and the SECONDS, LOWER Feline, Canine L-INCISORS and EXOTIC, MEDIUM, and FILM LED indicator lamps are illuminated. The PROVECTA V is now reset to operate with the factory-set default settings.

SETTING THE EXPOSURE













The PROVECTA V is normally operated in the automatic operation mode where the selection combinations of the TOOTH SELECT, SIZE and DIGITAL/FILM Mode Select Buttons provide 30 separate default exposure settings for specific exposure applications. These preset exposure time values (seconds or pulses) associated with the mode select button setting combinations are displayed as shown in the table below. The suggested exposure times are based on D-speed film exposure.

Note: Keypad button selection is confirmed by the sounding of an audible signal and illumination of the corresponding indicator lamp .

Automatic Exposure Time Selection - Perform the following procedure to set the PROVECTA V to operate in the automatic mode using preset exposure time values.

1. Press any Mode Selection Button    (Tooth Select, Digital/Film, Size) to initiate the automatic exposure mode of operation.
2. Press the  SIZE Mode Select Button to select the patient size parameter. Verify that the corresponding SMALL Mode, MEDIUM Mode or LARGE Mode indicator lamp illuminates and audible signal sounds for the desired preset exposure setting selection.
3. Press the  DIGITAL/FILM Mode Select Button to select the type of media processing. Verify that the corresponding indicator lamp  Digital Mode or  Film Mode illuminates and audible signal sounds for the desired preset exposure setting selection.
4. Press the  TOOTH SELECT Mode Select Button to sequentially advance through the 5 tooth categories until the corresponding indicator lamp illuminates for the desired tooth type selection. The resultant exposure setting is shown on the Digital Display in seconds or pulses as required.

PROVECTA V Available Preset Exposure Time Setting Combinations

	SMALL				MEDIUM				LARGE			
												
	SECONDS	PULSES	SECONDS	PULSES	SECONDS	PULSES	SECONDS	PULSES	SECONDS	PULSES	SECONDS	PULSES
	0.04	3	0.09	5	0.05	3	0.10	6	0.06	3	0.12	7
	0.05	3	0.10	6	0.06	4	0.12	7	0.07	4	0.14	8
	0.06	4	0.13	8	0.08	5	0.15	9	0.09	5	0.17	10
	0.09	5	0.17	10	0.10	6	0.20	12	0.12	7	0.23	14
	0.11	6	0.21	13	0.13	8	0.25	15	0.14	9	0.29	17

SYSTEM OPERATION

NOTE: If using other than D-Speed film, change the film multiplier ratio as recommended by the film manufacturer prior to use (refer to the section on Custom Programming on page 22).

The PROECTA V also allows the user to manually set exposure settings to meet the needs of specific patient applications or individual user preference. Using the INCREASE (▲) or DECREASE (▼) Select Buttons, the manual exposure selection mode enables the user to set exposure time values (seconds or pulses) as required. These user-set exposure time values offer 44 specific value settings shown in the tables below.

Manual Exposure Time Selection- Perform the following procedure to set the PROECTA V to operate in the manual exposure selection mode using user-set exposure time values.

1. Press either the INCREASE (▲) or DECREASE (▼) Select Buttons to initiate the manual exposure selection mode of operation. The Digital Display panel shows the last manually set exposure time.

Note: When set in the manual exposure selection mode, exposure time is increased by pressing the INCREASE (▲) Select Button and decreased by pressing the DECREASE (▼) Select Button. The resultant exposure setting is shown on the Digital Display panel in seconds or pulses.

2. Press either the INCREASE (▲) or DECREASE (▼) Select Buttons once to manually change the time setting in one increment or decrement. Rapid advancement through the entire range of 44 time values is accomplished by keeping the button depressed. Release button to set desired exposure time.
3. Verify that the desired exposure time value is shown on the Digital Display panel.

