EPM–3300

IMPORTANT

Read this manual before operating and save this book for future reference.

This manual describes the recommended procedures for inspecting and preparing the EPM-3300 Video Processor, prior to its use and the care and maintenance after its use.
Failure to follow the instructions in this manual may result in damage to or malfunction of the equipment.
Do not use this device for any other purpose than that for which it has been designed.

CAUTION:

Federal (USA) law restricts this device to sale by or on the order of a physician or other appropriately licensed medical professional.

SAFETY PRECAUTIONS- IMPORTANT ⚠

The following precautions should always be exercised with the use of all electro-medical equipment to ensure safety to all involved parties - user(s), patient(s), etc.

Please carefully read and follow this owner's manual.

TRAINING

1. This equipment should only be used under the supervision of a trained physician in a medical facility. Do not use in other locations or for any other purposes than the intended application.

INSTALLATION

1. This equipment should NEVER be installed or used in areas where the unit could get wet or be exposed to any environmental conditions such as temperature, humidity, direct sunlight, dust, salt, etc., which could adversely affect the equipment.
2. This equipment should NEVER be installed or used in the presence of flammable or explosive gases or chemicals.
3. This equipment should NEVER be installed, used or transported in an inclined position nor should it be subjected to impact or vibration.
4. For safety reasons, this equipment must be properly grounded. (This equipment should be connected to a three (3) prong hospital grade receptacle in U.S.A. or Canada.)
5. Ensure that all power requirements are met and conform to those specified on the rating plate located on the rear panel.
6. Do not block the air intake vent of this equipment.
7. Do not allow the power cord to become twisted, crushed or pulled taut.
8. When using an isolation transformer for any ancillary equipment, ensure the power requirements of the devices do not exceed the capacity of the isolation transformer. For further information contact your local Pentax distributor.

PRIOR TO USE

1. Confirm that this equipment functions properly and check the operation of all switches, indicators, etc.
2. To prevent electrical shock when used with endoscopes, this equipment is insulated (type BF electro-medical equipment). Do not allow it to be grounded to other electrical devices being used on the patient. Rubber gloves should always be worn to prevent grounding through user(s).
3. Confirm that other devices used in conjunction with this equipment function properly and that these other devices will not adversely affect the operation or safety of this equipment. If any component of the endoscopic system is not properly functioning, the procedure should not be performed.
4. Check and confirm that all cords or cables are connected correctly and securely.

DURING USE

1. To prevent electric shock, the endoscope and/or any other ancillary device should NEVER be applied directly to the heart.
2. Make sure that no contact is made between the patient and this equipment.
3. To avoid damage to the luminous display and flat membrane switches, do not press any keys with any sharp or pointed objects.
4. The light emitted by the Xenon lamp is extremely intense. Avoid looking directly at the light exiting the endoscope and/or this equipment.
5. To protect the users eyes and avoid risk of thermal injury during an endoscopic examination, use only the minimum amount of brightness required.
6. During clinical procedures, avoid unnecessary prolonged use which could compromise patient/user safety.
7. Continually monitor this equipment and the patient for any signs of irregularities.

8. In the event that some type of irregularity is noted to the patient or this equipment, take the appropriate action to ensure patient safety.
9. If the operation of any of the components of the endoscopic system fails during the procedure and the visualization of the procedure is lost or compromised, place the endoscope in the neutral position and slowly withdraw the endoscope.
10. This equipment should only be used according to the instruction and operating conditions described in this manual. Failure to do so could result in compromised safety, equipment malfunction or instrument damage.

AFTER USE

1. Refer to the operating instructions supplied with all the components of the endoscopic system to establish the right order which component should be turned off in due course. Some peripheral devices may have to be turned off first to avoid compromising their operation.
2. Wipe all surfaces clean with gauze slightly dampened with alcohol.
3. Be sure connector interfaces and ventilation ports are not allowed to become wet or splashed with liquids.

STORAGE

1. This equipment should NEVER be stored in areas where the unit could get wet or be exposed to any environmental conditions such as temperature, humidity, direct sunlight, dust, salt, etc., which could adversely affect the equipment.
2. This equipment should NEVER be stored in the presence of flammable or explosive gases or chemicals.
3. This equipment should NEVER be stored or transported in an inclined position, nor should it be subjected to impact or vibration.
4. Cords, accessories, etc., should be cleaned and neatly stored.
5. This equipment should be maintained in a clean condition during storage and be ready for subsequent use.

SERVICE

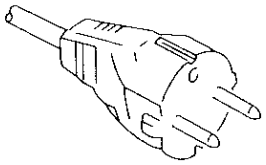
1. Alterations/modifications to the equipment should NEVER be made. Repairs should only be performed by an authorized Pentax service facility.
2. When replacing fuses, lamps, etc., use only the components recommended by Pentax.
3. When replacing the lamp cartridge remember;
   a. Immediately after use, the heat sinks of the lamp cartridge will be hot. Allow the heat sinks to cool before attempting to replace the lamp cartridge. Use caution when testing the heat sink temperature.
   b. Do not touch the glass of the xenon lamp with fingers as oils from skin on the xenon lamp glass could cause the lamp to explode when ignited.

MAINTENANCE

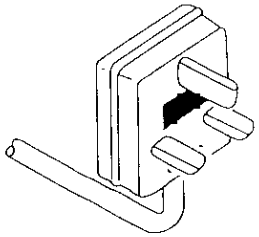
1. Periodically this equipment and any applicable accessories should be inspected for operation and safety.

POWER REQUIREMENTS

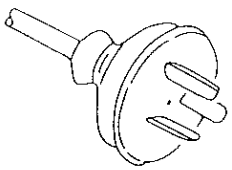
Check the standard power plug configurations that are used in your country. If the appropriate power cord is not included in your product, notify your local Pentax distributor.



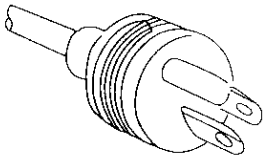
Continental Europe



U.K.



Australia and New Zealand



U.S.A. and Canada (Hospital Grade)

SYMBOLS ON MARKING

Alternating current

Type BF equipment (Safety degree specified by IEC 601)

OFF (Power : disconnection from mains)

ON (Power : connection to the mains)

Attention, consult Owner's Manual

Dangerous Voltage

Protective earth (ground)

CONVENTIONS

The following conventions have been established in the text of this manual to aid in the identification of potential hazards of operation;

⚠WARNING : Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property-damage.

NOTE : Indicates a potentially hazardous situation which, if not avoided, may result in property-damage. Also, advises owner/operator about important information on the use of this equipment.

PRECAUTIONS DE SECURITE-IMPORTANT ⚠

Les précautions suivantes doivent toujours être vérifiées en fonctionnement avec tout le matériel médical électrique susceptible d'être utilisé avec cet appareil, pour assurer à toutes les personnes concernées (utilisateus, patients, etc...) une sécurité maximale.

Veuillez lire et suivre attentivement le manuel d'utilisation.

1. Formation

1. L'appareil ne doit être utilisé que sous la surveillance d'un médecin expérimenté, dans un établissement médical. Ne pas utiliser dans un autre endroit ou pour toute autre application pour laquelle il n'est pas prévu.

2. Installation

1. L'appareil ne doit jamais être placé, utilisé, ou exposé à l'humidité, à une température élevée, à la lumière solaire directe, à la poussière, le sel, etc., qui pourraient l'endommager.
2. L'appareil ne doit jamais être placé ou utilisé en présence de gaz ou de produits chimiques explosifs.
3. L'appareil ne doit jamais être placé, utilisé ou transporté en position inclinée, ni être soumis à des chocs ou des vibrations.
4. Pour des raisons de sécurité, l'appareil doit être correctement relié à la terre (Cet appareil doit être branché dans une prise secteur 3 broches aux normes Hôpital aux U.S.A. et au Canada).
5. Assurez-vous que les spécifications électriques de la prise secteur sont conformes à celles indiquées à l'arrière de l'appareil.
6. Ne pas obturer les orifices de ventilation de l'appareil.
7. Ne pas écraser, plier ou tendre le cordon secteur.
8. Dans le cas ou un transformateur d'isolement est utilisé pour le matériel périphérique, vérifier que la puissance totale de l'installation ne dépasse pas la capacité du transformateur. Pour de plus amples informations, contacter votre distributeur Pentax.

3. AVANT UTILISATION

1. Vérifier le fonctionnement de l'appareil et de ses interrupteurs, afficheurs, voyants, etc...
2. Pour prévenir les risques de chocs électriques lorsqu'il est utilisé avec des endoscopes, cet appareil doit être installé comme "Matériel électrique médical type BF". Ne pas oublier de relier la terre aux autres appareils électriques utilisés pour le même patient. Les utilisateurs doivent s'isoler électriquement en portant des gants de caoutchouc.
3. Vérifier le fonctionnement des périphériques utilisés avec l'appareil et s'assurer qu'ils n'en perturbent pas le fonctionnement et la sécurité.
4. Vérifier le branchement des différents câbles de liasions (vidéo, secteur, contrôle, etc...).

4. PENDANT L'UTILISATION

1. Pour éviter les risques de choc électrique, l'endoscope et/ou tout autre périphérique utilisé conjointement avec l'appareil ne doivent pas être placés sur le coeur.
2. Ne pas mettre le patient en contact avec l'appareil.
3. Pour conserver l'afficheur et le clavier souple en bon état, ne pas presser les touches du tableau avec un objet pointu ou tranchant.
4. Eviter de regarder directement la lumière sortant de l'endoscope et/ou de l'appareil du fait de la forte luminosité émise par la lampe Xénon.
5. Pour protéger l'utilisateur et éviter toute blessure thermique pendant l'examen, régler la luminosité au minimum nécessaire.
6. Eviter une utilisation prologée de l'appareil si elle n'est pas indispensable, pour ne pas compromettre la sécurité du patient et de l'utilisateur.
7. Surveiller en permanence l'appareil et le patient pour prévenir tout signe de dysfonctionnement.
8. En cas de problème avec le patient ou l'appareil, prendre toutes les mesures nécessaires pour préserver la sécurité du patient.
9. Si un problème de fonctionnement survient sur l'un des appareils du système endoscopique et que l'image est interrompue ou altérer, placer le béquillage de l'endoscope en position neutre et retirer doucement le tube du patient.
10. Cet appareil doit toujours être utilisé selon les instructions et conditions de fonctionnement décrites dans ce manuel. Ne pas les suivre peut compromettre la sécurité, le fonctionnement du matériel, ou endommager l'appareil.

5. APRES UTILISATION

1. Après avoir ramené les différents commutateurs à leur position initiale (suivre le mode d'emploi de chaque appareil concerné), couper l'alimentation.
2. Essuyer les appareils avec une compresse légèrement imbibée d'alcool.
3. Vérifier que les connecteurs et les orifices de ventilation sont à l'abris des projections de liquides.

6. STOCKAGE

1. L'appareil ne doit jamais être rangé à l'humidité, à température élevée, à la lumière solaire directe, la poussière, le sel, etc., qui pourraient l'endommager.
2. L'appareil ne doit jamais être rangé en présence de gaz ou de produits chimiques explosifs.
3. L'appareil ne doit jamais être rangé en position inclinée ni être soumise à des chocs ou des vibrations.
4. Les accessoires et les câbles doivent être nettoyés et rangés correctement.
5. L'appareil doit être maintenu en parfait état de propreté durant le stockage, et tenu prêt pour l'utilisation suivante.

7. SERVICE

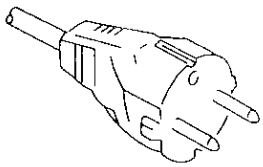
1. Ne jamais modifier ou altérer l'appareil. Les réparations éventuelles ne doivent être effectuées que par un Service Aprés-Vente PENTAX.
2. En cas de remplacement de fusibles, lampes, etc..., n'utiliser que des pièces recommandées par PENTAX.
3. Si la lampe doit être remplacée, attention:
    a. La lampe et ses dissipateurs sont très chauds juste après utilisation. Laisser refroidir l'appareil et faire trés attention en cas de remplacement de la lampe Xénon.
    b. Pour éviter tout risque d'explosion de la lampe, ne jamais toucher le verre de la lampe Xénon.

8. MAINTENANCE

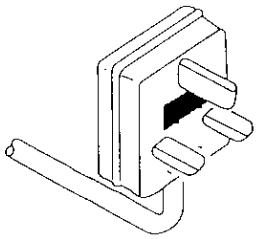
1. Périodiquement, cet appareil et tous les périphériques associés doivent être vérifiés en fonctionnement et en sécurité.

ALIMENTATION NECESSAIRE

Vérifier le type de prise de courant utilisé dans votre pays. Si le cordon secteur approprié n'est pas fourni avec votre appareil, contacter votre distributeur PENTAX.



Europe Continentale



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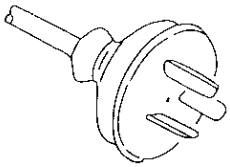
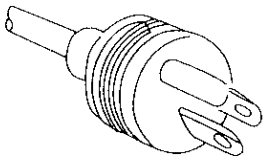


Australie
et
Nouvelle Zélande



USA et Canada
(Normes Hôpital)

SYMBOLES UTILISES:

Courant alternatif

Appareil type BF (Niveau de sécurité spécifié par la norme IEC 601)

"OFF" (Alimentation : déconnectée du secteur)

"ON" (Alimentation : connectée du secteur)

Attention : consulter le manuel d'utilisation

Voltage dangereux

Mise à la terre de protection

For European Countries;

Bescheinigung des Herstellers/Importeurs

Hiermit wird bescheinigt, daß der/die/das

Pentax Video Prozessor EPM-3300
(Gerät, Typ, Bezeichnung)

in Übereinstimmung mit den Bestimmungen der

EN 55014 (87/308/EEC)
(DIN-VDE-Norm bzw. EN-Norm bzw. BMPT-AmtsblVfg 242/1991)

funkentstört ist.

Dem Bundesamt für Zulassungen in der Telekommunikation wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf die Einhaltung der Bestimmungen eingeräumt.

