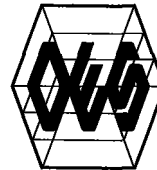


INSTRUCTIONS

OLYMPUS PSD-10

ELECTROSURGICAL UNIT



OLYMPUS ENDOSCOPY SYSTEM

WARNING

The user of this equipment should be thoroughly trained in the applicable procedure. Furthermore, failure to read and thoroughly understand the contents of this instruction manual may result in serious injury to the patient and/or user. It is essential to follow the instructions contained in this and other manuals which pertain to any equipment and accessories used in conjunction with this equipment. Possible injuries related to endoscopic procedures may include electric shock, explosion, burns, perforation, hemorrhage, etc. Failure to follow these instructions may also result in damage to and/or malfunction of this equipment.

CAUTION

Federal (USA) law restricts this device to sale by or on the order of a physician.

OLYMPUS®

Non-Controlled Document

IMPORTANT

The Olympus Electrosurgical Unit PSD-10 has been designed for endoscopic electrosurgery (coagulation, polypectomy, sphincterotomy, etc.) in conjunction with Olympus fiberscopes that are applicable to electrosurgery, Olympus electrosurgical accessories and light sources. Do not use the equipment for any purpose other than its intended use.

Please read this entire manual carefully before using the equipment in order to acquaint yourself with the proper care and handling of your new electrosurgical unit. Then prepare and inspect the equipment following these instructions.

Safety precautions must be exercised when handling electrical equipment to prevent operator/patient shock, fire hazard and equipment damage.

If you have any questions concerning the material contained in this manual or concerning the operation or safety of the equipment, please contact your Olympus representative or the nearest Olympus Service Center.

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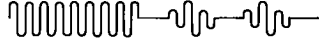
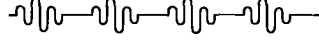
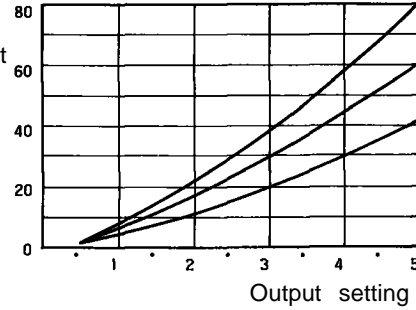
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1 FEATURES AND MAIN SPECIFICATIONS

1-1 Features

1. Simplified pre-procedural test, using a Check Lead, of the power output of the PSD-10 alone as well as that of the entire electrosurgical system including the endoscope and endoscopic electrodes. Test results confirmed by TEST "OK" or "FAULT" indicator lights on the front panel.
2. Push-button selection of CUT, COAG or BLEND current. Output power is controlled by a single-pedal footswitch.
3. The connection monitor circuit detects loose or inadvertent misconnection of cords or broken wires in the S-P cord (Safety cord and Patient cord). If any irregularity is present, the monitor activates an alarm and inhibits output (current is not delivered when the footswitch is depressed) to ensure safety of the procedure.
4. The feedback ratio monitor scans the entire circuit when the footswitch is depressed. If excessive leakage current is present, the output is inhibited to ensure safety of the procedure.
5. Flat switches and display panel can be easily wiped clean.
6. Compact, lightweight and portable.

1-2 Main Specifications

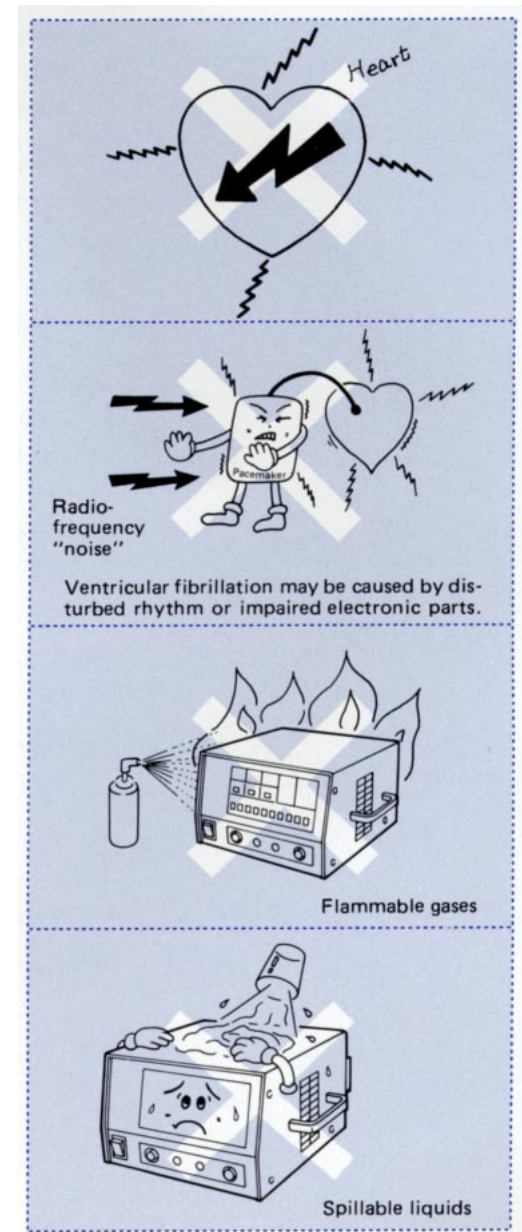
Applicability	Applicable field	Endoscopic electrosurgery
	Compatible endoscopes	Olympus fiberscopes suitable for electrosurgery
Radio-frequency Current	Waveform	CUT  BLEND  COAG 
	Output	Output (watts) Max. rated output (Load: 500Ω) CUT: 80 W BLEND: 60 W COAG: 40 W  Max. open-circuit output voltage: less than 1800 Vp-p
Output Adjustment	Type	Flat switches
	Range	0.5 – 5.0
	Steps	10 steps with 0.5 increment from 0.5 to 5.0.
Output	Selection of output current	Flat switches (CUT, BLEND or COAG)
	Current control	Footswitch

Monitors	Output check	<ul style="list-style-type: none"> When the Check Lead is connected and the footswitch depressed, either the "OK" or "FAULT" light will come on. Checks the PSD-10 or the entire electrosurgical system. (The entire electrosurgical system cannot be tested when using PSD-10 in combination with CD-3U/L or CD-40/L.)
	Connection monitor	Detects defective connections of cords and broken wires in the S-P cord, and activates: <ul style="list-style-type: none"> A warning light (P-cord or S-cord symbol), a warning buzzer, and inhibits output.
	Feedback ratio monitor	Computes return current/delivered current ratio. If the ratio is less than a preset value, it inhibits output.
Connection	S-P cord	Plug-in (PSD-10) and screw-on (P-plate and endoscope)
	A-cord	Plug-in
	Check lead	Plug-in
	Footswitch	Screw-on
Classification (Electro-medical equipment)	Type of protection against electric shock	Class I equipment
	Degree of protection against electric shock	Type BF (Body Floating) equipment
	Degree of protection against explosion	The PSD-10 should never be used where there is a risk of flammable gases.
	Other	Defibrillator-protected equipment 

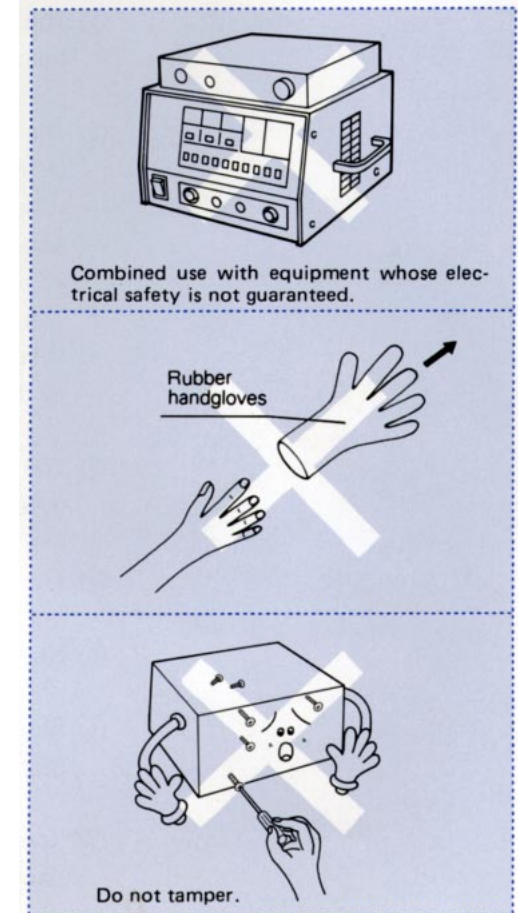
Operating Environment	Power requirements	Voltage: 110, 120, 220, 240 V _~ (a.c.) Frequency: 50/60 Hz Input: 4 A (110, 120V), 2A (220, 240V) Voltage fluctuation: Within ±10 %
	Ambient temperature	10 – 40°C (50 – 104°F)
	Relative humidity	30 – 75%
	Atmospheric pressure	700 –1060hPa (700 – 1060 mbar)
Dimensions & Weight	290 mm (W) x 162 mm (H) x 300 mm (D) max., 8 kg or 17.6 lb (PSD-10 main body)	