TIME VALUES IN SECONDS										
0.02	0.04	0.05	0.06	0.08	0.10	0.12	0.14	0.15	0.16	0.18
0.20	0.22	0.23	0.25	0.27	0.28	0.30	0.32	0.33	0.35	0.36
0.38	0.40	0.42	0.43	0.45	0.47	0.50	0.55	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

TIME VALUES IN PULSES										
1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	30	33	36	38	42
48	54	60	75	78	84	96	120	150	180	192


EXPOSURE EMISSION PROCEDURE

1. Introduce the film, plate or sensor into the patient's mouth according to the chosen technique (bisecting or parallel).
2. Move the Tubehead beam limiter near the patient and direct it exactly towards the tooth under examination.
3. Arrange the Tubehead with an angle suitable for the required exposure and positioning.
4. Select exposure time value via either the automatic or manual exposure time operating mode as follows:
 - a. Set automatic exposure settings for specific patient size, media type and tooth type per procedure of page 25.
 - b. Set manual exposure settings as necessary per procedure of page 26.
5. Move as far away as the hand control cable allows, in a direction opposite to the X-ray beam emission while maintaining visual contact with the X-ray Control panel and the patient.
6. Press the X-ray Exposure button and hold it depressed throughout the entire exposure.
7. The X-ray emission condition is indicated by the illumination of the ACTIVE X-RAY EMISSION CAUTION Indicator Lamp and an audible signal sounding.
8. At the end of the exposure, the system starts the Tubehead cooling cycle, which is 32 times the exposure time. The remaining cooling time is shown on the Digital Display panel.

WARNINGS:

1. The X-ray Exposure button is a "Dead Man" control. The button must be kept depressed throughout the entire exposure. Releasing the button before the end of the exposure terminates the emission. When this happens the exposure time display flashes, while the other panel indicators extinguish. The flashing display lasts until either the INCREASE (▲) or DECREASE (▼) button is depressed. At that time, system operation resumes in the tubehead cooling cycle and the display shows remaining cooling time.
2. If the combination of low AC line voltage and long exposure time results in a corrected exposure time of more than 4.00 seconds (240 pulses), the system will inhibit the exposure. In this case, the display shows the corrected exposure time. Reset the unit by pressing the INCREASE (▲) or DECREASE (▼) button and reduce the exposure setting so as not exceed 4.00 seconds (240 pulses).
3. If the AC line voltage reaches minimum/maximum operating limits, the display shows the following:
 - Error Code "LLL" denotes that the voltage is too low (under 106 Volts).
 - Error Code "HHH" denotes that the voltage is too high (over 134 Volts).Contact your ALLPRO authorized Dealer for service when either code is displayed.

READING THE EXPOSURE COUNTER

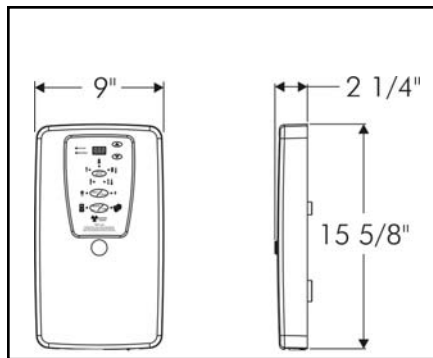
1. Simultaneously press and hold the INCREASE (▲) and DECREASE (▼) Select Buttons for more than 3 seconds.
2. When **P20** is shown on the Digital Display panel, release the INCREASE (▲) and DECREASE (▼) Select Buttons.
3. Press either the INCREASE (▲) or DECREASE (▼) Select Button to display the number of exposures in thousands (e.g. 004=4,000).
4. Press the INCREASE (▲) or DECREASE (▼) Select Button to display the number of exposures up to 999 (e.g. 354).
5. The total number of exposures is $4,000 + 354 = 4,354$.
6. Press the  TOOTH SELECT Button to exit the exposure counter mode.