Asahi Optical Co., Ltd.
(Name und Anschrift des Herstellers/Importeurs)

CONTENTS

1 SPECIFICATIONS, EPM-3300

Item	Specification	Observation
Power Requirements	Voltage	120 VAC, 220-240 VAC
	Frequency	50/60 Hz
	Power consumption	6.5 A (120 VAC), 4 A (220-240 VAC)
	Voltage fluctuation	+/- 10 %
Operating Environment	Temperature	10 ~ 40°C
	Relative humidity	30 ~ 85 %
	Air pressure	700 ~ 1060 hPa
Storage Environment	Temperature	-10 ~ 60°C
	Relative humidity	30 ~ 95%
	Air pressure	700 ~ 1060 hPa
Illumination	Lamp	Xenon short arc, Type Y1089
	Lamps average life span	200 hours, continuous use
	Color temperature	~ = 5600 K
	Lighting format	Switching regulator with continuous illumination
	Brightness control	Selection - Automatic or Manual
	Automatic iris	Servo type
	Auxilliary lamp	Tungsten, manual switch
Scope Compatibility	Pentax video endoscopes Pentax fiberscopes	All models With use of fiberscope video adapter module
	Other manufacturers' fiberscopes	With use of fiberscope video adapter module and appropriate eyepiece/light guide adapters
Air Feed System	Air pump system	Electro-magnetic vibrator system
	2 Pressure settings Low	>= 0.21 kg/cm2 (at flow rate of 0)
	High	>= 0.63 kg/cm2 (at flow rate of 0)
	Standard air feed volume	>= 2250 cc/min at inlet of water bottle (using Low pressure)
Water Feed System	Water bottle assembly pressurized by pump	Bottle capacity= 250cc, normal use <= 2/3 full, sterile water

Brightness Control System	Automatic Manual	Selection - Average or Peak +/- 5 step adjustment
Color System	RGB sequential strobing color wheel	1 Full color frame/(1/30) sec (NTSC) 1 Full color frame/(1/25) sec (PAL)
	Color correction	Red +/- 5 steps Blue +/- 5 steps
Freeze Function	Live video image provided when freeze mode activated	
Cooling	Forced air cooling	
Video Outputs	2 sets: RGBS (NTSC or PAL), BNC connectors 2 sets: Composite (NTSC or PAL), BNC connector 2 sets: Separate Video (Y/C), 4-pin female connector 1 set : Computer RGBS, 9-pin D-Sub female connector	
Classification as Electro Medical Equipment	Type of protection against electric shock	Class1 equipment, 3 prong plug
	Degree of protection against electric shock	BF Type (Body Floating), using insulated endoscope. Use on heart is prohibited
	Degree of explosion proofing	Do not use in potentially flammable surroundings
Acoustic Noise	Sound pressure level	< 70 dB (A) (Based on ISO 7779)
Compliance	Designed in accordance with	UL544, CSA125 for North America (120V) IEC601 for Europe (220-240V)
Size	Dimensions	Width= 500mm (19 5/8 in) Height= 200mm (7 7/8 in) Depth= 610mm (24 in)
Weight		Main Body= 35kg (77 lbs)

2 NOMENCLATURE, CONTROLS AND FUNCTIONS

2-1 EPM-3300 VIDEO PROCESSOR

2-1-1 MAIN BODY

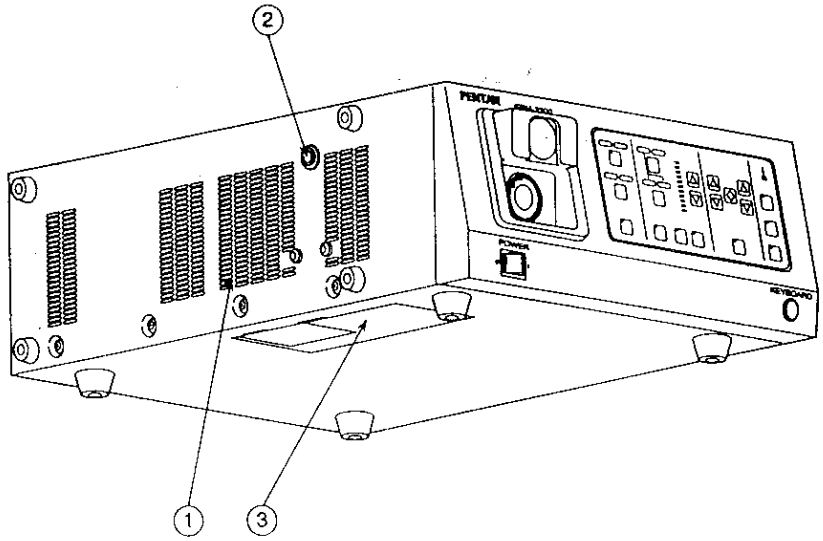


Fig. 1

LABEL	NAME	FUNCTION
1	Ventilation Grid	
2	Water Bottle Receptacle	
3	Lamp Cartridge Access Door	Provides access to lamp cartridge.

NOTE - *If door is not properly closed, unit cannot be turned on.*

2-1-2 FRONT PANEL

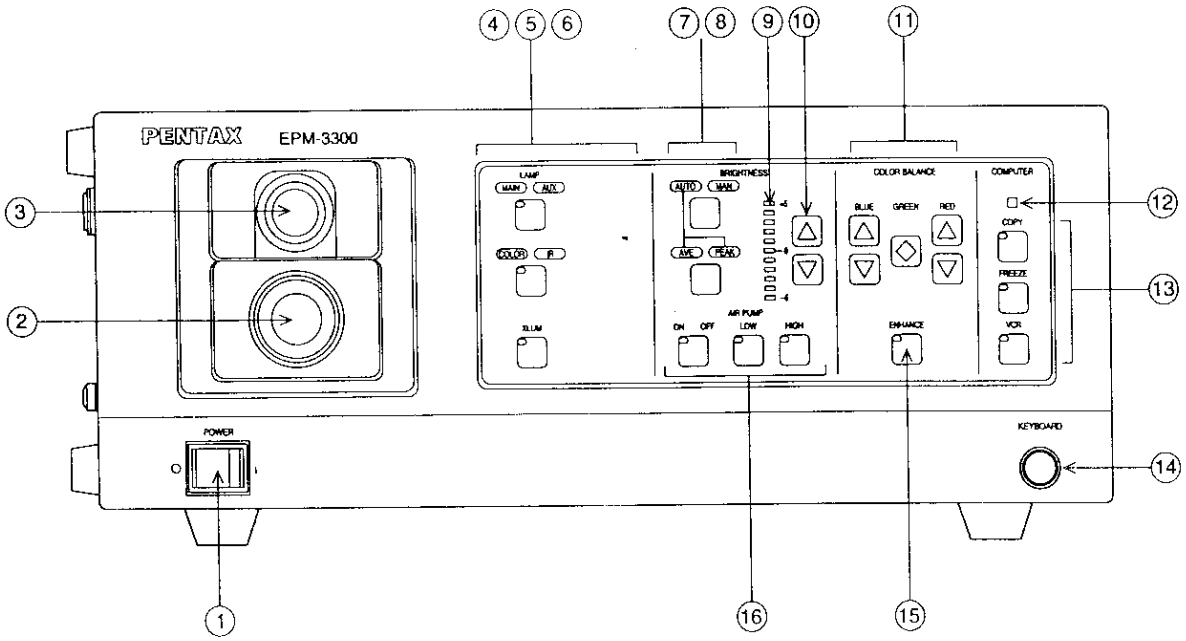


Fig. 2

LABEL	NAME	FUNCTION
1	Power Switch	Switch lights green when switched ON. Switch should not be hit with objects like endoscope light guides, when being switched ON or OFF. *NOTE-When power is turned OFF, wait 30 seconds before turning power switch ON. Failure to do so may compromise the functionality.* *NOTE-Before turning the EPM-3300 power ON, ensure the air flow vents are not obstructed.*
2	Light Guide Attachment	AE-P1 adapter for standard Pentax endoscopes. Port accepts video endoscope or fiberscope light guide. Adapter can be changed for use as Xenon light source for other manufacturer's endoscopes or for use with fiberscope video adapter module.
3	Endoscope Electrical Connector	Accepts video endoscope electrical connector or fiberscope video adapter module electrical connector. *NOTE-DO NOT use sharp objects like pens to press the 'membrane switches' below.*
4	Lamp Ignition Switch	LED on switch lights to indicate lamp has ignited. MAIN or AUX indicator backlights to indicate which is selected.
5	Color/ IR Switch	Color or IR indicator backlights to indicate which is selected. Color indicates normal color strobe viewing. IR provides Near-IR source light to pathology and the image on the monitor will appear black and white. Near-IR source light is thought to have more penetrative properties, which may help to increase visualization of vascularity or through blood flow (heme).
6	XLUM Switch	Transillumination (XLUM) is a function intended to enable the user to identify the position of the distal end of a video scope by removing the color wheel from the light path and allowing white Xenon light to be emitted at the distal end. *NOTE-Prolonged use of the XLUM function could result in minor discomfort and/or burns to the patient.* LED on switch will light to indicate feature is selected. *NOTE-When XLUM is selected the endoscopic image from a video endoscope will 'White-Out', that is the live image on the display screen will appear as all white.* XLUM should be activated when the EPM-3300 is being used as a Xenon light source for fiberscopes. Manual brightness control (see 10 below) will be automatically established when XLUM is selected.
7	Brightness Control Switch	Selects auto or manual brightness control mode, AUTO or MAN indicators will backlight to indicate which is selected. *NOTE-Selection will automatically change to manual if XLUM is activated.*

8	Light Measurement Select Switch	Selecting AUTO will require selection of light measuring method - average or peak. AVE or PEAK indicator backlights to indicate which is selected. NOTE-*Halation is defined as the appearance of a halo around areas on extreme brightness. Halation may occur if average mode is selected. If so, switch to peak mode.*
9	Brightness Indicator	Scale will backlight at position representing the brightness level.
10	Brightness Adjustment Buttons	Controls brightness level. Pressing Up or Down button will change brightness level as shown on brightness indicator. NOTE-*Minimum brightness should be used at all times to avoid risk of injury to the patient.*
11	Color Balance Buttons	Buttons for adjusting video image color - Blue Up or Down, Green OFF or ON and Red Up or Down.
12	Computer Indicator	LED backlights to indicate digital interface for IMS 3000 Image Management System is connected to the EPM-3300. NOTE-*Computer mode disables all EPM-3300 keyboard selected functions and Extended Menu functionality.*
13	Controls for attached Equipment	LED's on the switches COPY, FREEZE and VCR will light when selected at the front panel or from the video endoscope control body (see EXTENDED MENU, section 4-5-19, Page 34). The action of these buttons will depend on the system configuration and installed I/O option boards. See OPERATION in Section 4 for more detail.
14	Keyboard Connector	Use keyboard supplied by Pentax only.
15	Enhance Switch	Switch LED will light to show enhance mode is selected. Pressing the switch will toggle the selection. While enhance is ON and the switch is pressed, it will be turned OFF. While enhance is OFF and the switch is pressed, it will turn ON to the last established level. There are three (3) levels of image enhancement, see 4-5-11(Page 28) for more detail.
16	Air Pump Switches	LEDs on switches will light to indicate which is selected.ON/OFF controls air pumps. LOW or HIGH indicates pump output pressure. NOTE-*When selecting HIGH pressure, take care not to deliver too much air.*

2-1-3 REAR PANEL

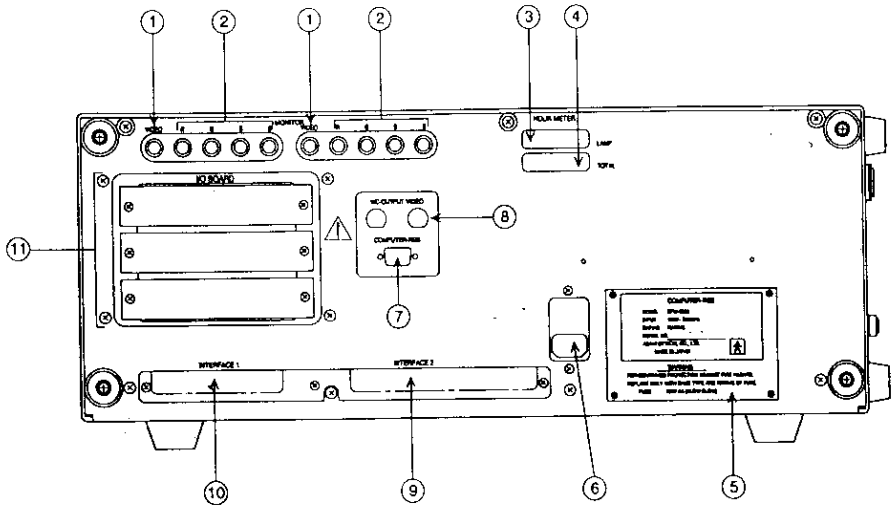


Fig. 3

LABEL	NAME	FUNCTION
1	Composite Video Output	NTSC or PAL composite video out connector, BNC type connector, two (2) outputs on rear panel.
2	RGBS Video Output	NTSC or PAL RGBS video out connectors, BNC type connectors, two (2) sets outputs on rear panel.
3	Lamp Life Meter	Indicates hours for Xenon lamp installed in video processor. The lamp life meter should be replaced when the Xenon lamp is replaced.
4	Unit Total Hour Meter	Indicates the total hours for the unit. Replaced by authorized Pentax personnel or returned to Pentax service center only.
5	Rating Plate	Displays unit model number, serial number, power requirements.
6	Power Input Socket	Accepts AC power cord and houses fuse holder.
7	Computer RGB Output	Analogue RGBS out connector, 9-pin D-Sub female connector.
8	Separated Video Output	Y/C video out connector (4-pin S connector), two (2) outputs on rear panel
9	Interface 2 Connector	RGB digital component video signal output. Not used at this time.
10	Interface 1 Connector	For use with digital interface, parallel interface device required for IMS-3000 Image Management System and EndoNet applications. *NOTE - Connecting a digital interface at Interface 1 connector will disable all EPM-3300 keyboard selected functions and extended menu functionality.*
11	I/O Board slots	Accepts optional Input/Output control PCBs for hardcopy and VCR applications.

2-2 WATER BOTTLE ASSEMBLY, MODEL OS-H2

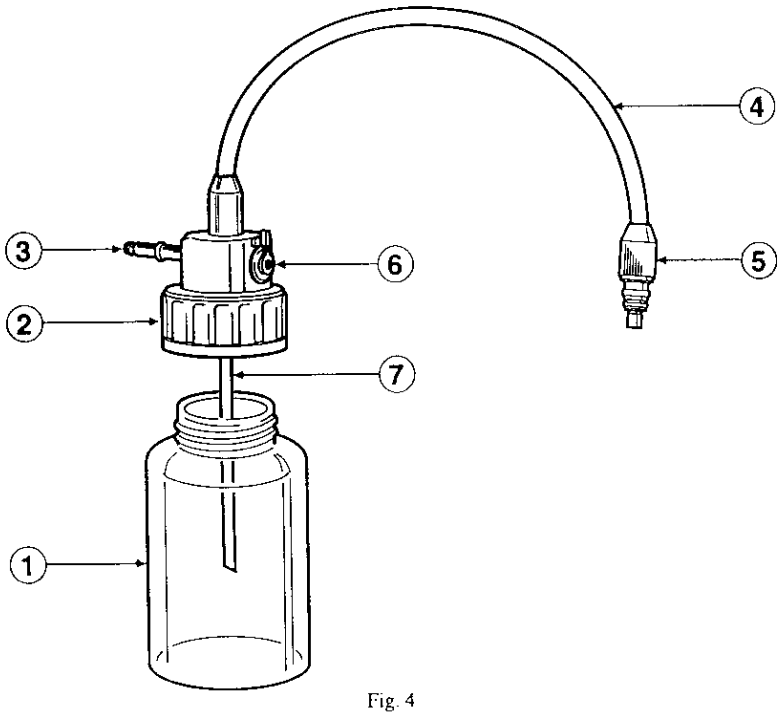


Fig. 4

LABEL	NAME	FUNCTION
1	Bottle	Holds sterile water for procedure.
2	Water Bottle Cap Assembly	
3	Air Pipe Stem	Inserts into video processor water bottle receptacle.
4	Air/Water Hose	
5	Air/Water Connector	Inserts into Air/Water socket of endoscope umbilical connector.
6	Air/Water- Drain Lever	
7	Water Feeding Stem	

2-3 KEYBOARD

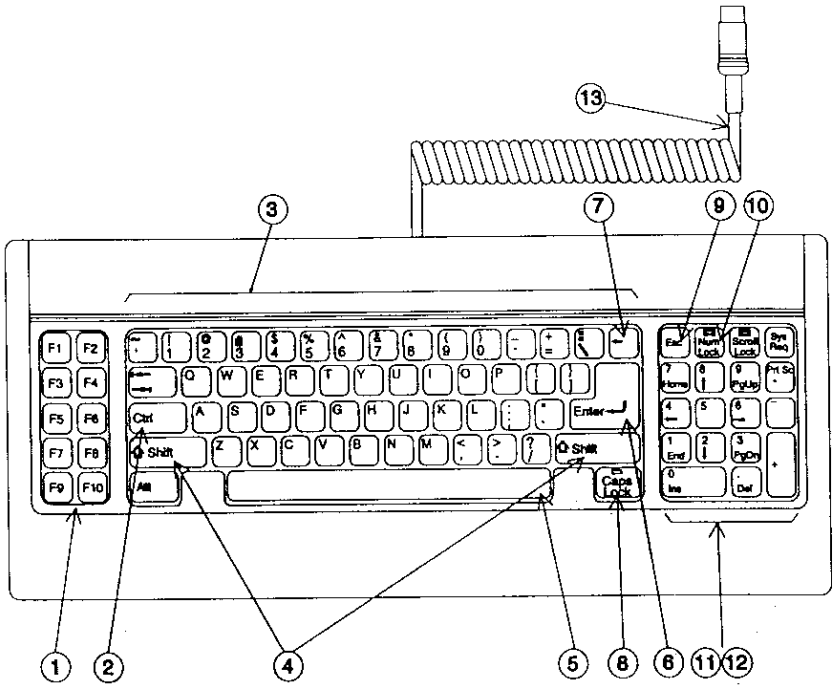


Fig. 5

NOTE -The Keyboard supplied with your EPM-3300 in North America may differ slightly from the one described here. All keyboards will have similar functionality, only key positions and select indicators may vary.