1-3 Safety Precautions

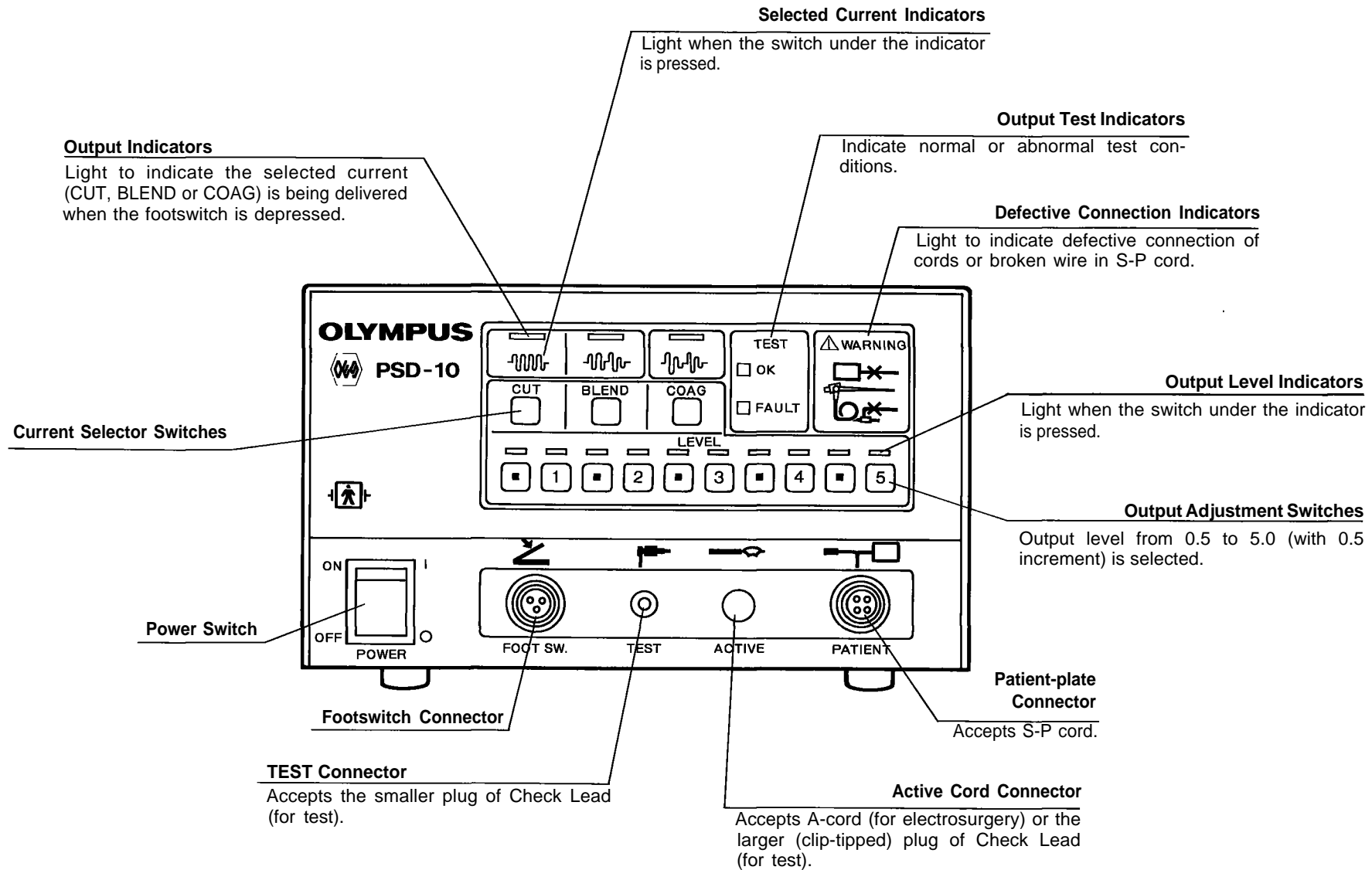
- ① The PSD-10 should be used only in a medical facility under the supervision of a trained physician.
- ② The PSD-10 is designed (floating) to function integrally with insulated patient attachments (active electrode and patient plate) to prevent operator/patient shock. To prevent shocks which may be caused by leakage current from other apparatus applied to the patient, endoscopes and cameras used with the PSD-10 should not be grounded.
 - The endoscopist and his assistant should wear rubber handgloves as an added precaution.
 - When using a camera (except the SC16-10) an insulating hood should be attached to the camera's eyepiece.
- ③ The enclosure of the PSD-10 must be grounded securely and effectively. Do not defeat the line cord ground connection.
- ④ The PSD-10 should never be applied to the heart directly.
- ⑤ Never install and operate the PSD-10 where there is a risk of flammable gases.
- ⑥ Should any irregularity or abnormality be suspected during operation, immediately stop the use of instrument and turn OFF the power switch.
- ⑦ Keep liquids away from all electrical equipment to prevent operator shock and instrument damage. Do not use the PSD-10 if spilled fluids have entered the unit.
- ⑧ Please investigate the possibility of electronic interference for other electromedical equipment in conjunction with the PSD-10 prior to use.
- ⑨ Do not install the patient plate adjacently to an artificial bone (metal), etc.



