

Combo/24/50 Camera System

CCD-camera with integrated Xenon light source

Cat. # 70-5924 / 24 Watt Light Source

Cat. # 70-5950 / 50 Watt Light Source

Operating / Service Manual



IMPORTANT: Read all instructions before assembling or using this device.

JEDMED
An Employee-Owned Company

08-2008

Rev. 2

pmm1079

JEDMED Instrument Company was formed in July, 1978 and is entirely employee-owned (ESOP). Our goal is to provide the best overall equipment packages to the medical disciplines we serve. We thank you for all your support and hope that your experience with this recent purchase will be a rewarding one which will grow into a lasting relationship with JEDMED.

Your suggestions on how we can improve our products and services are always greatly appreciated. Please feel free to contact us with your thoughts. We listen.

Sincerely,

JEDMED Instrument Company

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Note: Specifications subject to change without notice.

1. Safety Reference / Place the Equipment

1.1 Safety Reference

Normal Use

The equipment may only be used with accessories, parts, and disposable items, which have been designated by the manufacturer as suitable for the instrument or the safety use of which is proven.



User Qualification

The equipment may only be used by persons who have corresponding specialized qualification and who have been instructed in the use of the equipment.



It is the user's responsibility to make sure the equipment is safe and operates properly before using the equipment.

1.2 Place the Equipment

Unpacking / Items Included

Carefully unpack the equipment and accessories and remove them from their packing.

Check for missing items and evidence of shipping damage. File any complaints with the manufacturer or supplier immediately. Retain the original packing materials for later use. These can come in handy when the equipment must be transported.

Please verify immediately, after having unpacked the equipment, whether the delivery is complete. The standard extent of delivery includes the following:

- control unit with light source and camera module
- camera head with cable
- operation manual
- video cable
- power supply cord

Safety Precautions at the Site of Installation

Always place the equipment on a solid base.

Make sure that air circulation is sufficient. Never cover the louver-type slots of the unit.

The equipment may be used only in rooms having electrical installations conforming to applicable national, state and local electrical codes. The unit must be connected to the central potential equalization of the operating theater or of the equipment trolley by means of a grounding cable. The device must be connected to line voltage using the delivered protectively-earthed power supply cord.

The equipment may not be used in areas where there are dangerous flammable gases.

The equipment may only be connected to devices which also comply to the IEC601-1.

Never look directly in the light beam of the light source.



2. General Notes / Signs and Symbols

Thank you for your recent purchase of this product.

Like all of our other products, the product is the result of years of experience and great care in engineering and manufacture.

This manual is designed to teach you the function and the operation of your equipment.

Before you switch on the equipment for the first time, please thoroughly read this manual and pay special attention to all safety instructions so that endangering the user and/or the patient is prevented.

Please always store this manual with the equipment.

Equipment Data

The type label (rear of unit) contains technical data, type and serial number of your unit. Please always indicate these data when ordering spare parts or in case of any questions.

Please enter here the technical data of your device!

Serial No.:	
Type:	
Date:	
Class:	
Hz:	
Amp.:	
Volt:	

2. General Notes / Signs and Symbols (Continued)

Warranty

1 year according to our warranty conditions.

Opening the equipment or performance of any repairs or modifications of the equipment by unauthorized persons shall release the manufacturer of any liability for its performance. Any such opening, repair or modification performed during the warranty period shall void all warranty.

Normal wear is not included in the warranty.

The manufacturer shall be liable for failure or deterioration in the safe operation, operational reliability and performance of this equipment only subject to the conditions that all assembly operations, system expansions, readjustments or repairs to same have been performed by a person or persons duly authorized by the manufacturer, that all electrical installations at the location of use meet applicable national and local electrical codes and that the instrument has been used in accordance with its operating instructions at all times.



Rights

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The information given in the user manual can be changed or extended without notice and does not represent any liability.

Errors and technical changes are expected.

Symbols



attention, important note!



safety note!



service

Signs



please read the enclosed instructions



unit model BF



beware of dangerous electrical voltage



connection for ground potential



alternating voltage

3. Description of the Equipment

This system is a combination of a high intensity Xenon light source and a color CCD camera in a common housing. The Combo/24 unit contains a 24 Watt Xenon light source, while the Combo/50 contains a 50 Watt Xenon light source. Both units come equipped with a 1/3" camera head and an electronic ANTI-MOIRE-FILTER for use with flexible fiber scopes.

CCD Camera

The integrated CCD camera is a shutter-controlled camera. This means that the brightness of the monitor image is controlled via an "electronic shutter." The shutter works with shutter-cycles between 1/50 and 1/2,000,000 sec.

If the longest shutter-cycle of 1/50 sec. is not sufficient to display the image in an adequate brightness, the video signal is automatically boosted electronically by max. +30 dB. This electronic amplification is called AGC (Automatic Gain Control).

You will achieve the best image quality when you have sufficient illumination and only the shutter is working. If the AGC is added, this will cause additional noise on the monitor image.

Xenon Light Source

The integrated Xenon light source operates at constant power. The image brightness on the monitor is only influenced by the shutter of the camera.