LABEL	NAME	FUNCTION
1	Function Keys	
2	Ctrl (Control) Key	Used to access control/function menus.
3	Alpha-Numeric Keys	Includes keys for letters, numbers and special characters (brackets, commas, etc.) as well as command keys (Control, Shift, Enter etc.).
4	Shift Keys	When Caps Lock is OFF, holding the Shift key and pressing alpha - numeric key will be typed to the monitor screen as a capital letter or the special character pictured on the key.
5	Space Bar	
6	Enter Key	
7	Back Space Key	
8	Caps Lock Key	Caps Lock indicator will light to show Caps Lock selected. When Caps Lock is ON, all alphabet keys will be typed to the monitor screen as capitals.
9	Esc (Escape) Key	
10	Num Lock Key	Locks function of number keys to print numbers only. Status indicator will light when selected.
11	Number Keys	Can be used for numerical data entry. Sometimes preferred over use of lower case number keys in the alpha key grouping.
12	Cursor Movement Keys	Up, Down, Left and Right arrows move the cursor.
13	Keyboard Connector	Connects to EPM-3300 keyboard connector.

2-4 MONITOR DISPLAY SCREEN

2-4-1 NORMAL

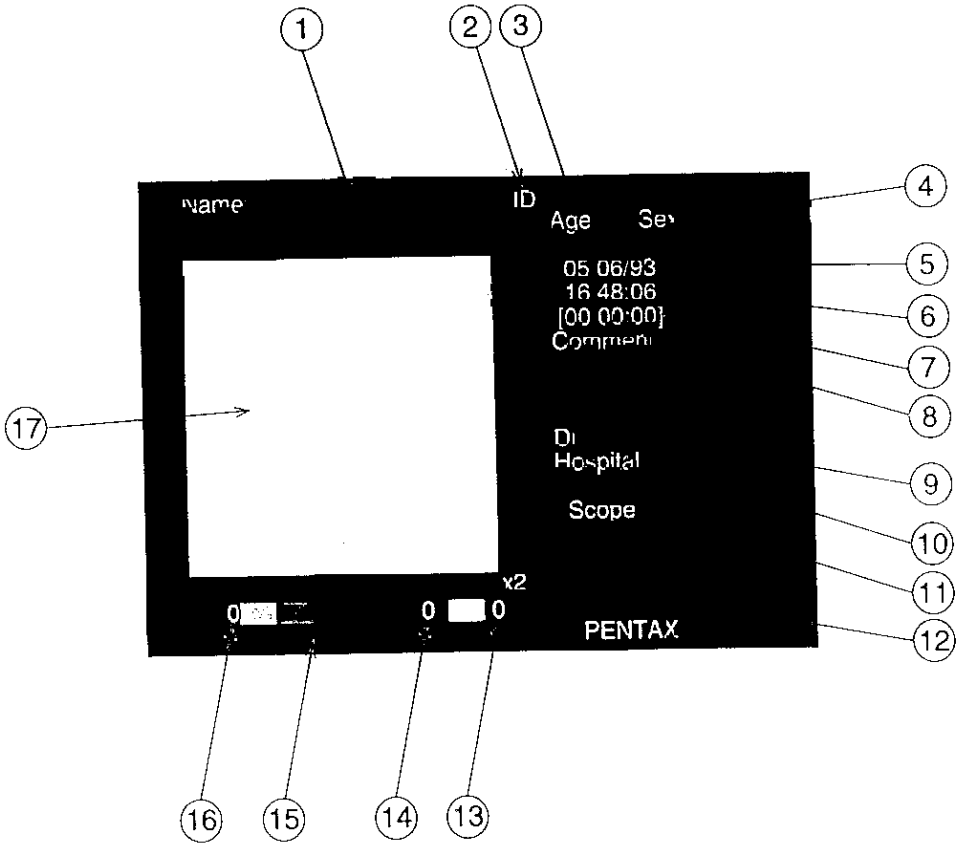


Fig. 6

LABEL	NAME	FUNCTION
1	Patient Name	Alpha-numeric field, 20 characters long.
2	Patient ID	Alpha-numeric field, 12 characters long.
3	Age	Numeric field, 3 characters long.
4	Sex	Alpha field, 1 character long (M= Male, F= Female).
5	Date	Numeric field, Month/Day/Year
6	Clock	Military format, Hours/ Minutes/ Seconds.
7	Stopwatch	Numeric display, [Hours:Minutes:Seconds]
8	Comment	Alpha-numeric field, Three (3) lines, 13 characters each.
9	Doctor's Name	Alpha-numeric field, 9 characters long.
10	Hospital Name	Alpha-numeric field, 12 characters long.
11	Scope ID	When video endoscope is connected to the EPM-3300, the model name will be displayed.
12	Magnification	When magnification is selected, the indicator will display X2.
13	Brightness Level Value	Numeric display of brightness level +5 to -5.
14	Red Color Level Value	Numeric display of Red color level +5 to -5.
15	Color Bar	Representation of color bar serves as background for Blue and Red color levels (+5 to -5 for each). Will indicate that Green is Off by removing Green from center of color bar. Includes white square to left of brightness level value.
16	Blue Color Level Value	Numeric display of Blue color level +5 to -5.
17	Main Screen	Endoscopic image will be displayed to this area of the monitor screen.

2-4-2 FREEZE (SUB-SCREEN DISPLAY)

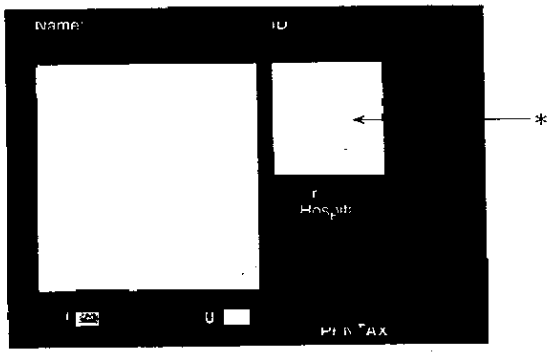


Fig. 7

* Sub-Screen — Endoscopic image will be displayed to this area of the monitor screen when freeze function is activated.

NOTE - *For assignment of live endoscopic image or frozen endoscopic image to the main screen or the sub-screen, see 4-5-12(Page 29). Appearance of sub-screen covers Age, Sex, Date, Clock, and Comment fields.*

2-4-3 SUB-MENU DISPLAYS

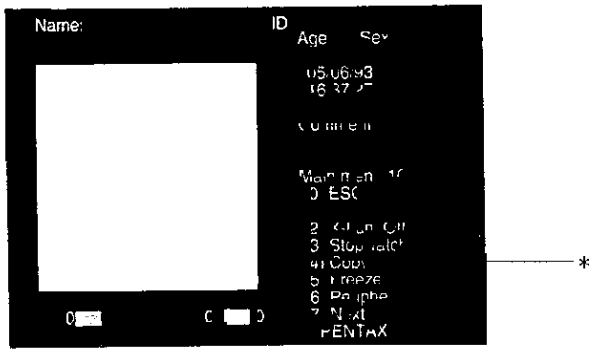


Fig. 8

* Sub-Menu Display — Some processor functions have sub-menus for selection choices. Sub-menus will be displayed here.

NOTE - *Appearance of the sub-menu covers Doctor's Name, Hospital Name, and Video Endoscope model name.*

3 PREPARATION AND SAFETY CHECK

3-1 PREPARATION

3-1-1 SETTING UP THE EPM-3300

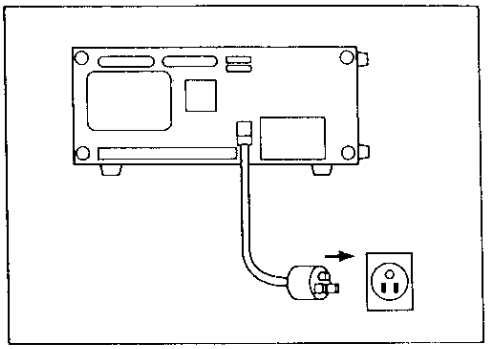


Fig. 9

1. Place the EPM-3300 video processor on a stable, level surface (cart, counter, stand,etc..).

NOTE
- *Avoid places where the EPM-3300 may be splashed with liquid.*
- *Absolutely DO NOT use in any environment with explosive or flammable gases.*
- *Do not block the venting grids on the sides of the video processor.*

2. Make sure the power switch is OFF.
3. Plug the power cord into the power source (see specifications) using the three (3) prong plug supplied with the unit. (fig. 9)
4. Ensure the keyboard is connected properly.

CAUTION - *To prevent electric shock, connect power cords of ancillary equipment to isolation transformers.*

NOTE - *When using isolation transformers, be sure to check that the total power consumption of all the devices does not exceed the isolation transformers' power ratings. Make sure that the power cord is connected to the main with a three (3)prong plug (In the U.S.A. use UL544 rated isolation transformers and/or power strips only).*

3-1-2 CONNECTING THE WATER BOTTLE

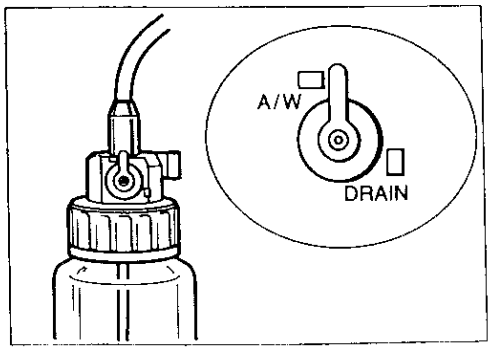


Fig. 10

1. Fill the water bottle approximately 2/3 full with sterile water.
2. Screw the water bottle cap assembly to the water bottle snugly.

NOTE - *Do not over tighten the water bottle cap*

3. Set the Air/Water- Drain lever to A/W (Fig. 10).
4. Insert the water bottle air pipe stem into the EPM-3300 water bottle receptacle, press until the water bottle 'clicks' into position.

NOTE - *Do not press the water bottle too forcefully into the EPM-3300, rough handling may cause water to leak onto/into the video processor.*

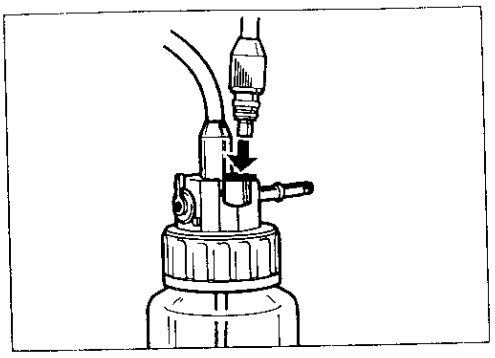


Fig. 11

5. Insert the Air/Water connector into the holder on the water bottle cap assembly until the endoscope is connected (Fig. 11).

NOTE - *Always disconnect the water bottle before moving the video processor into a position not common to normal use (to access the lamp cartridge door for example).*
Always disconnect the water bottle before packing the EPM-3300 for shipment.

3-1-3 CONNECTING THE ENDOSCOPE

1. Check to ensure the appropriate light guide adapter is mounted to the EPM- 3300.

NOTE - *Connecting a video endoscope without a light guide adaptor in place will reduce light output at the endoscope distal end. Attempting to connect a fiberscope without a light guide adapter and/or an appropriate light guide sleeve in place will damage the fiberscope and the EPM-3300.*

2. Connect the scope slowly (Fig. 12).

3. Press the scope firmly until it 'clicks'into position.

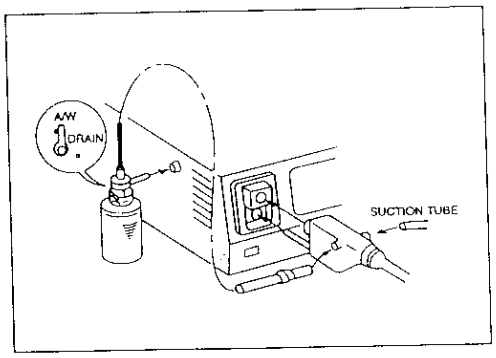


Fig. 12

NOTE - *If using the fiberscope video adaptor module, make sure the eyepiece of the fiberscope is properly connected to the module (use adapters as required). Connect the electrical connector of the module to the electrical connector of the EPM-3300, lining up the red dots on each.*

4. Connect the water bottle Air/ Water connector to the Air/Water receptacle on the endoscope's umbilical connector (Fig. 12).

5. Connect the suction tube of the suction device to the suction nipple on the umbilical connector of the endoscope (Fig. 12).

3-1-4 CONNECTING THE PERIPHERAL EQUIPMENT

1. Referring to the rear panel diagram (Fig. 3, Page 7), connect a TV monitor to the EPM-3300
2. Connect other required equipment such as hard copy equipment, VCR etc. through I/O board slots on the rear panel.

NOTE - *The optional I/O boad is required for the appropreate peripheral equipment.*
Contact your local Pentax distributor for the details.

3-2 PRE-USE SAFETY CHECKLIST

⚠WARNING - Before every use the following points should be checked. If any function or device in the video endoscope system does not perform properly, DO NOT perform the endoscopic examination. Contact the manufacturer of the device, your pentax sales representative or a Pentax service center before using the equipment for an endoscopic examination.

1.Ensure video processor is placed in stable, and level position.

2.Ensure water bottle is properly prepared and connected.

3.Ensure endoscope (and fiberscope video adaptor module if applicable) is connected properly.

4. Ensure EPM-3300 lamp life is less than 200 hours. If lamp life is 200 hours or more, change lamp and lamp life meter.

5. Turn ON monitor and other peripheral devices.

6. Turn ON EPM-3300 power switch. Ensure switch is lighted green and the sound of the ventilation fans can be heard.

NOTE - If the auxiliary indicator is blinking when the power switch is turned ON, the auxiliary lamp is burnt out. Do NOT attempt to perform an endoscopic examination. Contact a Pentax service center.