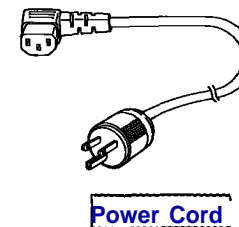
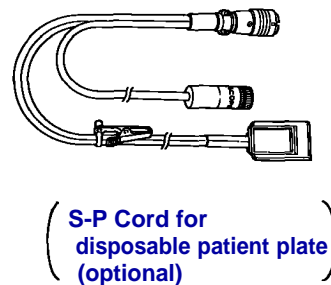
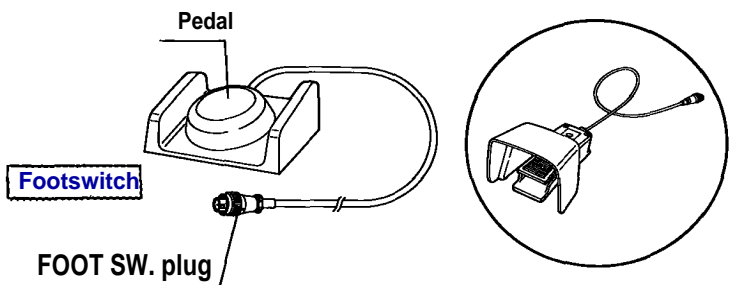
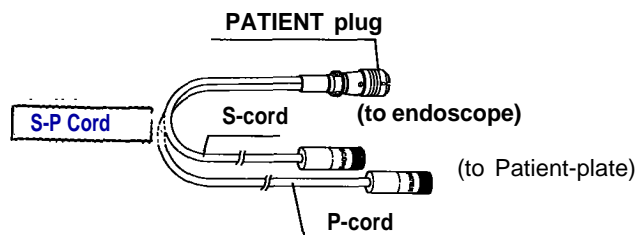
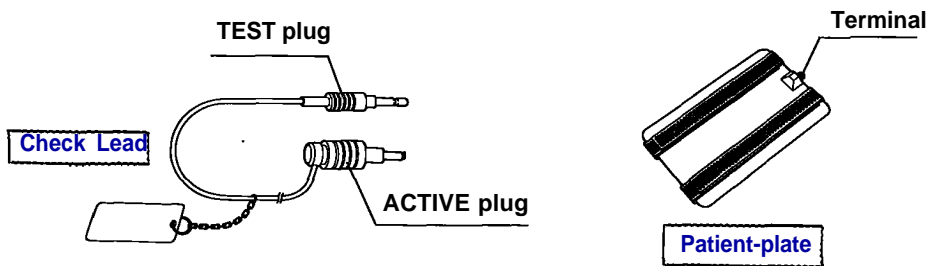
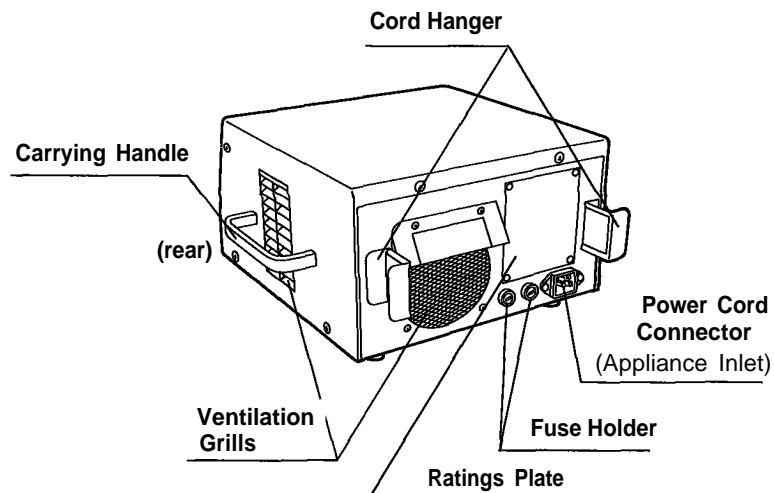
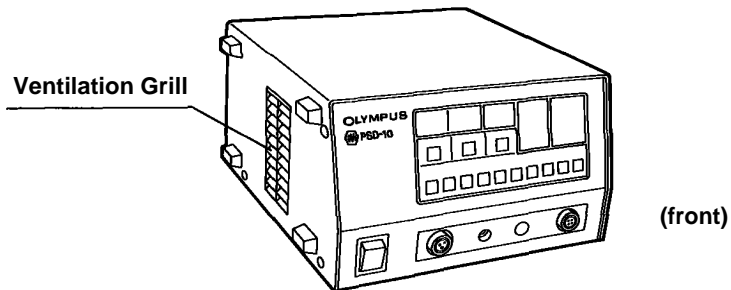
- ⑩ Keep adequately away from cords of electric scalpel (scalpel holder, scalpel cord and patient plate cord), scalpel main body and cords, main body of other electromedical equipment.
- ⑪ Do not loop cords of electric scalpel (scalpel holder, scalpel cord and patient plate cord). Do not contact these cords with the patient or metallic portion of an operating table, etc.
- ⑫ The PSD-10 should not be used in conjunction with electrical apparatus whose safety against leakage current is not guaranteed.
- ⑬ Radio-frequency and spark discharge “noise” may adversely affect other electro-medical equipment being used in the proximity.
 - Do not apply the electric scalpel to the patient who has a pacemaker in his body.
 - The use of a radio-frequency noise filter in monitor electrode lines may reduce interference. Patient monitor electrodes must be placed as far away as possible from the operative field.
 - Needle type electrodes should not be used as they increase the risk of burns.
- ⑭ To prevent instrument damage, the active electrode and the patient plate should not be short-circuited.
- ⑮ Do not activate the electrode for an extended time when it is not touching the target tissue.
- ⑯ The PSD-10 should be used in accordance with the operating environment specified in 1 – 2 Main Specifications; otherwise improper performance, compromised safety or instrument damage may result.
- ⑰ Repairs should be carried out only by an Olympus Service Center.