The Xenon bulb is mounted in a quick-exchange holder.

1/3" Camera Head

Included is a 1/3" 1-Chip camera head with a 3m cable. Only the head is soakable.

4. Operating Elements

4.1 Operating Elements on the Front Panel

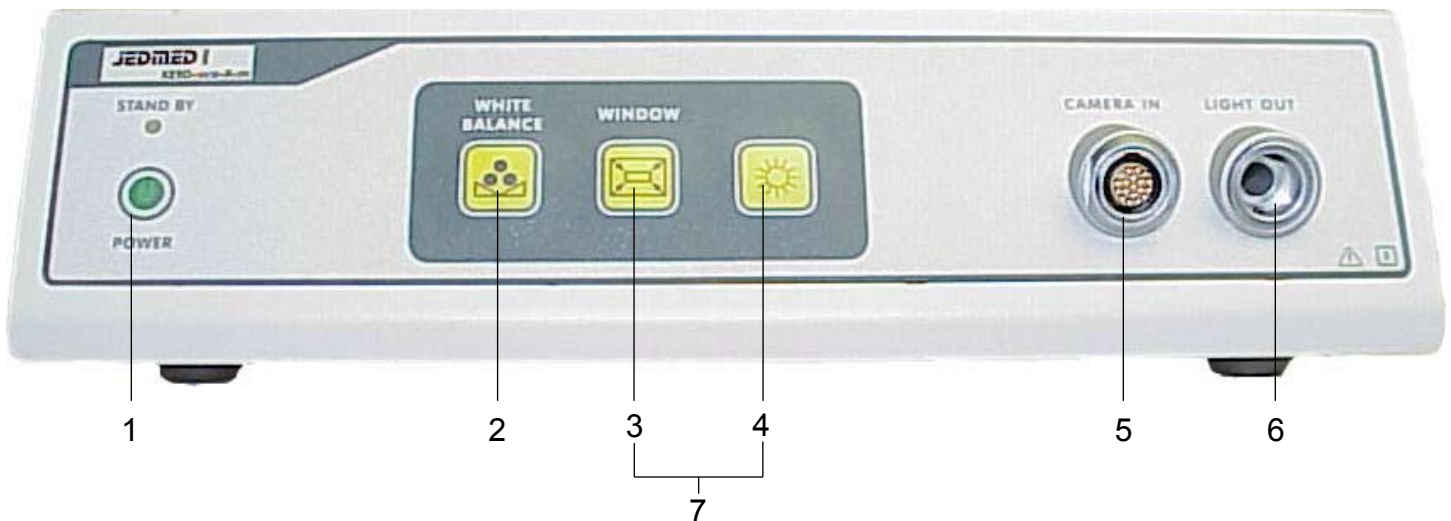


Fig. 1: Control elements on the front panel

- (1) power switch / light source
- (2) push-button for WHITE BALANCE
- (3) push-button for WINDOW
- (4) push-button for AGC
- (5) connector for camera
- (6) light connection
- (7) push-buttons for anti-moire filter

Power Switch / Light Source (1)

The camera / light source is turned on by switching this switch. After unit is running by depressing power button for 2 to 3 seconds light source will power down and camera will remain on. This will allow the use of alternative light source if desired.

Push Button for WHITE BALANCE (2)

WHITE BALANCE is performed by pressing the corresponding push button.

First, aim the camera head on a homogeneously illuminated white sheet of paper or a well illuminated multi-color object. Simultaneously, press the push button. The current WHITE BALANCE is stored in memory and is also saved when the camera is switched off.

Take notice that the paper-sheet or the multi-color object is not irradiated, which means that the grain structure of the paper is visible on the monitor.

If white balance is done correctly, a natural color reproduction is guaranteed.



4. Operating Elements Continued

Push Button for WINDOW (3)

The WINDOW-function is turned on and off by pressing the corresponding push button. By pressing the button you can change between three different window sizes.

The WINDOW-function carries out a light measurement that only affects a central window of the picture. That means that in contrast to a standard measurement where the average brightness is integrated over the entire picture size, only a center part of the image is taken to evaluate the average brightness; outer margins are disregarded.

To activate the WINDOW-function, push the corresponding button. If the WINDOW-function is activated, a yellow light inside the push button is illuminated. If the object to be viewed is in the center of the picture, you should activate the WINDOW function. The object itself is correctly illuminated on the monitor, and the outer margins of the screen are displayed proportionately darker or brighter.

Pressing of the button a second time deactivates the WINDOW-function.



Push-Button for Automatic Gain Control (AGC) (4)

For working under poor illumination conditions, the camera is equipped with an automatic gain control to increase brightness. Under good illumination conditions you will see no effect on the screen.

- AGC settings - 0dB, 10dB, 18dB
- Push the AGC button once to show the current settings
- To change the AGC setting, press the button again within one second

Connector for Camera (5)

This terminal device is used for the plug of the camera cable. The plug has a small "nose" inside, which has to face upwards when plugging in.

Attention! The control unit must be switched off when you connect or disconnect the camera cable otherwise, permanent damage to the camera head may occur!