7. Ignite lamp. If main lamp fails to ignite, turn EPM-3300 OFF, wait 30 seconds and repeat steps 6 and 7.

NOTE - If main lamp fails to ignite, DO NOT attempt to perform an endoscopic examination using the auxiliary lamp. The auxiliary lamp is intended to be a safety feature should the main lamp fail DURING procedure, providing visualization while the endoscope is being withdrawn.

8. With main lamp lit and endoscope connected, check for live endoscopic image on the monitor.

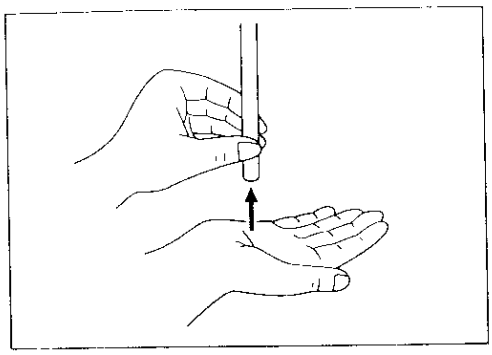


Fig. 13

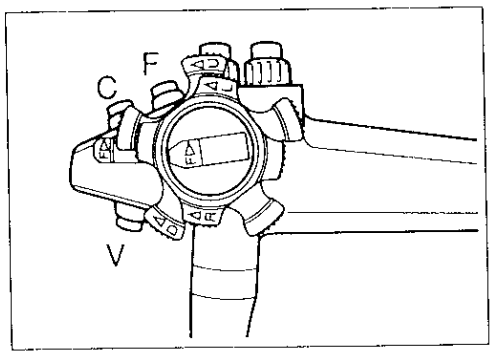


Fig. 14

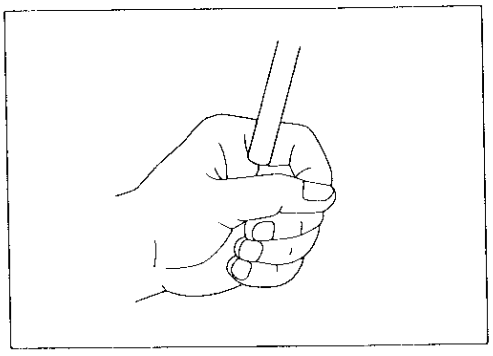


Fig. 15

9. Exercise the endoscopes automatic iris. Bring the tip of the endoscope within 1 cm of the palm of your hand and move it to about 5 cm away from the palm (Fig. 13). Watch the image on the monitor to ensure the brightness at both distances is similar. Lift the distal end of the endoscope to the room lights, the light being emitted at the distal end of the scope should lower significantly (dependent on the ambient light levels in the room). Return the distal end of the endoscope to point at the palm and ensure the light is being emitted from the distal end of the endoscope.

10. Check the endoscope control buttons positioned on the control body of the endoscope (Fig. 14). Each button; F, C and V will beep when pressed. If the COMPUTER indicator on the top right of the front panel is not lit, then when the F button is pressed, the main screen will freeze and the sub-screen will appear displaying the live video image (unless the screen format has been selected otherwise). Refer to the optional I/O board operating instructions for effects of other control buttons.

11. Select brightness control auto or manual. If selecting AUTO, also select light measurement mode, average or peak. And exercise the brightness control buttons to ensure the brightness indicator and controls are functioning.

12. Exercise the color adjustment.

NOTE -*Allow the processor to run for ten (10) minutes with main lamp ON before adjusting colors.*

Cup the distal end of the endoscope loosely in your hand (Fig. 15). Ensure that the monitor displays a natural color. exercise the color adjust buttons (Red Up and Down and Blue Up and Down) to ensure the color level values on the color bar of the monitor display register the changes and the changes are recognizable in the image of your hand. Remember, the 0 values are considered standard and all color adjustments should be made with that in mind.

13. If infrared is intended to be used during the procedure, exercise the infrared function. When selected the IR indicator will be backlit on the front panel and the live image should appear in black and white.

14. If XLUM is intended to be used during the procedure, exercise the XLUM function. Upon selecting the switch, LED will light and the live endoscopic image created in the cup of the hand will white- out. Turn OFF the XLUM.

15. Turn ON air pumps. Upon selection, switch LED will light and the sound of the air pumps should be heard. Select desired level, LOW or HIGH.

16. Exercise Air/Water delivery through the endoscope. Covering air venting hole on top of Air/Water button lightly should deliver air at the distal end of the endoscope by submerging the distal end in enough water to cover the tip, air flow will be demonstrated by a trail of bubbles (Fig. 16). Pressing the button all the way down should deliver water through the tip of the endoscope (Fig. 17).

If all items above appear to function satisfactorily, then the endoscopic procedure may be performed. If any functionality above is compromised, DO NOT attempt to perform the endoscopic procedure.

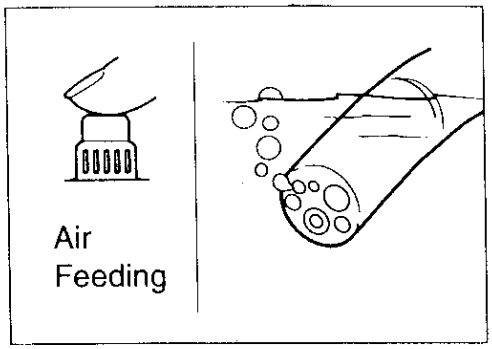


Fig. 16

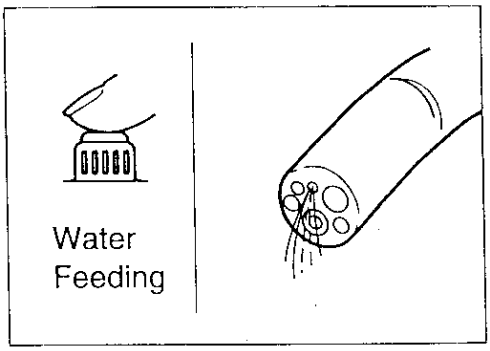


Fig. 17

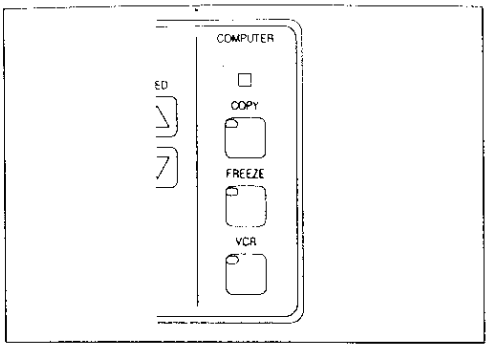


Fig. 18

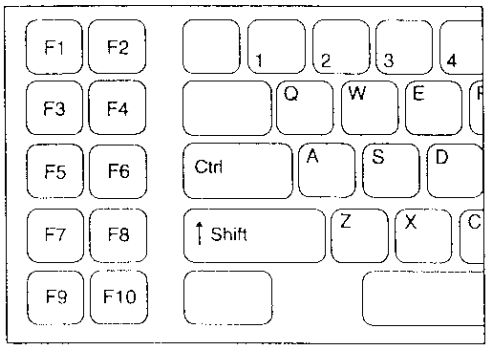


Fig. 19

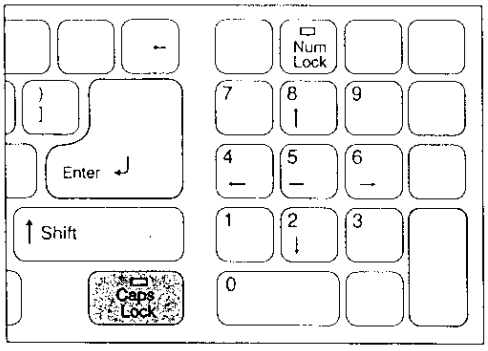


Fig. 20

4 OPERATION

NOTE - *The operation described in this manual applies ONLY if the computer indicator on the top right of the front panel is NOT lit (Fig. 18). When the computer indicator is lit, a parallel digital interface is attached to Interface 1 connector and operation for the specific application will be described in the operator manual supplied with the parallel digital interface.*

NOTE - *Before turning the EPM-3300 ON, ensure the air flow vents are not obstructed.*

4-1 FUNCTION KEY INDEXES

The EPM-3300 video processor function may be controlled from either the processor front panel control buttons, function key menu selections (Fig. 19) or the video endoscope control buttons (F,C,V,). The description for each function to follow will indicate the control options.

There are two (2) Function key menus, for details on each function refer to the appropriate section of this manual (see contents for selection numbers).

NOTE - *When Caps Lock is ON, function keys do not activate. Ensure Caps Lock is OFF (Fig. 20)*

Press F10 and the function menu below will be displayed on the main screen;

Keys
F1 :
F2 : Color Bar on/off
F3 : Characters on/off
F4 : Pointer on/off
F5 : Stopwatch
F6 : Sec adjustment
F7 : Time setting
F8 : Magnification on/off
F9 :
F10: Menu on/off

Pressing F10 again will remove this menu from the main screen.

Hold the Ctrl key and press F10 and the function menu below will be displayed on the main screen;

Keys + Ctrl
F1 : Extended mode on/off
F2 : Screen selection
F3 : Image enhancement level
F4 :
F5 :
F6 : White balance
F7 :
F8 :
F9 : Characters reset
F10: Menu on/off

NOTE - *See section 4-5-20(Page 36), PROCESSOR FUNCTION SUMMARY DIAGRAM.*

4-2 SETTING THE DATE AND CLOCK (TIME SETTING)

1. Turn the video processor ON.

2. Press the F7 function key (Fig. 21).

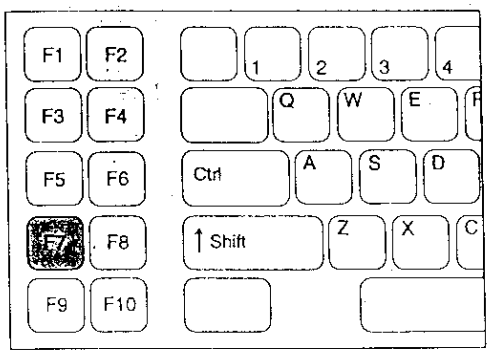


Fig. 21

3. The screen cursor will appear as a flashing underline on the first character of the Date (Fig. 22).

4. The format for the Date field is MM/DD/YY,
MM = Month,
DD = Day,
YY = Year.

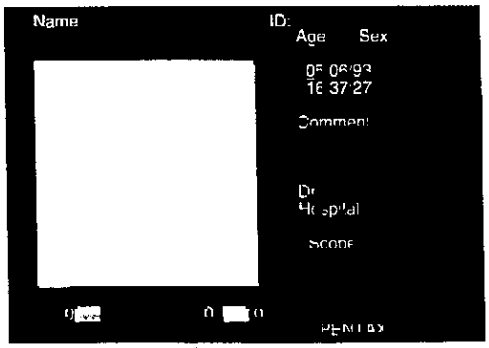


Fig. 22

The format for the Time field is HH/MM/SS,
HH = Hour military notation,
AM hours are expressed as number;
example 7 AM =07.
PM hours are expressed as the hour+ 12;
example 7 PM = 7 + 12 = 19).
MM = Minute
SS = Second

NOTE - *There is a SECOND ADJUST FUNCTION, F6, which can be used to reset the second counter, see 4-3 below.*

5. To change information, type the correct information using the number keys in the alpha group or press the Num Lock to activate and use the number keys at the right of the keyboard. The cursor will advance with each number typed. Do NOT press Enter.

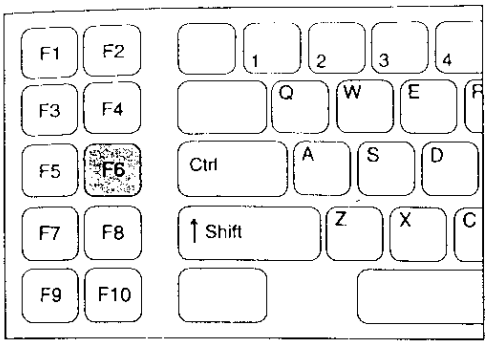


Fig. 23

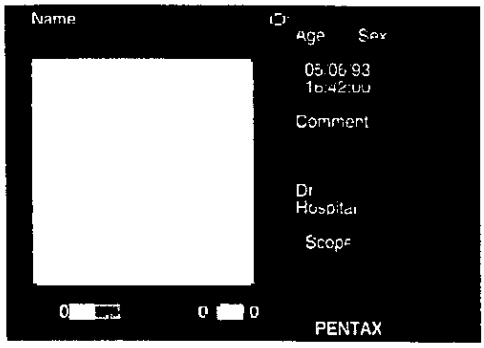


Fig. 24

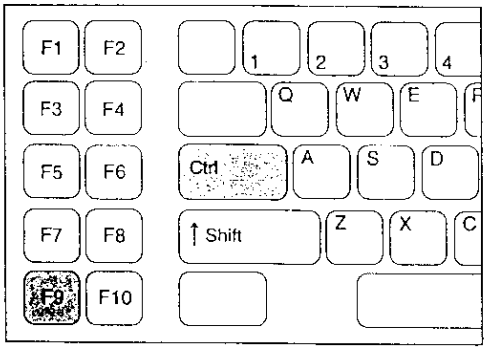


Fig. 25

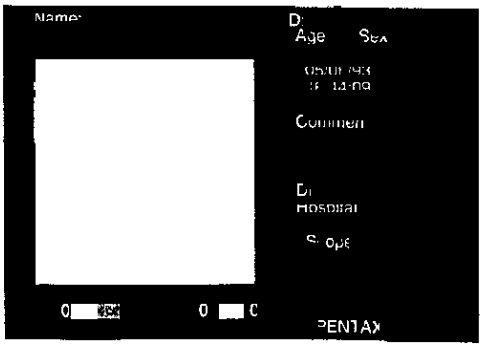


Fig. 26

6. To advance through a field without changing the information, use the Right arrow key.

7. To end this operation, press Enter or the F7 Function key.

NOTE - *The EPM-3300 has a battery backup memory and will retain and advance the Date and Time accordingly even if the unit is turned OFF or disconnected from the power outlet.*

4-3 SECOND ADJUST (EASY SETTING)

Press F6 and the second counter will (Fig. 23 and 24);

1. Turn to 00 if the current seconds value is 29 seconds or less.

2. Turn to 00 and add 1 minute to the minute value if the current seconds value is 30 seconds or more.

NOTE - *The EPM-3300 has a battery backup memory and will retain and advance the Time accordingly even if the unit is turned OFF or disconnected from the power outlet.*

4-4 ENTERING SCREEN (PATIENT) DATA

NOTE - *The EPM-3300 has a battery backup memory and will retain the last entries for all information fields of the screen even if the unit is turned OFF or disconnected from the power outlet. When the video processor is turned ON, the last entries for the screen information fields will be displayed.*

4-4-1 CLEARING SCREEN INFORMATION

1. To clear the previous entries for the screen information fields, hold the Ctrl key down and press F9 (Fig. 25). All fields will be reset to blank except the Clock, Date and Hospital Name. The scope's model name will also remain unchanged if a scope is connected.