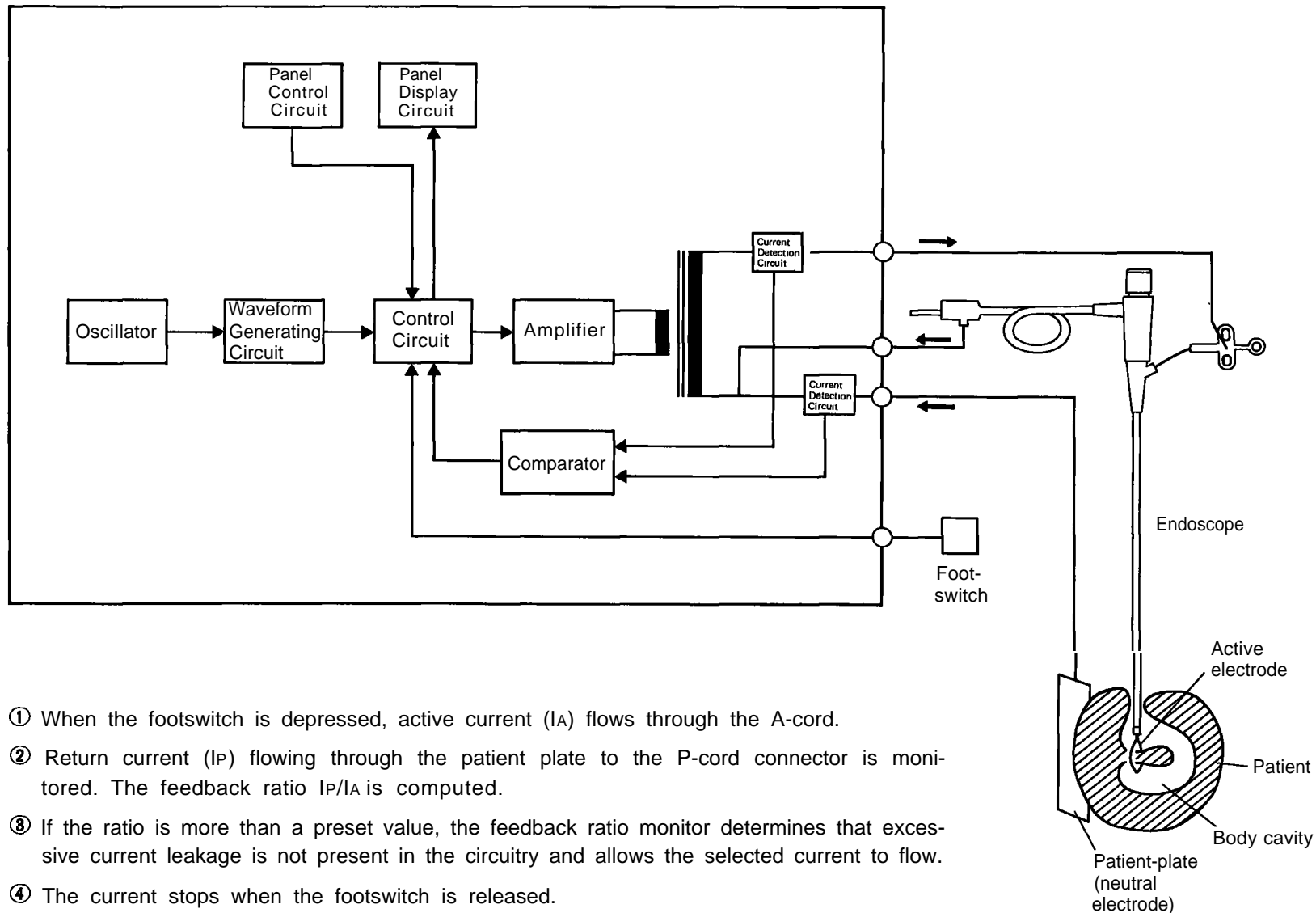
2 DESCRIPTION OF CONTROLS



Main Body & Components



3 CONSTRUCTION

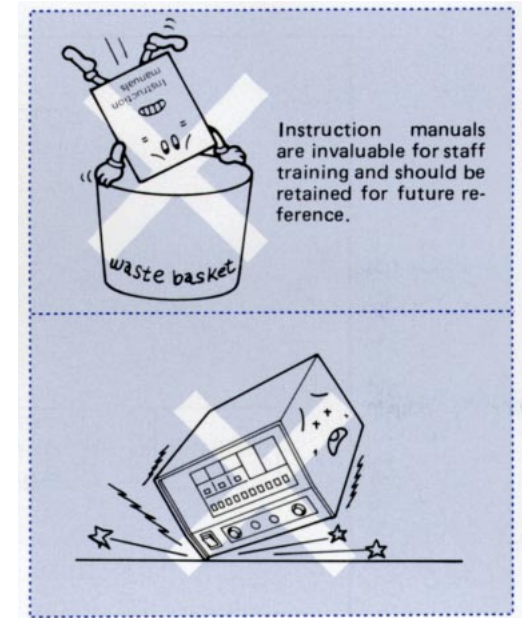
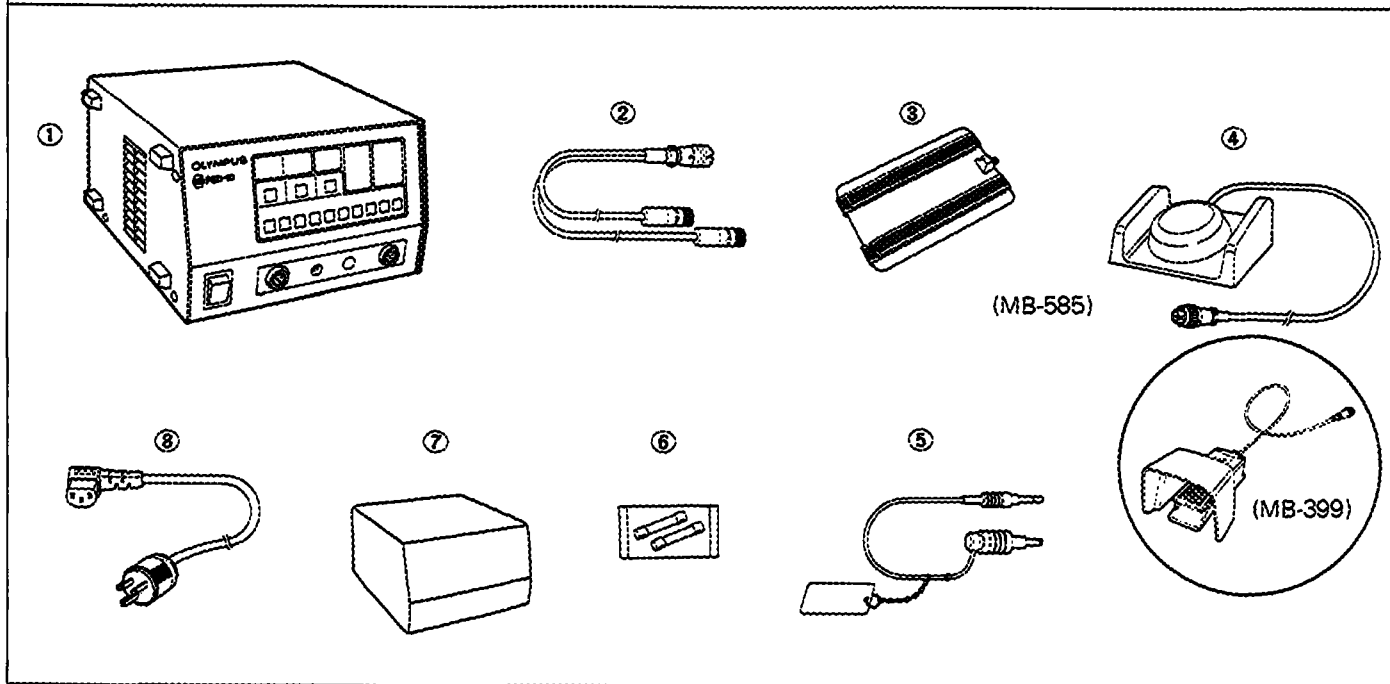


- ① When the footswitch is depressed, active current (I_A) flows through the A-cord.
- ② Return current (I_P) flowing through the patient plate to the P-cord connector is monitored. The feedback ratio I_P/I_A is computed.
- ③ If the ratio is more than a preset value, the feedback ratio monitor determines that excessive current leakage is not present in the circuitry and allows the selected current to flow.
- ④ The current stops when the footswitch is released.
- ⑤ Waveform and output level can be selected by push-button switches.

4 STANDARD SET

Please check each item in the set against the list of standard components below. Contact Olympus if there are any missing or defective parts.

① Electrosurgical Unit PSD-10.....	1	⑤ Check Lead (MB-576).....	1
② S-P Cord (MB-575).....	1	⑥ Fuses (spare).....	2
③ Patient-plate (MB-574).....	1	⑦ Vinyl Dust Cover.....	1
④ Footswitch (MB-585 or MB-399).....	1	⑧ Power Cord.....	1



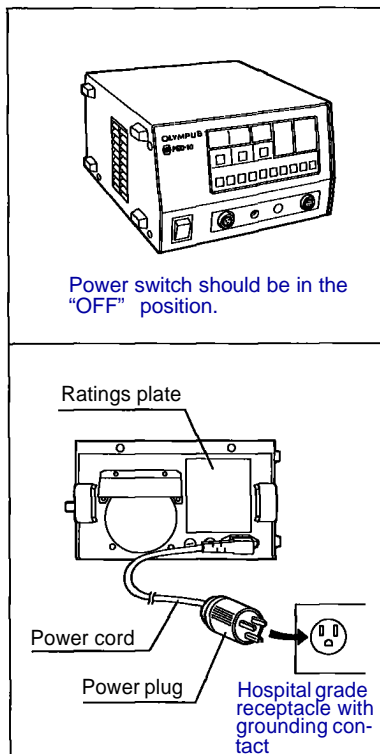
5 PREPARATION FOR USE

Also refer to the instruction manuals provided with the endoscope, electrosurgical accessories and light source, as well as the "Radio-frequency Cutting and Coagulation in Endoscopic Use" booklet and related literature.

5-1 Installation of PSD-10

- ① Check that all safety precautions described in Section 1 – 3 are met.
- ② Place the PSD-10 on a stable surface in a horizontal position.
 - ★ Ventilation must not be obstructed.
 - ★ Carts and stands must be of adequate size and strength to support load.
 - ★ Do not place in a vertical position, such as on the ventilation grill on the side panel.

5-2 Connection to AC Power

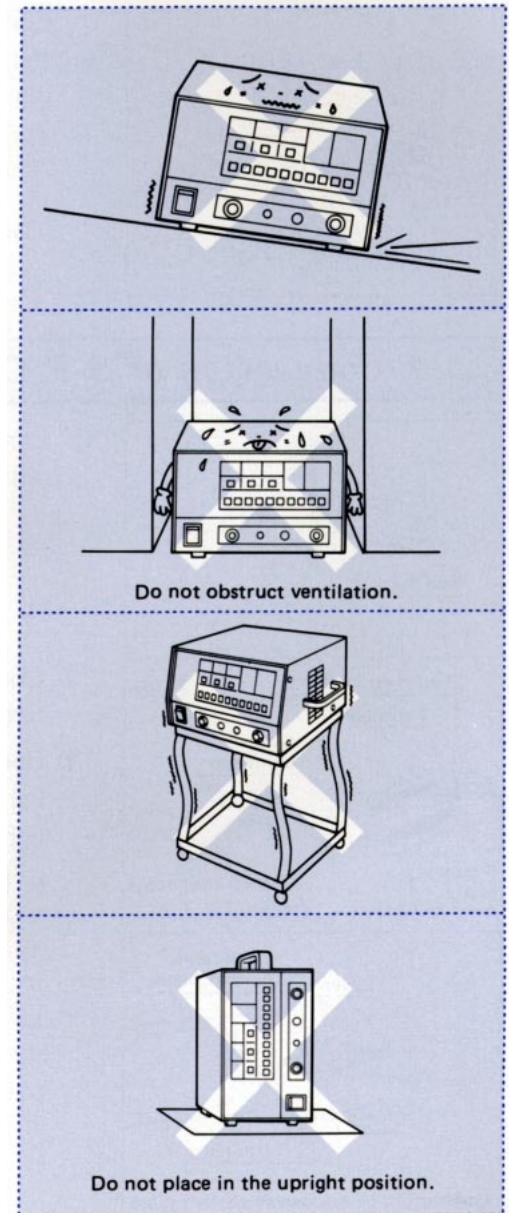


- ① Make sure the power switch is in the "OFF" position.
- ② Connect the power cord to a properly grounded "HOSPITAL GRADE" receptacle (or wall mains outlet with grounding contact) that meets the input requirements indicated on the ratings plate on the rear panel. Use only the supplied power cord.
 - ★ Do not use a 3-pin to 2-pin adapter or a cable tap.
 - ★ Connect the power cord securely to prevent accidental disconnection during procedure. The cord should not be sharply bent, twisted or crushed.