X-RAY SYSTEM REACH AND STORAGE DIMENSIONS

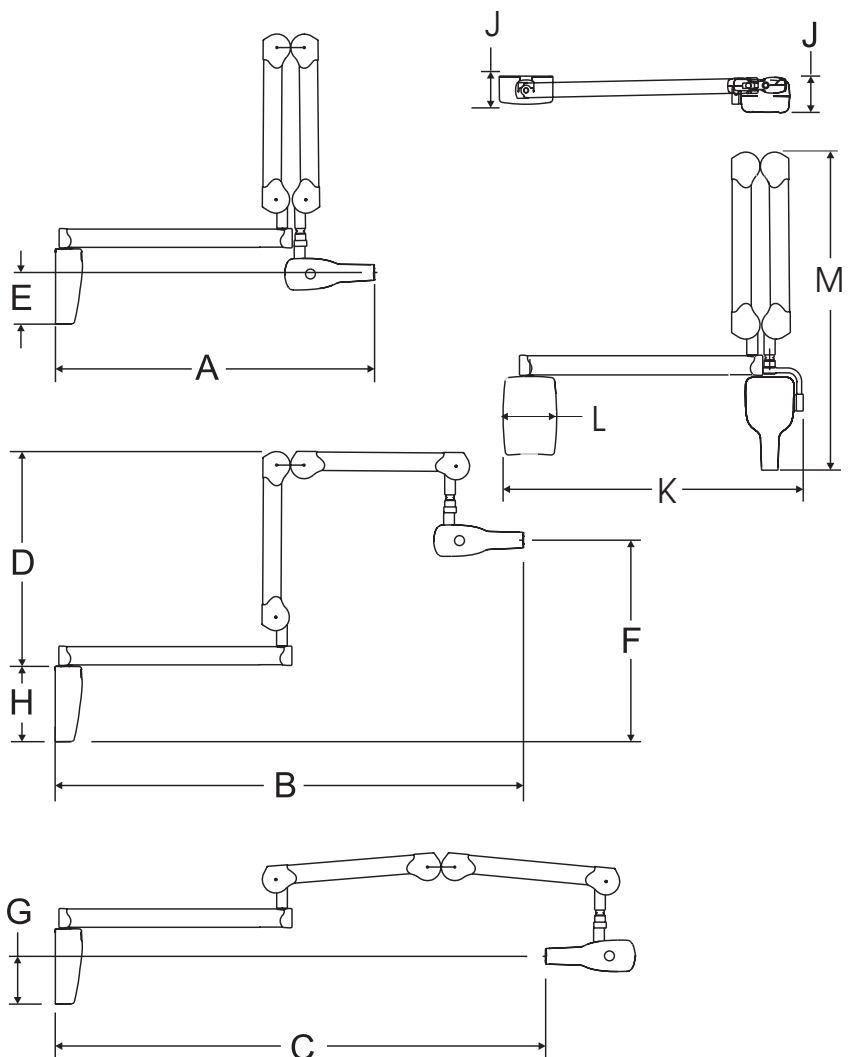
Straight Arm Length Options	A	B	C	D	E	F	G	H	J	K	L	M
35.00	49.25	74.50	80.00	35.50	6.25	29.00	7.00	12.75	5.00	47.44	8.52	52.25
24.00	37.75	63.00	68.50	35.50	6.25	29.00	7.00	12.75	5.00	35.94	8.52	52.25
16.00	30.50	55.75	61.25	35.50	6.25	29.00	7.00	12.75	5.00	28.69	8.52	52.25

Storage Dimensions		
Width	Height	Depth
47.44	51.25	5.12

Remote X-Ray Control Panel Dimensions



X-Ray Arm Dimension Options



RADIOGRAPH TROUBLESHOOTING

CHECKS AND CORRECTION OF POSSIBLE FAULTS IN DENTAL RADIOGRAPHS

TYPICAL DEFECTS OF INTRA-ORAL RADIOLOGY

- **Light radiographs:**

Possible causes:

- Insufficient exposure to X-ray (short time)
- Poor film processing technique
- Insufficient development time
- Deteriorated developer / contaminated developer
- Developer temperature below recommended value
- Incorrect developing fluid dilution
- Expired film

- **Dark radiographs:**

Possible causes:

- Excessive exposure to X-ray (long time)
- Film exposed to light / secondary X-ray exposure
- Poor film processing techniques
- Contaminated developer
- Excessive development time
- Developer temperature above recommended value
- Incorrect developing fluid dilution
- Expired film

- **Blurred radiographs (details not visible):**

Possible causes:

- The patient moved
- The tubehead moved

- **Radiographs with herringbone marks:**

Some intra-oral films are provided with a thin lead foil having a herringbone type mark on its lower side. These films may be exposed to radiation on one side only. If the film is exposed on the wrong side, the lead foil will absorb a large amount of radiation during exposure. The result will be a lighter radiograph and the film will show herringbone marks.

RADIOGRAPH TROUBLESHOOTING

PARTIALLY EXPOSED RADIOGRAPHS

Possible causes:

- X-ray Tubehead positioned incorrectly with respect to the imaging media
- Low developer fluid level, with resulting partial film development
- Two or more films placed against each other during development

CLOUDED RADIOGRAPHS

Possible causes:

- Outdated film (check expiration date)
- Film accidentally exposed to X-ray
- Film accidentally exposed to other natural or artificial light sources
- Improper development technique

RADIOGRAPHS SHOWING A BLACK LINE

This line appears when the film is excessively folded

RADIOGRAPHS SHOWING SIGNS OF ELECTROSTATIC ELECTRICITY

When a film is compressed too much and the air is dry, static electricity may occur, which displays black marks.

RADIOGRAPHS WITH CHEMICAL SPOTS

Developer or fixer fluid spattered on the film before development and fixing procedures produces spots on the radiograph; such spots are:

- dark, when caused by developer fluid
- light when caused by fixer fluid

RADIOGRAPHS WITH EMULSION COMING OFF

If the film is kept in a hot water bath too long (e.g. throughout the whole night), or in the developer solution too long, the emulsion may become softer and partially come off the film base. After development, the film will show scratches.

TYPICAL DEFECTS CAUSED BY INCORRECT POSITIONING

- Radiographs with elongated or shortened image:

The main beam is not perpendicular to the bisecting angle formed by the tooth longitudinal axis and the film.

- Radiographs with stretched out tip of tooth

Probably caused by excessive film folding or bending inside patient's mouth.

SYSTEM MAINTENANCE

To ensure the safe and effective performance of the PROVECTA V follow the proper operation as described by the instructions in this manual.

Periodic maintenance is determined by observations made by the operator and/or an ALLPRO Imaging Authorized Dealer Field Service Technician. Refer to the PROVECTA V Intraoral X-Ray System with Remote Control Installation & Service Manual for information pertaining to the installation and servicing of the PROVECTA V Intraoral X-Ray System with Remote Control.

WARNING: PRE-OPERATION CHECKS MUST BE PERFORMED BEFORE THE PROVECTA V SYSTEM. IF ANY PROBLEMS OR ANOMALIES ARE NOTED, DO NOT OPERATE THE UNIT AND CONTACT YOUR ALLPRO IMAGING AUTHORIZED DEALER FOR SERVICE.

The operator should observe before any operating session that:

- the unit is solidly secure on its wall mounting support
- the scissor arms are correctly balanced and stable
- the Tubehead is free from oil residues
- the Exposure switch cable is not damaged
- there is no external damage on the X-Ray unit
- the scissor arms are correctly balanced and stable
- the labels and keypad surface are properly secured

SYSTEM ERROR MESSAGES

ERROR MESSAGES

The PROVECTA V has been designed with safety features to protect the patient and operator in case of failure of an electrical component. The system automatically checks for errors and will report a malfunction by means of an error code on the Remote X-Ray Control Panel display. These error codes are shown in the table on the following pages. The table lists the code, identifies the potential source of the problem and recommends the corrective action required by the operator to clear the error.