2. The cursor will be positioned on the first character of the Patient Name field and will appear as a flashing underline. (Fig. 26)

4-4-2 ENTERING SCREEN INFORMATION

1. After clearing the previous entries for the screen information fields,use the alpha keys to type the desired information in fields (Fig. 27);

- Holding the Shift key and typing an alpha key will display the capital alpha key or upper case special character.
- Pressing the Caps Lock key (check status indicator to insure Caps Lock is selected) will cause all alpha keys typed to be displayed as capitals.
- To type numbers use the alpha group number keys or press Num Lock to activate the number keys on the right of the keyboard.
- The Backspace key will back the cursor one space to the left each time when it is pressed.
- If an entry is typed to a field and the number of characters exceed the number of characters of the field, the cursor will stop at the last character of the field and display the last character typed (except for Comment field, see 4 below). The cursor will not advance to the next field until the Enter key is pressed.

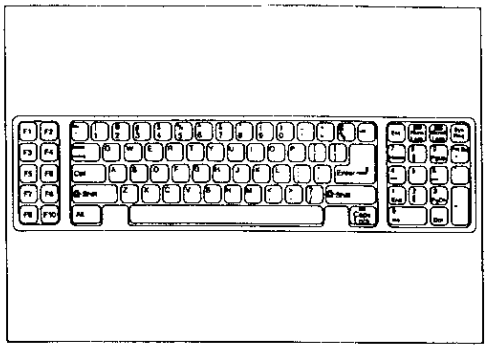


Fig. 27

NOTE - *If the monitor is displaying unusual characters and pressing keys on the keyboard has no response, turn the processor OFF and contact your local Pentax service center.*

2. Press Enter or the Down arrow key after typing an entry to advance to the next field (Fig. 28).

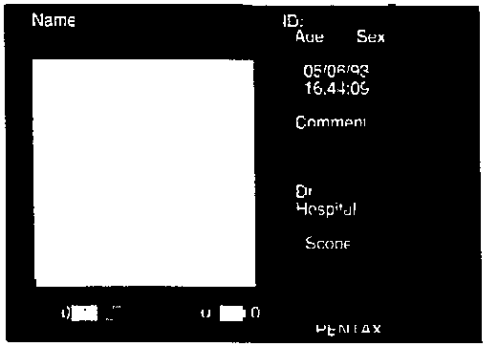


Fig. 28

3. Information fields will be accessed in the following order;

Name, ID, Age, Sex, Comments, Doctors Name, Hospital, Scope

4. The Coment field consist of three (3) lines.

- if an entry to a line is less than 13 characters, pressing the Enter key will advance the cursor to the first character of the next line.
- if an entry to a line is more than 13 characters, the entry will automatically continue to the next line but the Comment field is not a word processor and will not carry an entire word down to next line.

5. The Scope field will be automatically established when a video endoscope is connected to the EPM-3300. The field can be typed over.

6. After pressing Enter at the Scope field, the cursor will be removed from the screen.

NOTE - *The EPM-3300 has a backup battery memory and will retain the last entries to the screen information field if the unit is turned OFF or disconnected from the power outlet. It may be advantageous to enter patient information and shut the video processor OFF until the Pre-Use Safety Check.*

4-4-3 EDITING/CORRECTING SCREEN INFORMATION

1. If the cursor is not already visible, press the Enter key to have the cursor appear on the first character of the Patient Name field. It will appear as a blinking underline.

2. Use the Enter key to advance the cursor to the field to be corrected.

3. Use the Right or Left arrow keys to position the cursor under the character to be corrected.

4. Character can be typed over with alpha keys (including the Space bar).

5. All fields can be edited/corrected except the Date and Clock. See section 4-2 (Page 19), Setting the Date and Clock.

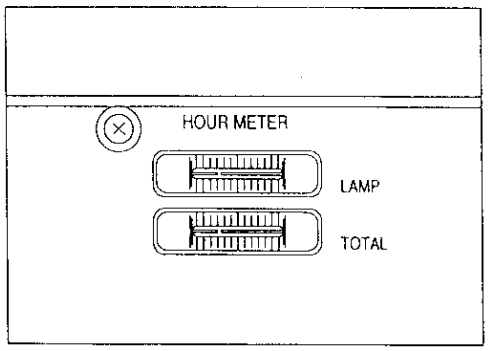


Fig. 29

4-5 PROCESSOR FUNCTIONS

NOTE - *Check the lamp life hour meter frequently, a lamp with 200 hours or more should be replaced before beginning a procedure (Fig. 29).*

4-5-1 MAIN LAMP

The lamp ignition switch is located on the front control panel and is labeled LAMP (Fig. 30).

NOTE - *If the AUX indicator above the lamp ignition switch blinks when the power is turned ON, it indicates that the auxiliary lamp is burnt out. Do not attempt to perform an endoscopic procedure. Contact your local Pentax service center.*

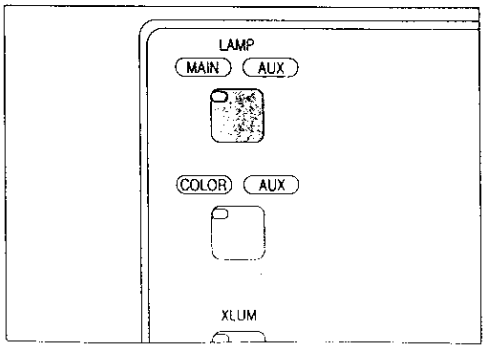


Fig. 30

Once the EPM-3300 has been turned ON, the main lamp can be ignited by pressing the lamp ignition switch. The switch will beep when pressed. After several seconds the lamp will ignite and the MAIN label above the switch will light (light will also be visible at the distal end of the endoscope.)

NOTE - If the main lamp fails to ignite, the AUX indicator will light. Turn the processor OFF and wait 30 seconds then repeat the step above. If the main lamp fails to ignite see section 6, TROUBLE - SHOOTING GUIDE. (Page 43)

NOTE - After igniting the lamp, allow the processor to run for ten (10) minutes. This will allow the color temperature to stabilize and ensure accurate color.

When the procedure is completed, the main lamp can be shut OFF by pressing the lamp ignition switch again or by turning the EPM-3300 power OFF.

4-5-2 AUX (AUXILIARY) LAMP

The auxiliary lamp is intended to be a safety feature in the event that the main lamp fails DURING a procedure.

NOTE - If the AUX indicator above the lamp ignition switch blinks when power is turned ON, it indicates that the auxiliary lamp is burnt out. Do not attempt to perform an endoscopic procedure. Contact your local Pentax service center.

If the main lamp fails, the AUX label above the lamp ignition switch will light. Press the lamp switch to ignite the auxiliary lamp (Fig. 31). The switch will beep when pressed. The endoscopic image will be visible but will appear as a black and white image.

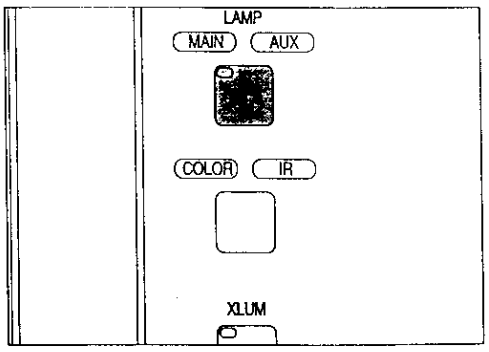


Fig. 31

CAUTION - DO NOT attempt to perform an endoscopic examination with the auxiliary lamp. After igniting the auxiliary lamp return the endoscope to the neutral position and slowly withdraw the endoscope under controlled visualization by the auxiliary lamp.

The auxiliary lamp can be turned OFF by pressing the lamp ignition switch (the switch will beep and the LED on the switch will go OFF) or by turning the EPM-3300 OFF.

4-5-3 BRIGHTNESS

Brightness functions can be controlled from either the endoscope control buttons (see section 4-5-19, EXTENDED MENU, Page 34) or the processor front panel control buttons.

Select the desired brightness control mode, AUTO or MAN, using the brightness control switch on the processor front panel (Fig. 32).

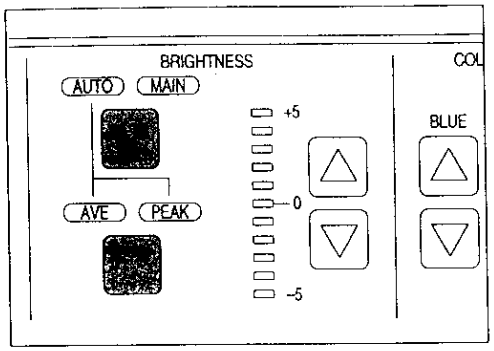


Fig. 32

AUTO = Automatic brightness control, where the video signal of the endoscope will automatically maintain the brightness level selected by the brightness adjustment buttons. The switch will beep when pressed and the AUTO indicator will light when the AUTO mode is selected.

If the AUTO brightness mode is selected, select the desired brightness level and the light measurement method, AVE or PEAK, using the light measurement switch on the front panel (Fig. 32).

AVE = Average, the brightness level is automatically adjusted with respect to an averaging of the brightness of the video signal.

PEAK = The brightness level is automatically adjusted with respect to a peak (maximum) value of the brightness of the video signal.

The switches will beep when pressed and the AVE or PEAK label will light when either is selected.

NOTE - *Halation is defined as the appearance of a halo around area of extreme brightness. Halation may occur if the AVE mode is selected and if so switch to the peak mode.*

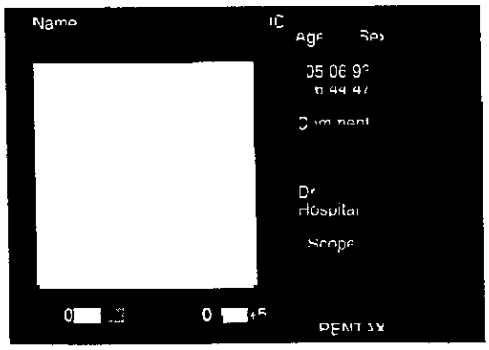


Fig. 33

MAN= Manual brightness control, the user will select the brightness level by using the brightness adjustment buttons. The switch will beep when pressed and the MAN label will light when manual mode is selected.

NOTE - *Manual brightness will automatically be established when using the EPM-3300 as a Xenon light source for fiber endoscope (see section 4-5-6 XLUM, Page 26).*

There are eleven (11) brightness levels. The brightness level will be display as a value -5 to +5 on the monitor display (Fig. 33) and the brightness indicator on the front panel.

To change the brightness level;
Press the Up button (△) to increase the level.
Press the Down button (▽) to decrease the level.
The switches will beep when pressed and the brightness level indicator will change accordingly (Fig. 32).

NOTE - *Minimum required brightness levels should be used at all times to avoid risk of injury to the patient.*

NOTE - *The EPM-3300 has a battery backup memory and will retain the last selected brightness value even if the unit is turned OFF or disconnected from the power outlet.*

4-5-4 COLOR BALANCE

Whenever the EPM-3300 is turned ON the color mode is automatically established and the COLOR label above the COLOR/IR switch will light.

NOTE - *Selecting the XLUM function will disable the color function (see section 4-5-6, XLUM Page 26).*

Color balance functions can be controlled from either the endoscope control buttons (see section 4-5-19, EXTENDED MENU, Page 34) or the processor front panel color balance control buttons.

There are eleven (11) color levels for both Red and Blue hue. They will be displayed as a value -5 to +5 on the monitor Display at either end of the color bar (Fig. 34).

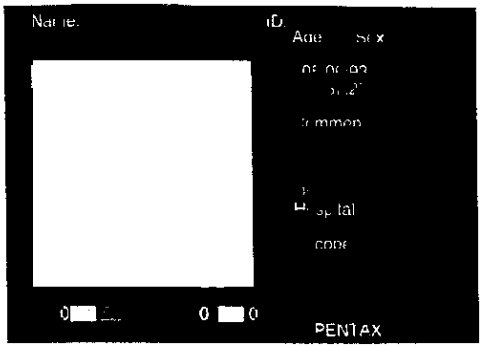


Fig. 34

To change the Red or Blue color hue levels, press the Up button (△) to increase hue or press the Down button (▽) to decrease the hue (Fig. 35).

NOTE - *When color levels are at -5 and the Down button is pressed, the color will be turned OFF and that color segment of the color bar will be blank. To turn Red or Blue back ON, press the Up button (△).*

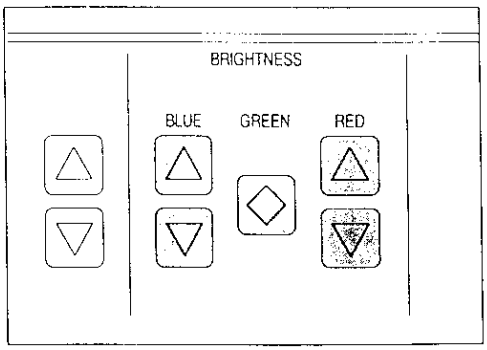


Fig. 35

The Green color hue can be turned OFF or ON by pressing the (◇) button.

NOTE - *When the Green is OFF, the Green segment of the color bar will be blank.*

All the switches described above will beep when pressed.

NOTE - *The EPM-3300 has battery backup memory and will retain the last selected color balance levels even if the unit is turned OFF or disconnected from the power outlet.*

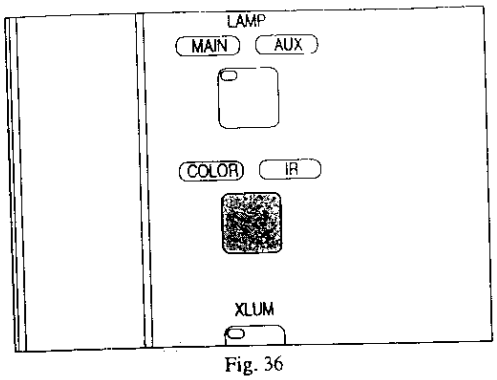


Fig. 36

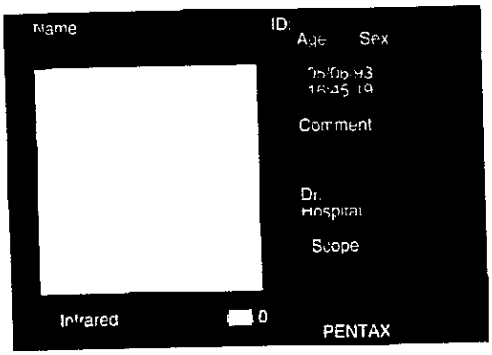


Fig. 37

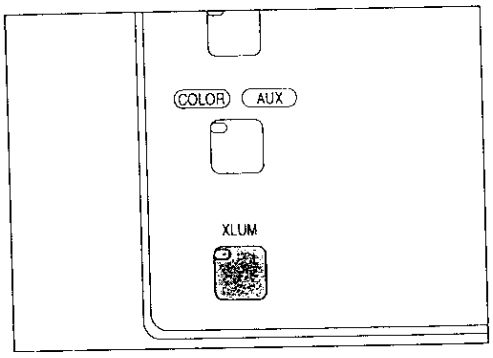


Fig. 38

4-5-5 INFRARED

The infrared function can be controlled from either the endoscope control buttons (see section 4-5-19, EXTENDED MENU, Page 34) or from the processor front panel COLOR/IR switch.

Infrared provides Near-IR source light to pathology. Near-IR light is thought to have penetrative properties which may help visualization of vascularity or through blood flow (heme).

The COLOR/IR switch will beep when pressed and the IR indicator will light when the IR mode is selected (Fig. 36).

The color bar on the monitor display will be removed and the word "Infrared" will appear in its place (Fig. 37).