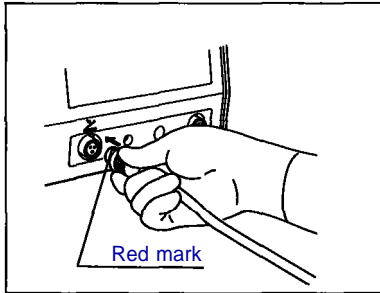
If an additional protective earth is required to guard against electric shock which may be caused by trouble of the protective earth conductor:

Screw a suitable lead wire firmly to the additional protective earth terminal provided on the rear panel of the electrosurgical unit (PSD-10).

Connect the other end of the lead wire to the earth terminal facility of the room.

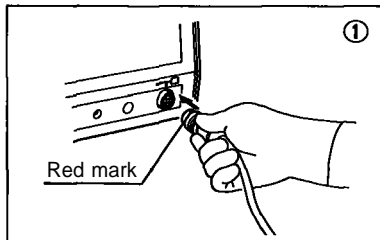


5-3 Connection of Footswitch

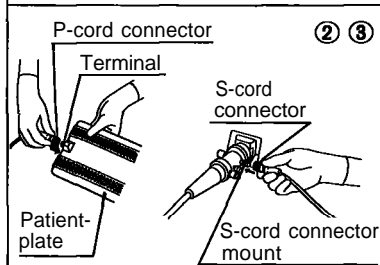


Connect the footswitch to the FOOT SW. connector on the PSD-10, with the red positioning dot on the plug facing upward. Fully tighten the clamping ring on the plug by turning clockwise.

5-4 Connection of S-P Cord



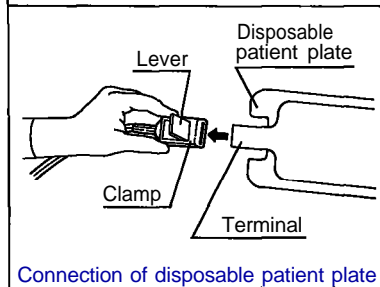
① Connect the S-P cord to the PATIENT connector on the PSD-10, with the red dot facing upward. Push the plug until it is locked in place.



② Connect the P-cord connector to the Patient-plate. Fully tighten the clamping ring.

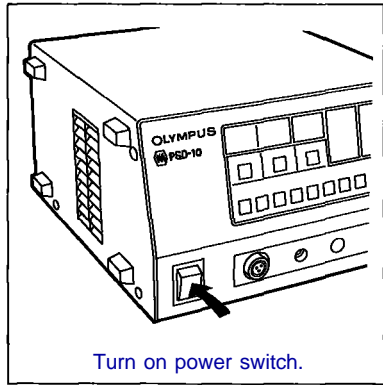
③ Connect the S-cord to the endoscope (S-cord connector mounted on the light guide connector), which has been plugged in the output socket of the light source. Fully tighten the clamping ring.

★ The alarm will be activated when the power switch is turned on, if above connections (Steps ① through ③) are defective.



In case a disposable patient plate (Scotchplate®#1149, 3M) is being used: Lift the lock lever of the special S-P cord (MB-583, optional) and insert the terminal of the patient plate into the port. Press the lever back down to secure plate.

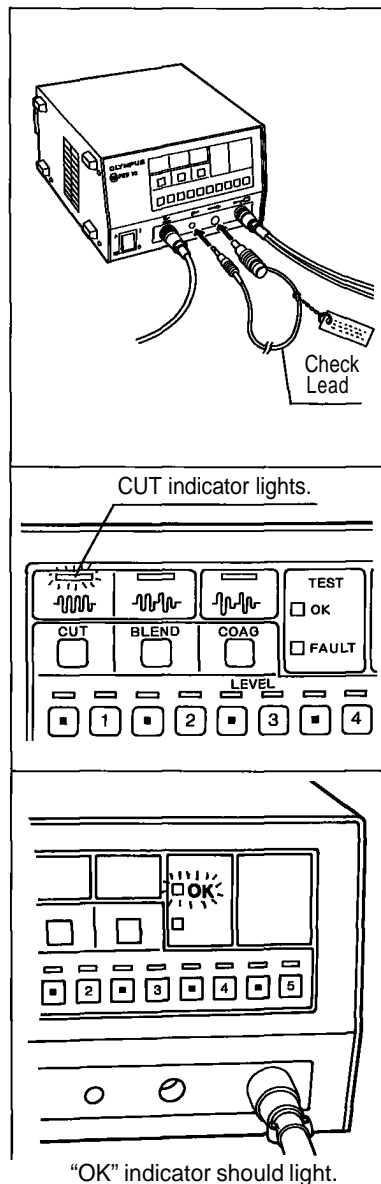
6 INSPECTION OF ELECTROSURGICAL SYSTEM



1 Power Feeding

Turn ON the power switch. The power indicator and LED (Light-Emitting Diode) indicators on the front panel will light and the cooling fan will be heard.

★ If the unit fails to turn on, inspect the power cord connection.



2 Output Check 1 (PSD-10 alone)

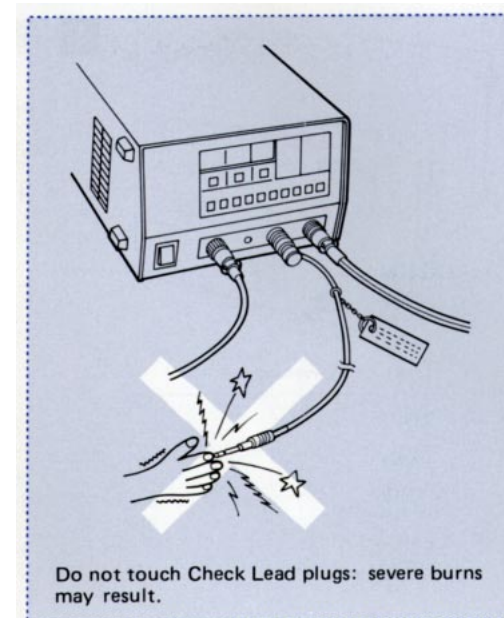
The Check Lead plugs are at an extremely high potential when the footswitch is depressed. **DO NOT TOUCH!** Severe burns may result.

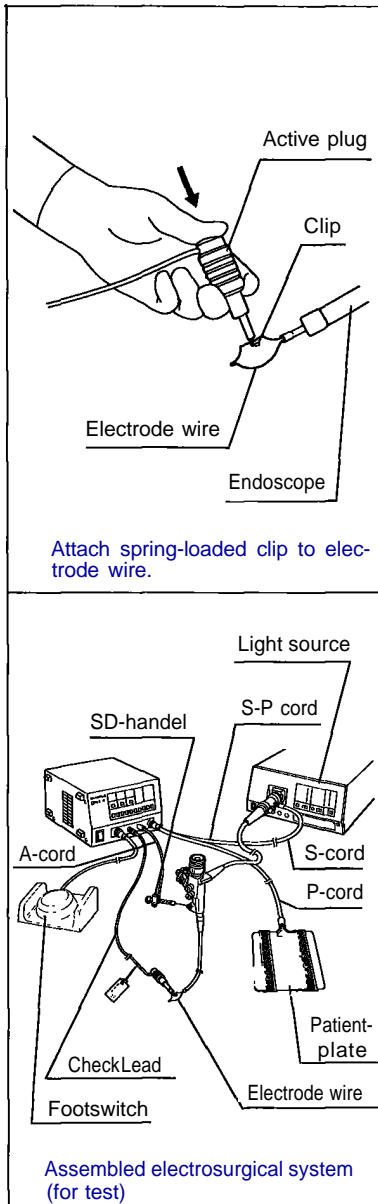
- ① Connect the Check Lead to the TEST connector and to the ACTIVE connector on the PSD-10, by pushing each plug fully into the connector.

- ② Depress the footswitch for approximately 1 second (until the output tone ceases to sound). Make sure the CUT output indicator (yellow) lights and the TEST "OK" light (green) comes on after the output tone has stopped.

- ★ The TEST "FAULT" light (red) may come on if the pedal is released before the output tone stops or if the allowable voltage fluctuation range is exceeded.
- ★ The "FAULT" light comes on:
if the footswitch is depressed when the WARNING light is glowing red.
Re-connect the S-P cord correctly and repeat above procedure.
(If the red WARNING light fails to go out, consult an Olympus service center.)
- ★ Do not touch the Patient-plate; burns may occur.

- ③ Disconnect the Check Lead from the PSD-10.