WARNING: WHEN A PROBLEM IS DETECTED FOLLOW THE IDENTIFIED "ACTION REQUIRED" IN THE ERROR CODE TABLE BELOW AND CALL YOUR ALLPRO IMAGING AUTHORIZED DEALER FOR SERVICE AS REQUIRED.

FOR PROPER MAINTENANCE AND SAFETY, SERVICE MUST BE PERFORMED ONLY BY AN ALLPRO IMAGING AUTHORIZED DEALER SERVICE TECHNICIAN.

WARNING: IMMEDIATELY REMOVE POWER IF ERROR CODE E02 APPEARS ON THE DISPLAY AND A PULSATING AUDIBLE TONE IS HEARD.

ERROR CODE	X-RAY GENERATION IS CONTINUOUS AND THE POWER SWITCH MUST BE SET TO THE OFF (0) POSITION TO END EMISSIONS.
E02	CALL YOUR ALLPRO IMAGING AUTHORIZED DEALER FOR SERVICE.

SYSTEM ERROR MESSAGES

ERROR CODE	AUDIBLE SIGNAL	SOURCE OF ANOMALY	ACTION REQUIRED
E01	None	The X-ray relay is closed when power is turned on. X-RAY GENERATION IS INHIBITED.	Test with Tubehead Simulator. Reset power by turning the Main Power Switch OFF (0) and ON (I). If E01 error repeats, replace the X-ray Control Panel.
E02	Continuously Pulsating	Voltage is present at the Tubehead when power is turned ON (I). This is a result of multiple component failures. X-RAY GENERATION IS CONTINUOUS.	IMMEDIATELY REMOVE POWER. TURN THE POWER SWITCH TO OFF (0). Test with Tubehead Simulator. Reset power by turning the Main Power Switch OFF (0) and then ON (I). If E02 error repeats, replace the X-ray Control Panel.
E05	None	The main or Remote Exposure Switch is depressed when power is turned ON (I). X-RAY GENERATION IS INHIBITED.	Check that the switches are not depressed. Reset power by turning the Main Power switch OFF (0) and then ON (I). If E05 error repeats check the switches and cables for defects or short circuits. Replace Switch assembly.
E07	None	The DIGITAL/FILM button is depressed when power is turned ON (I). X-RAY GENERATION IS INHIBITED.	Check that the Control Panel switch is not depressed. Reset power by turning the Main Power switch OFF (0) and then ON (I). If E07 error repeats, replace Membrane Assembly.
E08	None	The INCREASE button (▲) is depressed when power is turned ON (I). X-RAY GENERATION IS INHIBITED.	Check that the Control Panel switch (▲) is not depressed. Reset power by turning the Main Power switch OFF (0) and then ON (I). If E08 error repeats, replace Membrane Assembly.
E09	None	The DECREASE (▼) button is depressed when power is turned ON (I). X-RAY GENERATION IS INHIBITED.	Check that the Control Panel switch (▼) is not depressed. Reset power by turning the Main Power switch OFF (0) and then ON (I). If E09 error repeats, replace Membrane Assembly.
E10	None	The SIZE button is depressed when power is turned ON (I). X-RAY GENERATION IS INHIBITED.	Check that the Control Panel switch is not depressed. Reset power by turning the Main Power switch OFF (0) and then ON (I). If E10 error repeats, replace Membrane Assembly.