NOTE - *The monitor displayed image will appear black and white when IR is selected.*

To turn IR OFF, press the COLOR/IR switch again. The switch will beep when pressed, the COLOR indicator will light, the color bar will be displayed on the monitor and the endoscopic image will return to a color image.

4-5-6 XLUM

The XLUM function can be controlled from the endoscope control buttons (see section 4-5-19, EXTENDED MENU, Page 34) or the processor front panel XLUM switch.

XLUM (transillumination) is a function intended to enable the user to identify the position of the distal end of the video endoscope while in the body. The color filter wheel is removed from the light path allowing white Xenon light to be emitted at the endoscope distal end.

NOTE - *Prolonged use of the XLUM function could result in minor discomfort and/or burns to the patient.*

The XLUM switch will beep when pressed and the LED on the switch will light to indicate XLUM is selected (Fig. 38).

NOTE - *When XLUM is selected the image from a video endoscope will "White-Out", that is the live image on the display screen will appear as all white.*

XLUM should be activated when the EPM- 3300 is being used as a Xenon light source for fiberscopes. Manual brightness control will automatically be established when XLUM is selected.

To turn the XLUM function OFF, press the XLUM switch again. The switch will beep when pressed and the LED on the switch will go OFF.

4-5-7 AIR PUMP

The air pump function can be controlled from the endoscope control buttons (see section 4-5-19, EXTENDED MENU, Page 34) or the processor front panel air pump switches.

There are two (2) air pump levels, LOW and HIGH. The switches will beep when pressed and the LED on the level switch will light to indicate the selected level(Fig. 39). The air pump level will control the pressure of both the air and water delivery .

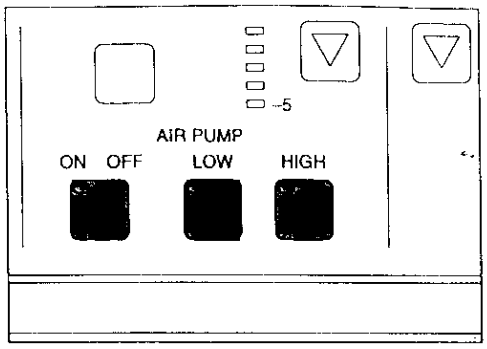


Fig. 39

NOTE - *When HIGH pressure is selected, take care not to deliver too much air.*

To turn the air pumps On, press the ON/OFF switch. The switch will beep when pressed. Then the LED on the switch will light and the sound of the air pump will be heard. To turn the air pumps OFF, press the ON/OFF switch again. The switch will beep and the LED on the switch will turn OFF.

4-5-8 COPY

The COPY function is only active if an optional I/O board for hardcopy has been installed. Refer to the instructions for the optional I/O board. Be sure to read carefully the instruction for the hardcopy equipment (Fig. 40).

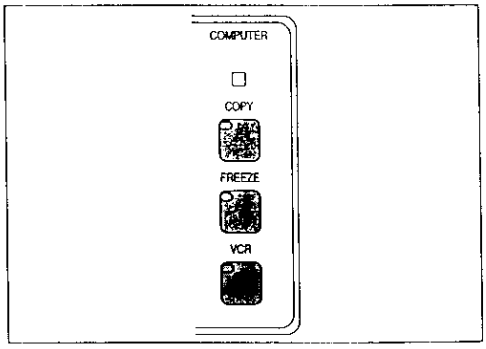


Fig. 40

NOTE - *When the computer indicator on the processor front panel is ON, the EPM-3300 has been equipped with a digital interface for use with IMS-3000 Image Management System and the COPY button is redefined. Refer to the IMS-3000 operating instructions.*

4-5-9 FREEZE

The freeze function can be controlled from the endoscope control buttons (see section 4-5-19, EXTENDED MENU, Page34) , the endoscope F button in the normal mode or the processor front panel FREEZE button (Fig. 40).

NOTE - *the assignment of the FREEZE/LIVE images describe below can be changed, see section 4-5-12, SCREEN SELECT (Page 29).*

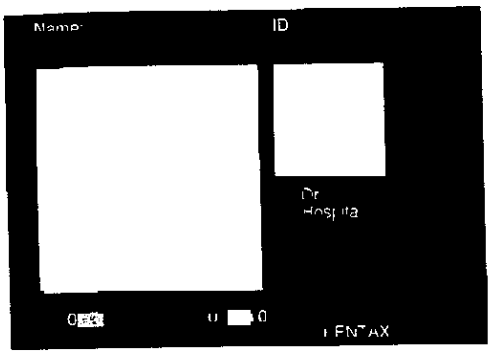


Fig. 41

When the freeze function is activated, the main screen will display a still endoscopic image frozen at the time the freeze selection was made and the sub-screen will display the live endoscopic image observed by the video endoscope (Fig. 41).

When selected, the switch will beep when pressed and the LED on the switch will light to indicate the freeze function is selected.

To release the freeze function, press the endoscope F button or processor front panel FREEZE button. Then the switch will beep, the main screen will be released from the still image, the live image sub-screen display will be removed and the LED on the FREEZE button on the front panel will go OFF.

4-5-10 VCR

The VCR function is active only if an optional I/O board for VCR recording has been installed. Refer to the instructions for the Optional I/O board. Be sure to read carefully the instructions for the VCR equipment (Fig. 40).

NOTE - *When the computer indicator on the processor front panel is ON, the EPM- 3300 has been equipped with a digital interface for use with IMS-3000 Image Management System and the VCR button is redefined. Refer to the IMS-3000 operating instructions.*

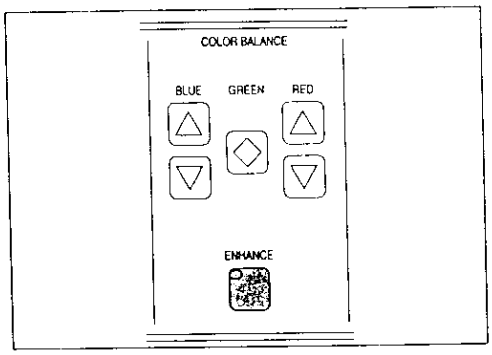


Fig. 42

4-5-11 ENHANCE

The enhance feature provides three levels of image enhancement; Low,Medium and High.

NOTE - *When the processor is turned ON, the enhance function will default to the same state which was in when the processor was last turned OFF.*

Enhancement levels and enhance ON/OFF can be selected from the endoscope control buttons (see section 4-5-19, EXTENDED MENU Page 34) or the function control menu.

The enhance switch on the front panel will beep and the LED on the switch will toggle from its current state, go ON if it is OFF or go OFF if it is ON, when pressed (Fig. 42).

NOTE - *The selected enhancement level will not be indicated on the monitor display. See instruction below to determine current setting.*

To change the enhancement level;

1. Hold the Ctrl key and press F3 (Fig. 43),

2. The enhance sub-menu will be displayed in the sub-menu screen in the lower right of the monitor display (Fig. 44),

NOTE - *The asterisk to the LEFT of the menu selection number is the cursor. The asterisk to the RIGHT of the menu selection number is the current setting.*

3. Use the Up and Down arrows to move the cursor (left asterisk) to the desired selection.

4. Press Enter to make the selection.

NOTE - *If OFF is selected from the function menu or the extended menu, the enhance switch on the processor front panel LED will turn OFF.*

5. To remove the enhance sub-menu, press the Esc key or use the Up or Down arrows to move the cursor to the Esc selection and press Enter.

To turn the enhance mode OFF from the processor front panel, press the enhance switch will beep and the LED on the switch will go OFF.

4-5-12 SCREEN SELECT (SCREEN FORMAT)

The screen select feature allows the user to select the assignment of the FREEZE image to the main screen or sub-screen of the monitor display.

1. Hold the Ctrl key and press F2 (Fig. 45).

2. The screen select sub-menu will be displayed (Fig. 46).

NOTE - *The asterisks to the left of the screen assignment selection indicate the current selection. The screen assignments- Main screen=Freeze / Sub screen=Active- will result in operation described in section 4-5-9, Freeze(Page 27).*

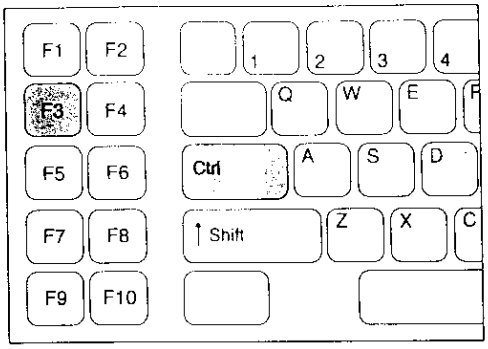


Fig. 43

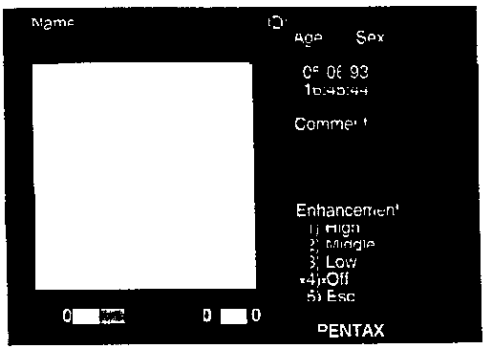


Fig. 44

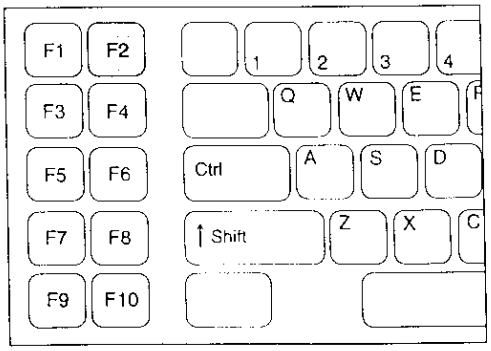


Fig. 45

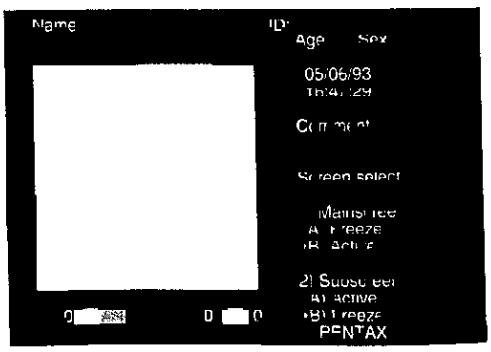


Fig. 46

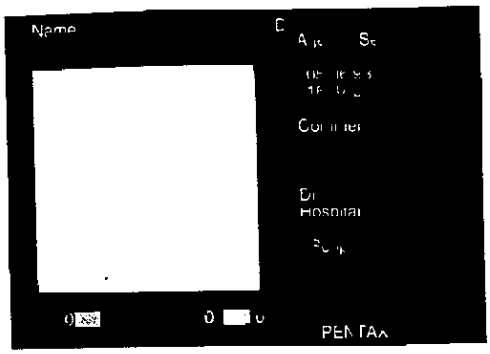


Fig. 47

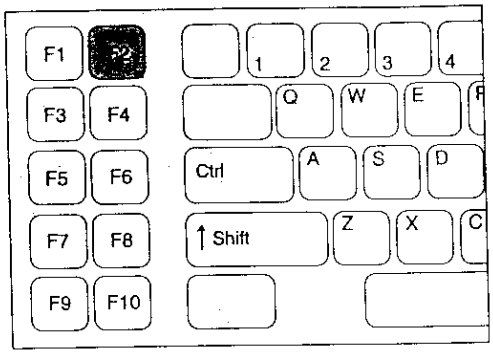


Fig. 48

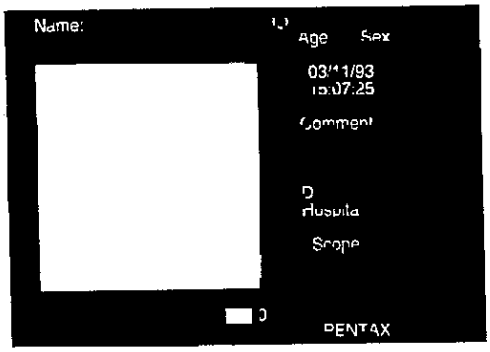


Fig. 49

3. To change the assignment, press the Up or Down arrow keys.

NOTE - *Both the main screen and sub screen assignments will change when the arrow keys are pressed.*

4. Press the Enter key to make the selection and the sub-menu will be removed.

If the screen assignments are selected as
Main screen= Active / Sub screen= Freeze,
when the freeze function is activated, the main screen will display the live image observed by the endoscope and the sub screen will display the still endoscopic image frozen at the time the freeze selection was made.

4-5-13 COLOR BAR

The color bar is a visual indicator that serves as a background for the Red and Blue color level indicators (Fig. 47). The Red level is displayed on the right and the Blue level is displayed on the left.

NOTE - *While the color bar reacts to change in the color hue levels, the color bar should NOT be used to evaluate color level ratios. Refer to the subjective evaluation of the endoscopic image or the Red and Blue color level values indicated at each end of the color bar.*

When a color is turned OFF, the color segment of the color bar will be blank (see section 4-5-4, COLOR BALANCE for adjustments, Page 25). The color bar can be turned OFF or ON by pressing F2 (Fig. 48, 49).

NOTE - *The Red and Blue color level indicators will also be removed from the screen when the color bar is turned OFF.*

NOTE - *If the screen characters are turned OFF, the color bar will also be turned OFF (see section 4-5-14, SCREEN CHARACTERS ON/OFF).*

4-5-14 SCREEN CHARACTERS ON/OFF

All screen information such as Name, ID, Age, etc. and the color bar can be turned OFF or ON by pressing the F3 key (Fig 50).

NOTE - *When screen characters are turned OFF, function menu selection cannot be made except for;*

F3 : Characters on/off
F8 : Magnification on/off
F10 : Menu on/off
Ctrl + F10: Menu on/off

4-5-15 POINTER

NOTE - *The pointer function will only be active if the computer indicator on the processor front panel is OFF.*

The pointer function is a small white arrow that will appear on the main screen when activated (Fig. 51).

Press F4 to activate the pointer function.

NOTE - *Each time the EPM-3300 is turned ON, the pointer position is established at the center of the main screen.*

To change the position of the pointer use the Up, Down, Left, Right arrow keys.

To turn the pointer OFF, press the F4 key again.

NOTE - *If the processor is not turned OFF, when the pointer is activated again, it will appear in the position previously selected.*

4-5-16 IMAGE MAGNIFICATION

NOTE - *The image magnification feature will only be active if the computer indicator on the processor front panel is OFF.*

The image magnification feature can be controlled from either the endoscope control buttons (see section 4-5-19, EXTENDED MENU, Page 34) or from the function menu.

The image magnification feature doubles the image magnification.

NOTE - *When the magnification feature is selected, although the main screen will be filled, only the center half (1/2) of the video endoscope image will be visible.*

To activate the image magnification feature, press F8.

When selected, the magnification indicator on the monitor display will be "X2" (Fig. 52).