3 Output Check 2 (Electrosurgical system)

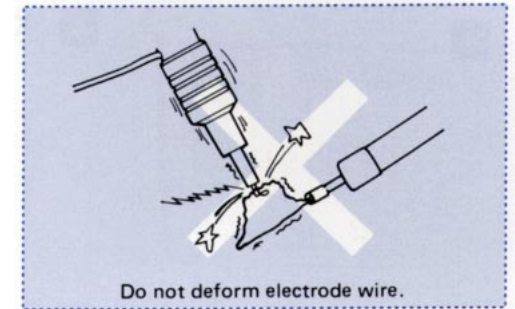
After proper operation of the PSD-10 has been confirmed by Output Check 1, insert the electro-surgical accessory into the endoscope and proceed with the following steps.

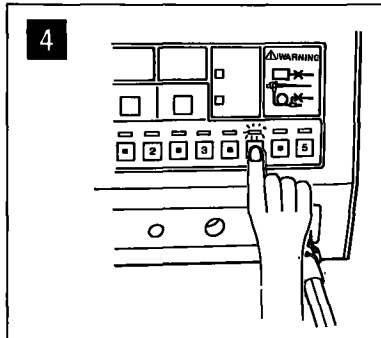
★ The entire electro-surgical system cannot be tested when using PSD-10 in combination with CD-3U/L or CD-4U/L. Be sure to perform the Output Check 1 for the PSD-10 to ensure the proper connection of the system.

- ① Connect the A-cord to the PSD-10 (ACTIVE connector) and to the electro-surgical accessory (A-cord plug on SD-handle).
 - ★ Only Olympus A-cord MA-255 is compatible with this equipment.
 - ★ Push each end of the A-cord until a click is felt and heard.
- ② Connect the smaller plug of the Check Lead to the PSD-10 TEST connector. Connect the larger plug (spring-loaded clip) to the electrode tip/snare wire which is protruding out of the endoscope.
 - ★ Before connection, wipe the clip clean with gauze dampened with alcohol.
 - ★ When attaching the clip to the wire, be careful not to deform or damage the wire (snare, loop, etc.)
- ③ Depress the footswitch and ascertain that the TEST "OK" light (green) comes on.

If the TEST "FAULT" light (red) comes on:

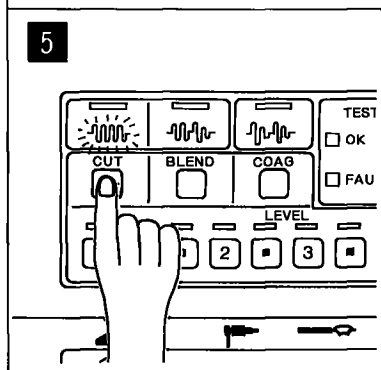
 - a. Connection between the A-cord and the electro-surgical accessory is defective.
 - b. Wire is broken in the above line, or
 - c. The electrode tip is in contact with the metal portion of the endoscope tip.
 - ★ Do not touch the Patient-plate; burns may occur.
- ④ After performing this check, disconnect the Check Lead and the A-cord from the PSD-10.





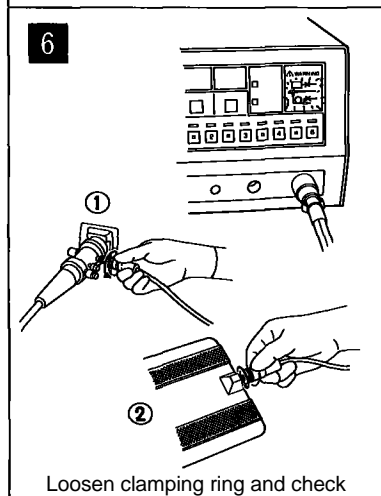
4 Checking the Output Adjustment Switches

Press a given output adjustment switch (0.5 to 5.0): the indicator above the switch should light.



5 Checking the Current Selector Switches

Press a given current selector switch: the waveform pattern above the switch should light.



6 Checking the Connection Monitor

① Connection between S-cord and endoscope

- Loosen the clamping ring on the S-cord connector. Check that:
 - a. S-cord indicator (red) lights and the warning tone (intermittent) sounds simultaneously.
 - b. Depress the footswitch. Make sure output indicators and output tone are not activated.
- Re-tighten the clamping ring to resume correct connection.

② Connection between P-cord and Patient-plate

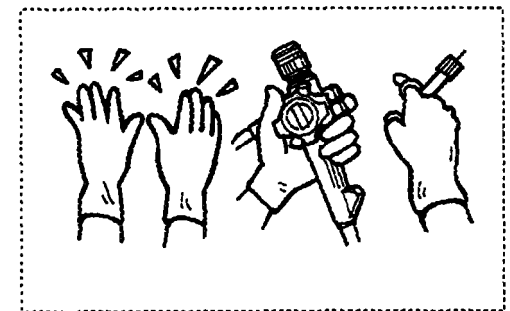
- Loosen the clamping ring on the Patient-plate connector. Check that:
 - a. The P-cord indicator (red) lights and the warning tone sounds simultaneously.
 - b. Depress the footswitch. Make sure output indicators and output tone are not activated.
- Re-tighten the clamping ring.

7 *ENDOSCOPIC ELECTROSURGERY*

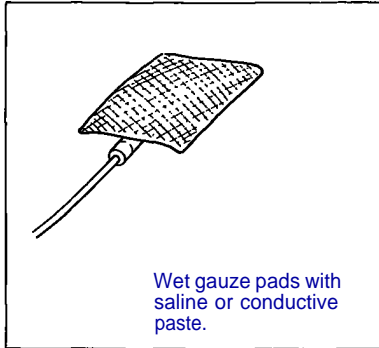
This section outlines a general procedure for endoscopic electrosurgery. The endoscopist should evaluate the clinical factors involved and decide on the specific details of the procedure.

7-1 Precautions against Patient/Operator Burns

- ① To prevent accidental burns, attention must be paid to the following points.
 - The patient should not come into contact with grounded metal objects (e.g., iron bar of bed, external surface of an appliance).
 - Patient skin surfaces should not touch each other (e.g., bare arm and chest).
 - Patient's clothes must be dry.
 - Patient monitoring electrodes should be placed as far away from the operative field as possible.
 - The A-cord or S-P cord should not touch or lay on the patient.
- ② When using lower GI endoscopes, intestinal gas should be replaced with non-flammable gas (CO₂, etc.) before operation.
- ③ The operator and assistant should wear rubber handgloves.



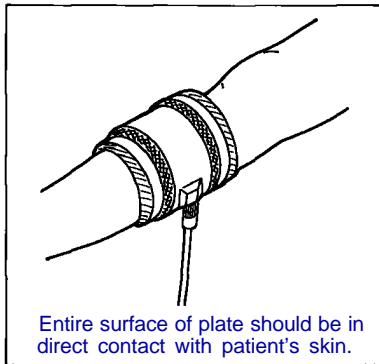
7-2 Setup of Patient-plate



Incomplete attachment of the Patient-plate may cause patient burns.

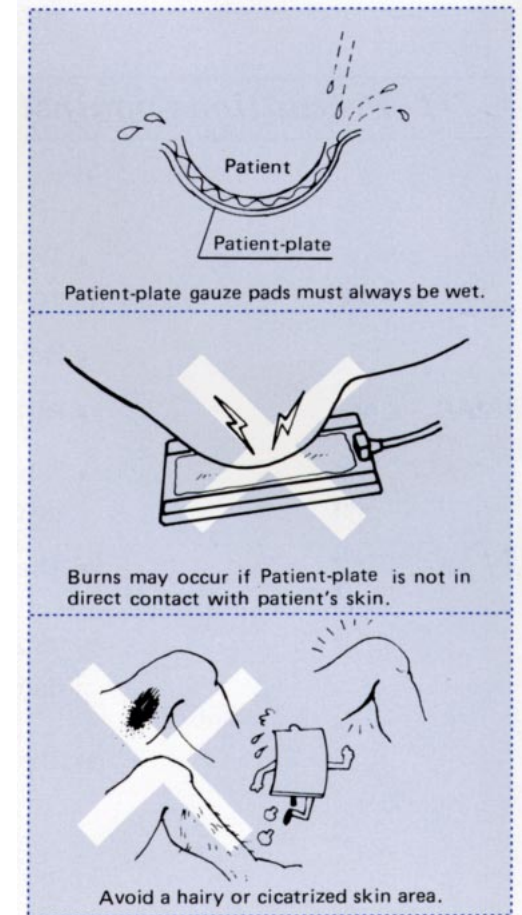
- ① Put gauze pads which are slightly larger than the Patient-plate and moistened with physiological saline or conductive paste (e.g., Conductive Gel #1103, 3M) on the Patient-plate. Attach it to the patient's thigh or calf with the fastening band, or lay it under the hip.