SYSTEM ERROR MESSAGES

ERROR CODE	AUDIBLE SIGNAL	SOURCE OF ANOMALY	ACTION REQUIRED
E12	None	The TOOTH SELECT button is depressed when power is turned ON (I). X-RAY GENERATION IS INHIBITED.	Check that the Control Panel switch is not depressed. Reset power by turning the Main Power switch OFF (0) and then ON (I). If E12 error repeats, replace Membrane Assembly
E20	None	The X-ray relay is not closing within the required time after the Exposure Switch is pressed. X-RAY GENERATION IS INHIBITED.	Test with Tubehead Simulator. Reset power by turning the Main Power Switch OFF (0) and ON (I). If E20 error repeats, replace the X-ray Control Panel.
E21	Continuously Pulsating	The X-ray relay is not opening within the required time after the exposure is completed. X-RAY GENERATION IS TERMINATED BY A SAFETY TIMER.	IMMEDIATELY REMOVE POWER. TURN THE POWER SWITCH TO OFF (0). Test with Tubehead Simulator. Reset power by turning the Main Power switch OFF (0) and then ON (I). If E21 error repeats, replace the X-ray Control Panel.
E22	None	The X-ray triac is not closing within the required time after the Exposure Switch is pressed. X-RAY GENERATION IS INHIBITED.	Test with Tubehead Simulator. Reset power by turning the Main Power Switch OFF (0) and ON (I). If E22 error repeats, replace the X-ray Control Panel.
E23	Continuously Pulsating	The X-ray triac is not opening within the required time after the exposure is completed or the Tubehead is not connected to the X-ray control. X-RAY GENERATION IS TERMINATED BY A SAFETY TIMER.	IMMEDIATELY REMOVE POWER. TURN THE POWER SWITCH TO OFF (0). Test with Tubehead Simulator. Reset power by turning the Main Power switch OFF (0) and then ON (I). If E23 error repeats, replace the X-ray Control Panel. If E23 error does not repeat, turn the Main Power switch OFF (0) and verify that the resistance at the wires going to the Tubehead is nominally 1.5 ohms. If not, remove the Tubehead and verify the resistance at the Tubehead connector is nominally 1.5 ohms. If not, replace the Tubehead. If yes, check the wiring in the fixed and scissor arms

SYSTEM ERROR MESSAGES

ERROR CODE	AUDIBLE SIGNAL	SOURCE OF ANOMALY	ACTION REQUIRED
E25	None	The X-ray emission exceeds the programmed time and is terminated by the hardware timer at nominally 5.5 seconds. X-RAY GENERATION IS TERMINATED BY A SAFETY TIMER.	Test with Tubehead Simulator. Reset power by turning the Main Power Switch OFF (0) and ON (I). If E25 error repeats, replace the X-ray Control Panel.
LLL	None	The AC input line voltage is less than 106 Volts when the Exposure Switch is pressed. X-RAY GENERATION IS INHIBITED.	Press the INCREASE (▲) or DECREASE (▼) buttons to reset the display. If LLL error repeats, check the AC line voltage at the input terminals to the X-ray Control Panel
HHH	None	The AC input line voltage is greater than 134 Volts when the Exposure Switch is pressed. X-RAY GENERATION IS INHIBITED.	Press the INCREASE (▲) or DECREASE (▼) buttons to reset the display. If HHH error repeats, check the AC line voltage at the input terminals to the X-ray Control Panel
Greater than 4.00 seconds or 240 pulses	None	The combination of low AC input line voltage and long selected exposure time when the Exposure Switch is pressed X-RAY GENERATION IS INHIBITED.	Press the INCREASE (▲) or DECREASE (▼) buttons to reset the display. Reduce the selected exposure time such that the corrected time is less than 4.00 seconds or 240 pulses.
Flashing Exposure Time	None	The Exposure Switch was released prior to the completion of the programmed X-ray emission time. X-RAY GENERATION WAS PREMATURELY TERMINATED.	Press the INCREASE (▲) or DECREASE (▼) buttons to reset the display.

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- Rinsendo Root Canal Disinfection System
- ScanX®
- STS™
- VacStar™

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- 2010
- Medscope
- Provecta V
- ScanX® 12
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