Fig. 50

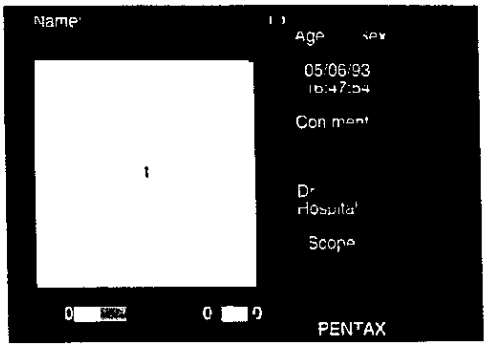


Fig. 51

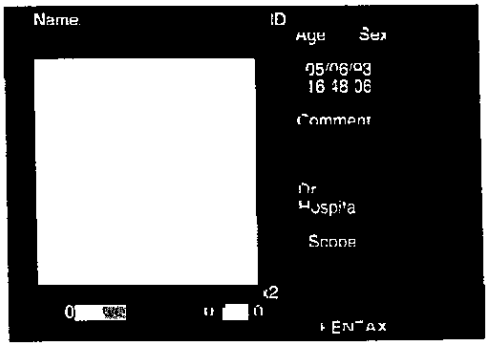


Fig. 52

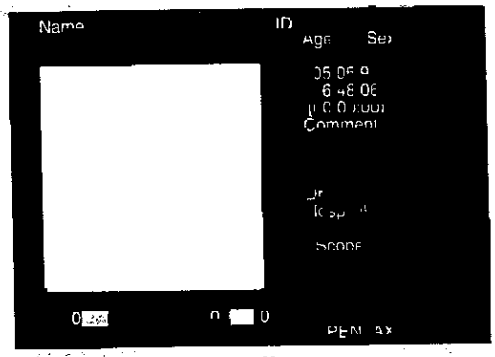


Fig. 53

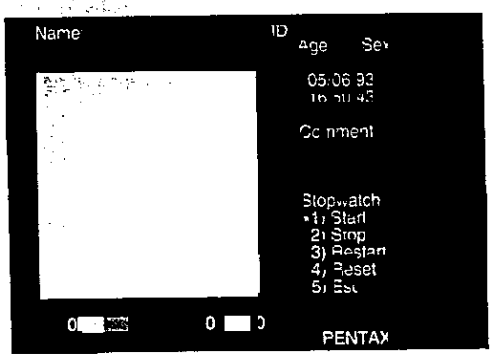


Fig. 54

To turn the image magnification feature OFF, press F8 again.

4-5-17 STOPWATCH

NOTE - *The stopwatch function will only be active if the computer indicator on the processor front panel is OFF.*

The stopwatch function can be controlled by either the endoscope control buttons (see section 4-5-19, EXTENDED MENU, Page 34) or the function menu.

When selected, the stopwatch is displayed immediately below the clock on the monitor display (Fig. 53).

The stopwatch display format is
[HH:MM:SS];
HH=Hour
MM=Minute
SS=Second

To active the stopwatch function, press F5.

When activated the stopwatch, sub-menu will be displayed.

The asterisk to the left of the menu selection numbers indicates the cursor position.

To start the stopwatch, press Enter when the asterisk is at 1) Start position. (Fig. 54)
The stopwatch [00:00:00] will appear on the monitor display .

Use the Up and Down arrow keys to advance the cursor to the other menu selections.

Stop will stop the stopwatch and display its last value.

Restart will restart the stopwatch from its last value.

Reset will reset the stopwatch to [00:00:00]. It will also stop the stopwatch.

Esc will exit the stopwatch sub-menu.

NOTE - *If the stopwatch is ON or stopped, it will remain on the monitor display when the sub-menu is exited. If the stopwatch is reset, it will be removed from the display when the sub-menu is exited.*

4-5-18 WHITE BALANCE

This function adjusts the white balance of each endoscope. Proper white balance requires the use of the white balance adjuster attached to the video processor. If a vector scope is available, it will make the adjustment easy and accurate. Contact your local Pentax service center for the details if required.

1. Allow the processor to run for ten (10) minutes after igniting the lamp to stabilize the color temperature.

2. Put the distal end of the video endoscope into the white balance adjuster which is supplied with the processor (Fig 55).

3. Watching the monitor, adjust the position of the distal end of the scope in the adjuster so that the grains inside the adjuster can be recognized on the full screen. If any halation is recognized on the screen at this time, lower the brightness level so that the grains inside the adjuster can be recognized clearly.

4. Set the color balance, Red and Blue, of the processor to 0 value (see 4-5-4, COLOR BALANCE, Page 25).

5. Hold down the Ctrl key and press F6. When activated, the white balance sub-menu will be displayed (Fig. 56).

6. Pressing arrow keys corresponding to the menu screen, adjust the image screen to be WHITE.

7. Press the enter key on the keyboard to record the adjusted white balance data to the scope. (The data is stored on ROM in the scope).

8. If you want to stop the adjustment process, press the Esc (escape) key on the keyboard. Adjusted data will NOT be recorded to the scope.

NOTE - *If the white balance data is not provided to the scope, a warning message as shown in Fig. 57 will be displayed. Adjust white balance as mentioned above and press the Enter key. The warning message will not be displayed anymore. The warning message will disappear by pressing any arrow key on the keyboard.*

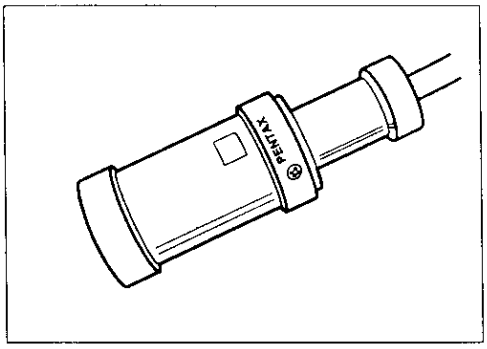


Fig. 55

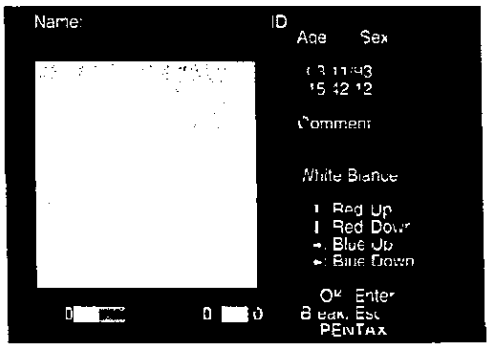


Fig. 56

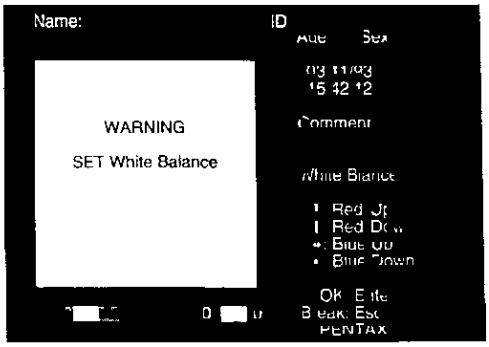


Fig. 57

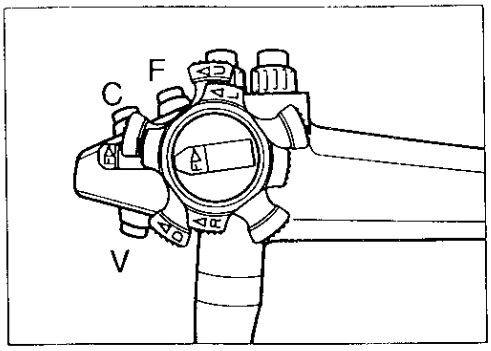


Fig. 58

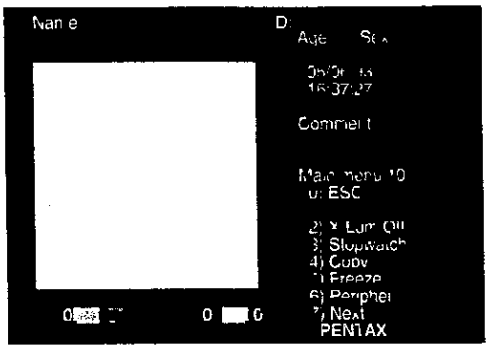


Fig. 59

4-5-19 CONTROL OF VIDEO PROCESSOR FUNCTION FROM THE ENDOSCOPE CONTROL BUTTONS (EXTENDED MENU)

NOTE - *The extended menu feature is only available if the computer indicator on the front panel of the processor is OFF.*

The extended menu feature provides users with access to certain processor functions from the endoscope control buttons or from the keyboard Up, Down and Enter keys. Refer to section 4-5-20(Page 36), PROCESSOR FUNCTION SUMMARY DIAGRAM for menu selections and paths.

NOTE - *All the processor functions accessible from the extended menus have been described. Refer to specific sections for operation details.*

To activate the extended menu, hold the Ctrl key and press F1 or press both the F and C button on the endoscope control body at the same time. "Main menu: 10" will be displayed and the F,C and V buttons on the endoscope control body (Fig. 58) will redefined;

F= Down arrow
C= Up arrow
V= Enter

Cursor position will be indicated by menu selections being highlighted green (Fig. 59).

Use the F and C buttons on the endoscope control body or the Up/Down arrow keys on the keyboard to move cursor to desired menu selections.

Press the V button on the endoscope control body or the Enter key on the keyboard to activate selections or access sub menus.

Some functions are toggle functions and when selected will change the function state. Both states will be indicated in the menu selection. The active state will be displayed white on the menu selection and the inactive state will be highlighted purple. When the cursor is moved to highlight the selection and the V button on the endoscope control body is pressed, the states will reverse.

Examples of toggle function are
Sub menu:11 Bright AUTO/MAN, or Sub menu: 22 Chroma GRN ON/OFF.

NOTE - *The exception to the comment above is the XLUM selection (Main menu: 10, 2) and the Zoom selection (Main menu: 20, 1). XLUM will display the active state, XLUM ON or XLUM OFF, and Zoom will display the active state Zoom ON or Zoom OFF. This selection will switch (toggle) whenever the menu selection is activated.*

Menu selections Esc (escape) will return to the previous menu.

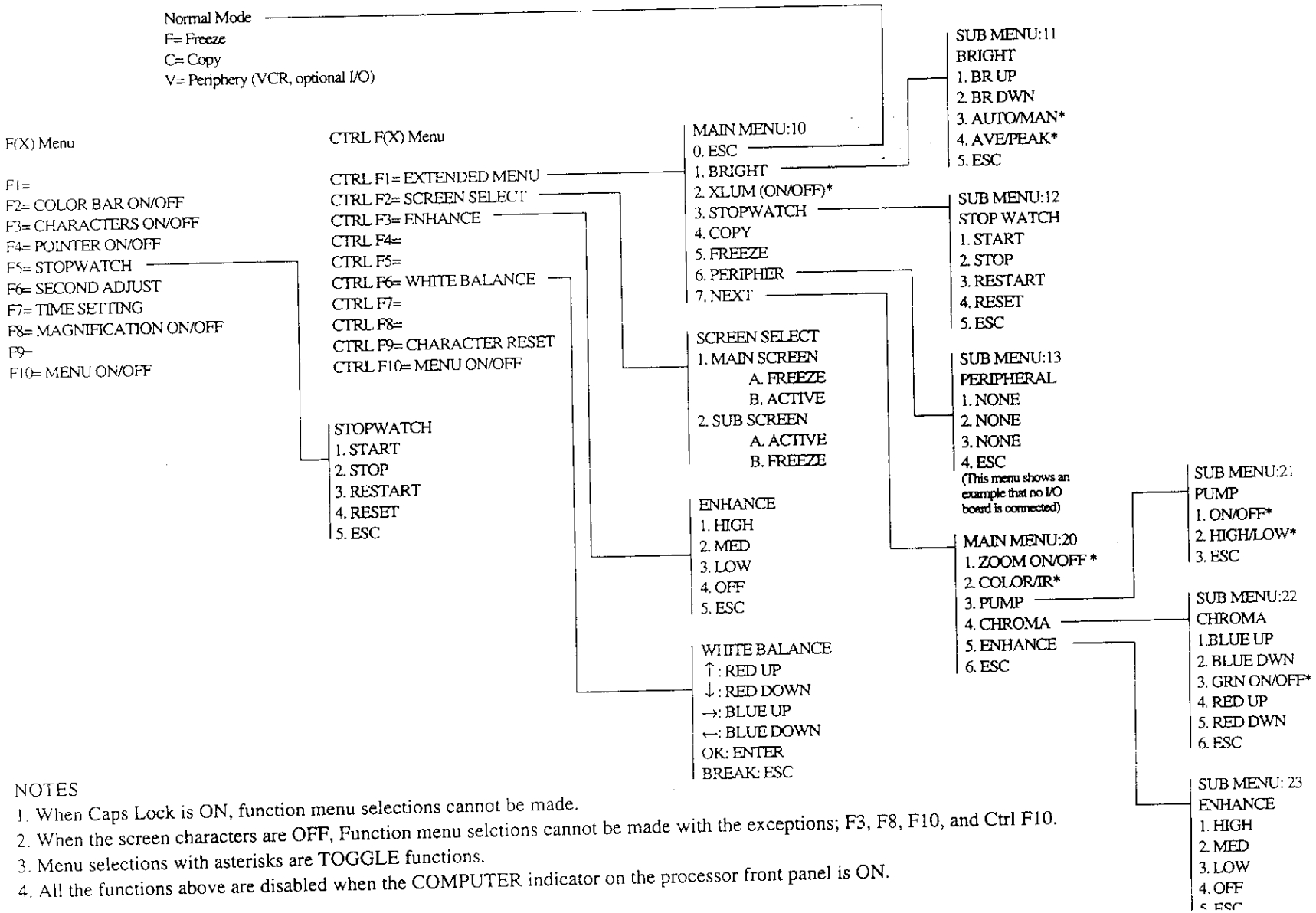
NOTE - *Main menu: 10, 0) Esc will exit the extended menu and return the user to the normal mode where the endoscope control buttons are defined;*

F= Freeze

C= Copy (I/O option)

V= Periphery (VCR, I/O option)

4-5-20 PROCESSOR FUNCTION SUMMARY DIAGRAM



NOTES

1. When Caps Lock is ON, function menu selections cannot be made.
2. When the screen characters are OFF, Function menu selctions cannot be made with the exceptions; F3, F8, F10, and Ctrl F10.
3. Menu selections with asterisks are TOGGLE functions.
4. All the functions above are disabled when the COMPUTER indicator on the processor front panel is ON.

5 MAINTENANCE

5-1 AFTER EACH PROCEDURE

NOTE - *Some peripheral devices may have to be turned off BEFORE the EPM-3300 to avoid compromising their operation. Refer to the operating instructions supplied with all the components of the video endoscopy system to establish the right order which component should be turned off in due course.*

Disconnect the endoscope and water bottle *(Fig. 60)*.

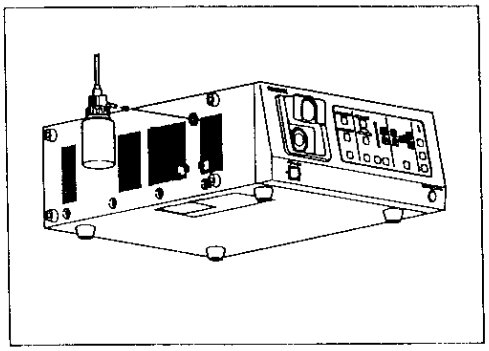


Fig. 60

Wipe all surfaces with gauze slightly dampened with alcohol.

NOTE - *Never allow liquids to be splashed on the EPM-3300. Be sure connector interfaces and ventilation ports are not allowed to become wet.*

5-2 WATER BOTTLE CLEANING

NOTE - *Take care in handling the water bottle. DO NOT carry the water bottle by the Air/Water Connector or Air/Water hose. When the cap assembly has been separated from the bottle, be careful in handling the water feeding stem.*

Water bottles should be cleaned at least on a daily basis.