- ★ The gauze pads should be wet throughout the operation. If they become dry, wet again.
- ★ Do not apply the Patient-plate to a hairy or cicatrized skin area.
- ★ Do not deform the Patient-plate. The entire surface of the Patient-plate should be in contact with the patient.



- ② When a disposable patient plate (#1149, 3M) is being used:
Remove the protective paper and attach the plate to the patient.

- ★ The plate may become detached easily unless thoroughly dry.
- ★ Avoid a hairy or cicatrized skin area.
- ★ Do not wrinkle the plate. Its entire surface should be in direct contact with the patient's skin.
- ★ The plate should not be reused.



7-3 Electrosurgery

The type of output current and its intensity must be determined by reference to related papers and based on one's own experience.

1 Power Feeding

Turn ON the power switch.

2 Selection of Current

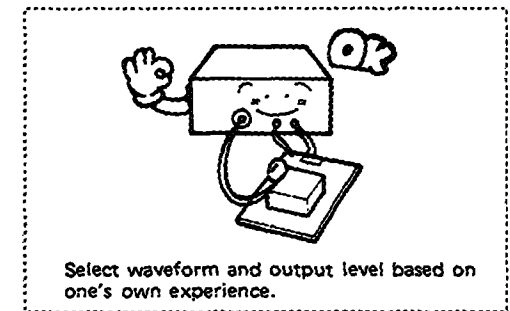
Press the desired current selector switch (CUT, BLEND or COAG).

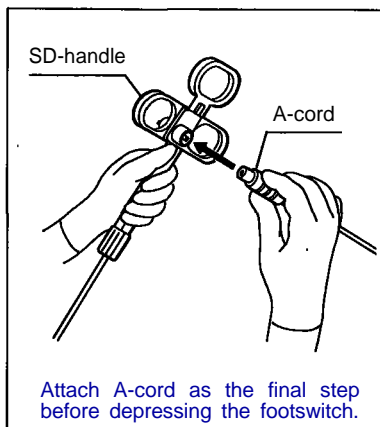
- ★ If none of the current selector switches are pressed, none of the current indicators above them will be lit; instead, the warning tone sounds and current will not be delivered when the footswitch is depressed.
- ★ If more than two current selector switches are pressed, the current indicators corresponding to the pressed switches will light; in this case also, the warning tone sounds and the output is inhibited.

3 Selection of Output Level

Press the desired output adjustment switch.

- ★ If none of the output adjustment switches are pressed, none of the LEVEL indicators above them will be lit; instead, the warning tone sounds and current will not be delivered when the footswitch is depressed.
- ★ If more than two output adjustment switches are pressed, the LEVEL indicators above them corresponding to the pressed switches will light; in this case also, the warning tone sounds and the output is inhibited.





4 Connection of A-Cord

Connect the A-cord to the PSD-10 and to the electrosurgical accessory.

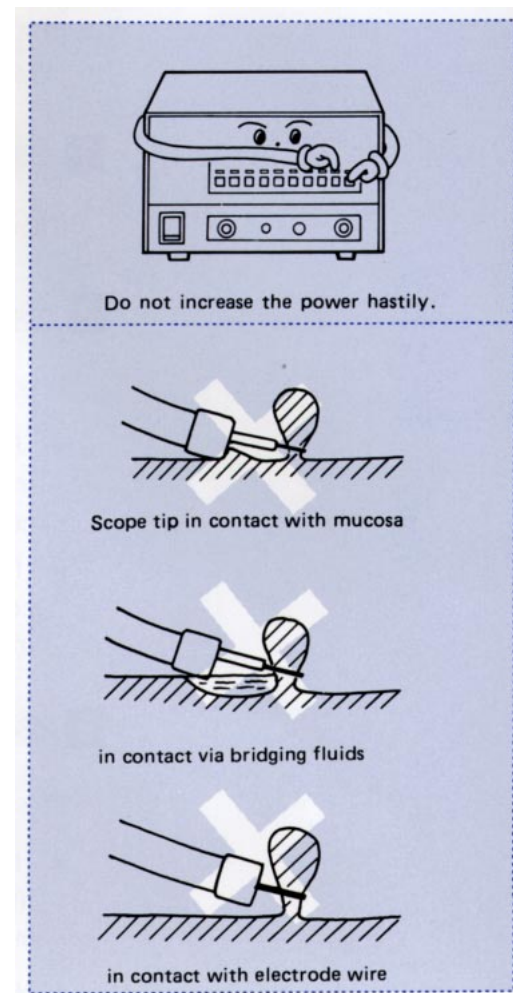
- ★ Only Olympus A-cord MA-255 is compatible with this equipment.
- ★ As an added precaution, connect to the accessory as the final step before depressing the footswitch.

5 Operation

Depress the footswitch and operate on the tissue.

- ★ If the electrosurgical procedure is not progressing as expected, do not increase the power hastily. Inspect the whole circuitry again (connection of cords, contact of Patient-plate, etc.) for any abnormality.
- ★ If the output tone sounds and the output indicator lights when the footswitch is not operated, immediately stop the use of the equipment and turn OFF the power switch.
- ★ If the output tone does not sound and the output indicator does not light, it may be because some abnormality is detected by the monitor and the output is inhibited. The table below lists some possible remedies. (For detailed discussion refer to the "Radio-frequency Cutting and Coagulation in Endoscopic Use" booklet.)

Symptom	Remedy
Metal portion of endoscope's distal end is touching the target tissue.	Move endoscope tip back from the tissue.
The metal portion above is indirectly touching the tissue via fluids.	Suction fluids from around the tissue and move endoscope tip back from the tissue.
The metal portion is touching electrode tip.	Move electrode tip well away from the tissue and bring electrode tip into clear view.



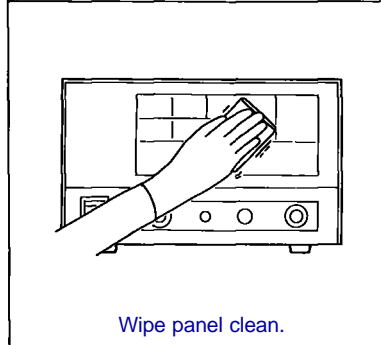
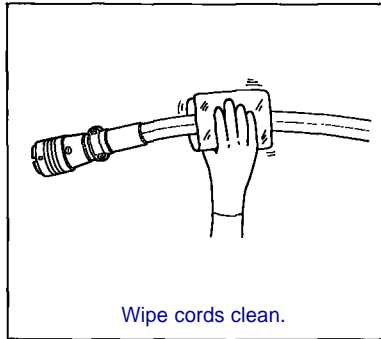
7-4 After Operation

Turn OFF the power switch.

- ★ Disconnect the power plug from the hospital grade receptacle if the PSD-10 is not going to be used for an extended period.