Like all endoscopic accessories, the water bottle assembly must be thoroughly cleaned. Failure to do so could result in incomplete or ineffective sterilization.

5-2-1 CLEANING

1. After use, the entire water bottle assembly (bottle, cap assembly and tubing) should be washed with clean running water and dampened gauze or scrub brush. Cleaning solutions in the TABLE 1 below, should be used for soiled items.

2. Ultrasonic cleaning of the entire water bottle assembly is recommended to access difficult to reach areas. Use an operating frequency of 40 kHz or higher for a period 5-10 minutes.

3. After washing with the cleaning solution, all surfaces of the water bottle assembly should be thoroughly rinsed and dried. Use gauze or cloth to wipe dry most surfaces. Compressed air and 70% alcohol should be used to facilitate drying of hard to reach areas.

5-2-2 STERILIZATION

Before any sterilizing the water bottle assembly, ensure the cleaning process above has been completed.

5-2-3 STEAM STERILIZATION

NOTE - EPM-3300 standard water bottle assembly is model OS-H2 and is steam autoclavable. DO NOT confuse the OS-H2 Steam autoclavable water bottle with its non-autoclavable predecessor that had been supplied as standard accessories with other Pentax products.

The OS-H2 water bottle assembly can be easily identified by the black Air/Water hose, off white colored plastic cap (NOT transparent) and the clear plastic bottle.

1. The OS-H2 water bottle assembly has been designed to withstand high pressure steam sterilization procedures. Use the parameters below;

	OPTION 1 or	OPTION 2
TEMP:	121 °C (250 °F)	132 °C (270 °F)
PRESSURE:	1 atmosphere	2 atmosphere
TIME:	20 minutes	5 minutes

2. During steam sterilization, ensure the cap assembly has been removed from the bottle.

5-2-4 ETO STERILIZATION

1. The parameters below must be followed for ETO sterilization;

TEMP:	MUST NOT EXCEED 55 °C (131 °F)
PRESSURE:	MUST NOT EXCEED 1.7kg/cm² (24PSI)
HUMIDITY:	MUST NOT EXCEED 50%
TIME:	MUST NOT EXCEED 4 HOURS

2. Following ETO Sterilization, aeration time of 72 hours is required. An aeration chamber may be used to shorten the aeration time to 12 hours but the temperature must not exceed 55 °C (131 °F).

5-2-5 COLD STERILIZATION

1. After the water bottle assembly has been cleaned and thoroughly dried, it may be soaked in the sterilant for the time period recommend by the manufacturer and accepted by the user as appropriate.

2. Internal surfaces of the water bottle assembly may be exposed to the sterilant by injecting the sterilant into the air pipe stem (opposite the A/W-Drain lever on the water bottle cap) using a syringe. The A/W-Drain lever should be in the A/W position to ensure contact with all internal tubes (Fig. 61).

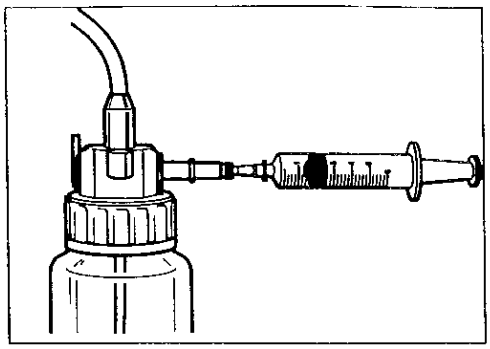


Fig. 61

3. After soaking in the sterilant for the appropriate time, the water bottle should be thoroughly rinsed with clean water. Ensure all sterilant is rinsed from the water bottle.

4. The water bottle should be dried. Compressed air and 70% alcohol can be use to facilitate drying.

NOTE - *All final rinses should be made with sterile water.*

See TABLE 2 for a listing of compatible high level disinfectants. Specific reference to brand name on this table is not an endorsement of their efficacy. Tests have shown these solutions to compatible with Pentax water bottles provided the manufacturer's directions are followed.

NOTE - *Make sure that the sterilant manufacturer's instructions for contact time are followed. Each solution and brand may have different times to achieve sterilization.*

CAUTION - *Never exceed the ten (10) hour maximum immersion. Following 10 hour maximum immersion, the entire water bottle assembly must be thoroughly rinsed to remove residual solution.*

5-2-6 CARE DURING STORAGE

Prior to storage it is important to ensure that no residual water is left inside the water bottle assembly. Thoroughly dry all surfaces to reduce the potential for bacteria colonization during storage. Compressed air and 70% alcohol should be used to facilitate drying.

TABLE 1 : COMPATIBLE CLEANING SOLUTIONS

Brand Name	Source	Note	Usage
Endozime	The Ruhof Corp.	Enzymatic	Follow manufacturer's instructions
Klenzyme	Calgon Vestal Labs	Enzymatic	
Metrizyme	Metrex Research Corp.	Enzymatic	
Enzol	Johnson & Johnson Medical Inc.	Enzymatic	
Enzy-Clean	Burishine Products	Enzymatic	
Prontcid Cleaner	B. Braun-SCC AG		
Stabisept Cleaner	B. Braun-SCC AG		
Instru Plus	Laboratorium Dr. Deppe		
VP266	Bode Chemicals		

TABLE 2 : COMPATIBLE HIGH LEVEL DISINFECTING SOLUTIONS

Brand Name	Source	Note	Usage
Cidex (14 Day)	Johnson & Johnson Medical Inc.	Glutaraldehyde	Follow manufacturer's instructions
Metricide (14 Day)	Metrex Research Corp.	Glutaraldehyde	
Wavicide- 01	Wave Energy System	Glutaraldehyde	
Omnicide NS	Omnitech Medical Corp.	Glutaraldehyde	
Calgo-Cide 14	Calgon Vestal Labs	Glutaraldehyde	
Sekusept Forte	Henkel	Glutaraldehyde	
Sporcide	Fresenius	Aldehyde	
Tegoment	TH. Goldschmidt	Aldehyde	
Bodephen	Bode Chemicals	Non-ionic detergent	
VP275	Bode Chemicals	Glutaraldehyde	
Carlitt 2000	B. Braun-SCC AG	Isopropylalchohol	
Endomat Plus	Laboratorium Dr. Deppe	Glutaraldehyde	

5-3 STORAGE

Do not store the unit in direct sunlight or where temperature and humidity are high.

Do not store the unit where it can be exposed to liquids.

For long term storage, take precautions to reduce dust build up within the EPM-3300.

5-4 CHANGING THE LAMP CARTRIDGE

Backup lamp cartridges with lamp installed, model name OL-X8, are available from your Pentax dealer.

NOTE - *Before attempting to replace a lamp cartridge, CAREFULLY read the instructions below;*

⚠WARNING - *Always turn the EPM-3300 OFF, disconnect the power cord, and allow the processor to cool down before attempting to replace a lamp cartridge.*

NOTE - *To replace the lamp in a lamp cartridge contact your local Pentax service center.*

1. Turn the EPM-3300 OFF.

2. Disconnect the power cord.

3. Place the processor up on its side to access the lamp cartridge access door.

4. Open the lamp cartridge access door (Fig. 62).

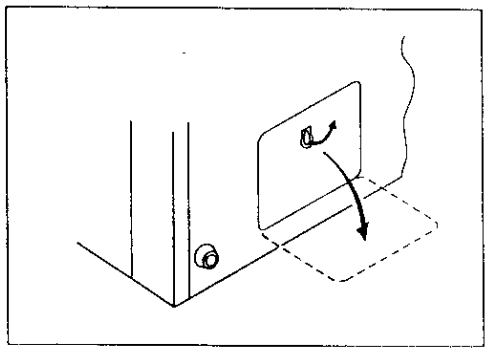


Fig. 62

5. Turn the four (4) thumbscrew knobs counterclockwise to loosen. The knobs should be loosened by using the fingers (Fig. 63).

6. Remove the lamp cartridge and place it upside down on the work surface (so that the locking screws are UP).

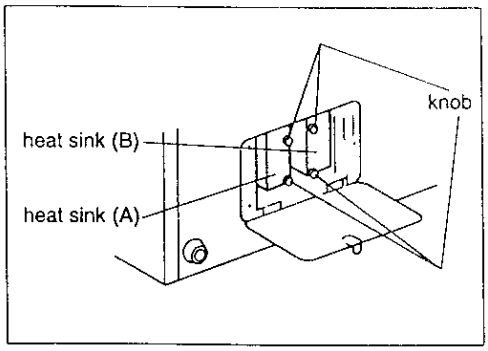


Fig. 63

CAUTION - *Do not touch the glass of the Xenon lamp. Oils from the fingers can cause the lamp to explode when ignited.*

7. Insert the replacement lamp cartridge into the lamp compartment as the other had come out (with the lamp glass facing the processor front).

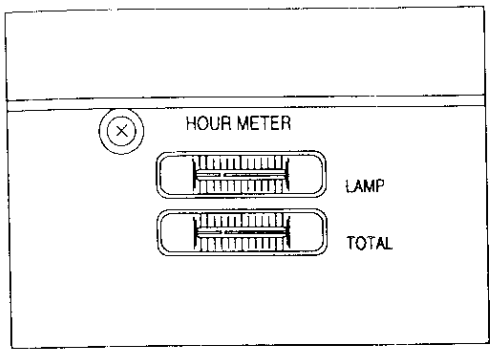


Fig. 64

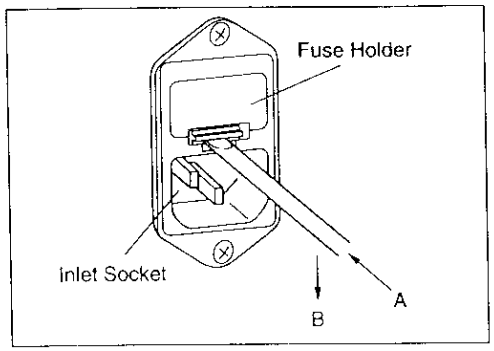


Fig. 65

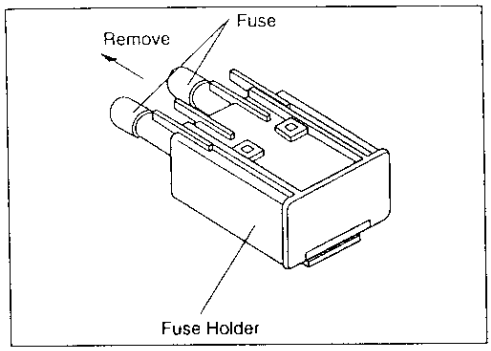


Fig. 66

8. Tighten the four (4) thumbscrew knobs, use fingers (do not use tools) to secure the lamp cartridge into the lamp cartridge compartment.

9. Close the lamp cartridge compartment door.

NOTE - *Ensure the lamp cartridge compartment door is properly closed. The door is equipped with a power interlock safety switch. If the door is not properly closed, the EPM-3300 will NOT turn ON.*

10. Place the processor back in its position of operation and reconnect the power cord.

11. Remove the old lamp life meter and install a new one, model name OL-X3 (Fig 64).

NOTE - *Lamp cartridges with old lamps in can be returned to authorized Pentax service centers to have new lamp installed.*

5-5 CHANGING THE FUSE

NOTE - *Changing the fuse will require a flat blade screw driver.*

1. Place the screw driver into the notch on the lower side of the fuse holder immediately above the power inlet socket (direction A as shown in Fig. 65).

2. Move the screw driver in a slightly downward direction (direction B as shown in Fig. 65), the fuse holder will pop out slightly.

3. Pull the fuse holder out by hand.

4. Inspect the fuse, remove and replace the fuse if blown (Fig. 66).

⚠WARNING - *ALWAYS replace the fuse with the supplied spare fuse value indicated on the rating plate to the right of the power inlet socket. NEVER bypass the fuse. If the supplied spare fuse is not available, contact your local Pentax service center;*

VOLTAGE	FUSE
120 V AC	125V 8 A (Slow Blow), 1 piece
220-240 V AC	250 V T4A, 2 pieces

5. Reinstall the fuse holder by pushing with the finger until it clicks into the case.

6 TROUBLE-SHOOTING GUIDE

CONDITION	CHECK	ACTION
Power does not come ON	Power cord	Ensure proper connection at unit and wall outlet.
	Fuse	Ensure fuse is good and of proper value.
	Lamp housing door	Ensure lamp housing door is closed properly.
	Power outlet	Move the power cord to a power socket that is known to work.
No display on monitor	Monitor/ other peripheral devices	Ensure power is ON for all devices.
		Ensure proper video input is selected for all devices.
	Cable connections	Ensure all video cables are connected properly.
Function keys not active	Keyboard	Ensure Caps Lock is OFF.
Text cannot be typed to screen	Monitor display	Ensure cursor is visible, press Enter to evoke cursor.
	Keyboard	Ensure keyboard is properly connected to the processor.
	Computer indicator on processor front panel	If the indicator is ON and the processor is not being used with an IMS-3000 Image Management System, call a service representative.
Numbers cannot be typed to screen	Keyboard	Ensure Num Lock is ON and use numeric keys.
Main lamp will not ignite	Lamp life meter	Ensure less than 200 hours lamp life. If more, change the lamp.
	Lamp cartridge	Ensure lamp cartridge is properly installed.
No image on main screen	Endoscope	Ensure the endoscope is connected properly.
	Main lamp	Ensure main lamp is ignited.
	Color levels	Ensure Red, Blue and Green color levels are not OFF.
	XLUM	Ensure XLUM function is not ON
Image on screen is black and white	Main lamp	Ensure main lamp is ignited.
	IR feature	Ensure IR feature is not ON.

Endoscope control buttons do not control functions	Scope	Ensure endoscope is properly connected.
	Computer indicator on processor front panel	If the indicator is ON and the processor is not being used with an IMS-3000 Image Management system, call a Service representative.
	Freeze, Copy, VCR front panel control buttons	Test front panel control buttons. If they activate features and endoscope control buttons do not, call a service representative.
	Cables	Ensure all control cables are properly connected.
No air delivery at distal end of endoscope	Air pump	Ensure air pumps are ON.
	Water bottle	Ensure proper connections at EPM-3300 and endoscope.
		Ensure the A/W-Drain lever is in the A/W position.
	A/W valve	Ensure the A/W valve aperture is not clogged, inspect all O-rings, clean the A/W valve.
No water delivery at distal end of endoscope	Air pump	Ensure air pump is ON.
	Water bottle	Ensure proper connections at EPM-3300 and endoscope.
		Ensure water bottle is 2/3 full.
		Ensure the A/W-Drain lever is in the A/W position.
		Ensure the water feeding stem is connected to the cap Assembly inside the bottle.
	A/W valve	Ensure the A/W valve aperture is not clogged, inspect all O-rings, clean the A/W valve.

NOTE- If the water bottle assembly has been handled roughly, the water feeding tube inside the Air/Water hose may be disconnected at the A/W connector for the endoscope. To test, remove the cap assembly and using a syringe, inject water into the water feeding stem. If the water comes out of both the center hole of the A/W connector and the series of holes around the center hole, the water feeding tube is disconnected. Use another water bottle assembly.

NOTE- If the monitor screen shows unusual characters and no response is obtained by pressing any key on the keyboard, switch the power OFF and contact your local Pentax service center.

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