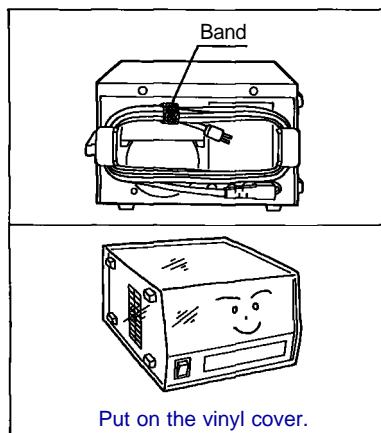
8 CARE AND STORAGE

8-1 Care After Use

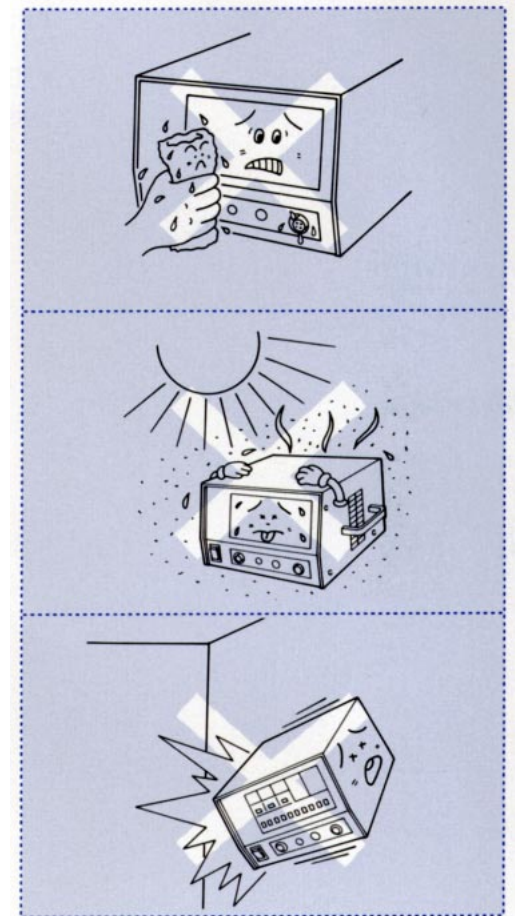


- ① Disconnect the A-cord, S-P cord and footswitch from the PSD-10.
 - ② Lightly wipe all surfaces using a soft cloth or gauze sponge. If dirt remains, moisten the gauze with disinfectant ethanol and wipe again.
 - ③ For disinfection, wipe with a gauze sponge moistened with disinfectant ethanol or 2% glutaraldehyde solution. If a glutaraldehyde solution is used, wipe again with disinfectant ethanol to remove all residue.
- ★ Avoid touching the electrical contacts and connectors: poor electrical contact will result.
 - ★ To prevent scratches, do not use harsh or abrasive wiping material.
 - ★ Surfaces must be thoroughly dry before use.

8-2 Storage

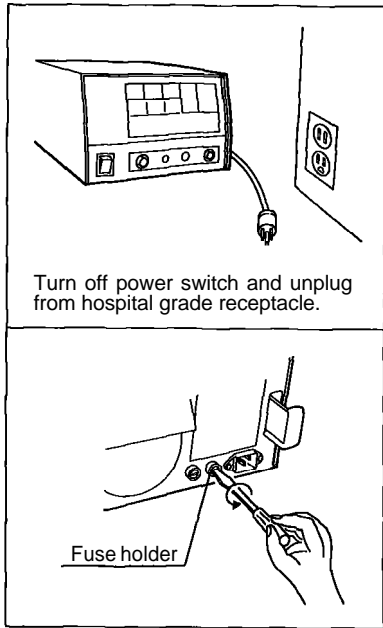


- Wind the power cord around the hanger on the rear of the PSD-10.
 - Place the PSD-10 on a stable surface in the horizontal position.
 - Put on the vinyl dust cover.
- ★ Storage area must be maintained at normal temperature and humidity, and away from water splashes.
 - ★ Do not subject to heavy blows or impacts.



9 MAINTENANCE

9-1 Replacement of Fuse



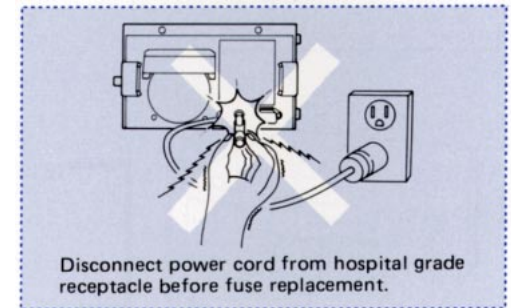
① If the PSD-10 ceases to operate and the malfunction cannot be isolated, check the fuse holder on the rear of the PSD-10 after unplugging the power cord from the hospital grade receptacle.

★ Be sure to unplug the power cord from the AC mains.

② If the fuse is found to have blown, replace it with a new fuse making sure that the requirement for supply voltage fluctuation in 1-2 Main Specifications, is met.

★ In case the spare fuse has been expended, use a commercially available equivalent (rated value is indicated near the fuse holder).

★ After replacement, if the new fuse blows again, contact an Olympus service center.



9-2 Cleaning of Ventilation Grills

If dust and dirt have collected on the ventilation grills, clean using a vacuum cleaner.

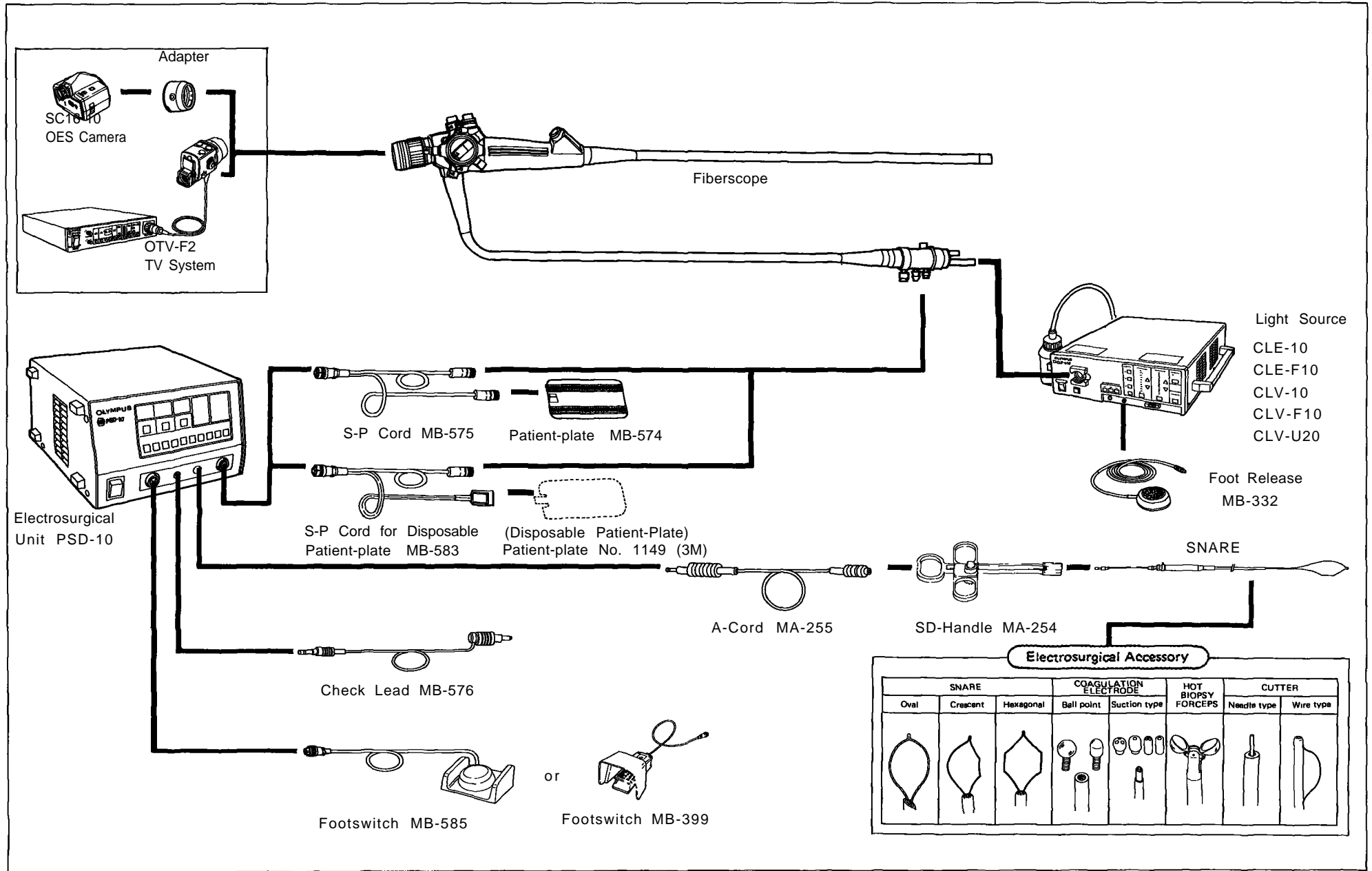
9-3 Periodic Inspection

Periodically inspect the PSD-10 following the procedure in Section 6 INSPECTION.

★ If any irregularity or abnormality is suspected, contact your Olympus representative.

★ Repair must be made by an authorized Olympus service center, and should not be attempted by non-Olympus service personnel.

10 ELECTROSURGICAL SYSTEM CHART



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The design of the product is under constant review and whilst every effort is made to keep this manual up to date, the right is reserved to change specifications and equipment at any time without prior notice.



O-2100-003-0 HE

This publication is printed on recycled paper.

Printed in Japan 9408 M 02