Light Exit (6)

Interchangeable adapters for the use of the light source with different types of light guides can be mounted in this hole. Using the wrong adapter will damage the light exit.

Push Button for Anti-Moire Filter (7)

By pressing the window and AGC button simultaneously, the special moire filter turns on. Pressing these buttons again will turn the filter off.

4.2 Operating Elements on the Rear

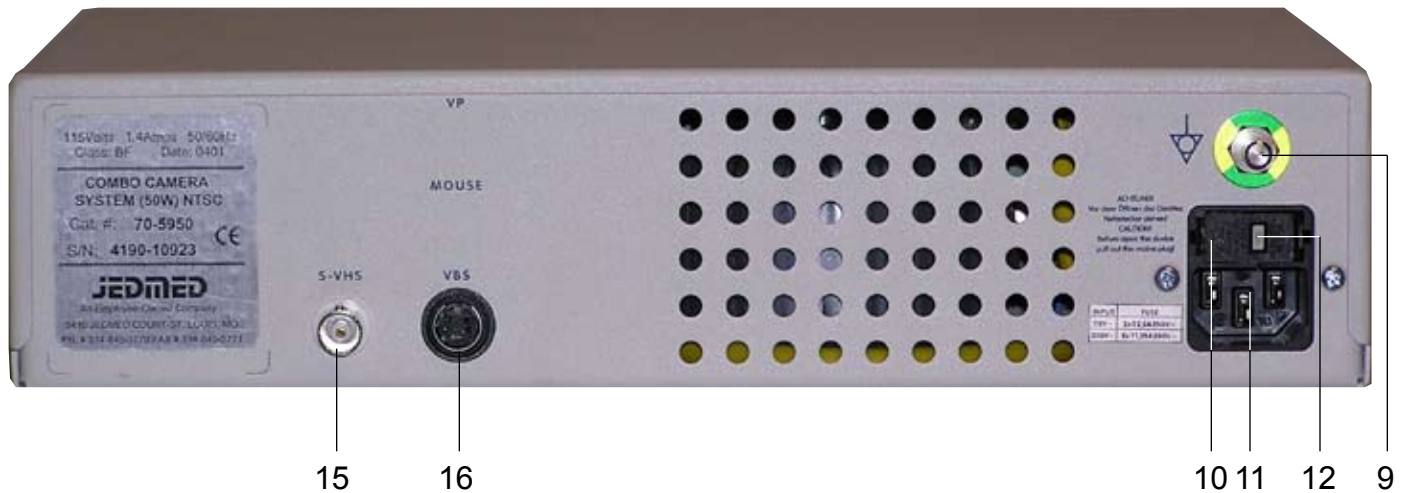


Fig. 2: Connectors on the rear panel

- (9) terminal device for potential equalization conductor
- (10) mains fuses drawer
- (11) mains plug
- (12) voltage selector
- (13) connector for video printer-remote (optional)
- (14) connector for PC-control (optional)
- (15) video terminal / Y/C
- (16) video terminal / BNC

Terminal Device for Potential Equalization Conductor (9)

Basically, the control unit is protectively-earthed (grounded) by the 3-pin power supply cord when it is connected to a protectively-earthed wall socket, as prescribed.

When running the equipment in rooms which comply to class 1 or 2E according to MedGV, the control unit must be connected to the central potential equalization of the operating theater or of the equipment trolley by means of a grounding cable.

Mains Fuses Drawer (10)

In this drawer are the mains fuses. Use only fuses with same type and rating as specified on fuse label.

Mains Plug (11)

This terminal device (11) is used to connect the equipment to the mains by the power supply cord.



Voltage Selector (12)

The control unit can be operated with mains voltages of either 115V or 230V

Connector for Video Printer-Remote (optional) (13)

This connector (15) is used to connect a video printer (Sony UP) to the control unit. The connection cord is delivered separately. If the video printer is connected, you can freeze the monitor image by pressing the front push button on the camera head and you can print the image by pressing the rear push button.

Connector for PC-Control (optional) (14)

This connector (16) is used to control the device by a personal computer. If the device is equipped with this feature, you will get additional information on a separate paper.

Video Connector (15) (16)

You can attach external output devices such as monitor, video recorder or video printer to the VIDEO-OUT connectors.

The video signal is provided in two different standards.

- The BNC-connectors provide the video signal as VBS-signal (composite-signal, VHS-standard)
- The 4-pin Y/C connector provides the video signal as Hosiden-signal (separate conductors for chroma-and-luminance-signal, S-VHS-standard).

The camera is equipped with both VBS-output and S-VHS output.

Whenever possible, use Y/C-signal rather than VBS-signal since it will achieve a much better image quality in contrast to VHS-standard.

5. Connecting and Operating the Equipment

Before you connect the mains plug, check on the back of the equipment that the voltage indicated (in the square panel above the mains socket) is the correct one.

voltage = 115VAC - indicator '115' voltage = 230VAC - indicator '230'

If the incorrect voltage is indicated, then the equipment may under no circumstances be connected.

Before connecting a light cable into a light source adapter of the equipment, please ensure that you have the correct plug and adapter. A plug that is too long or too thin can, for example, be pushed too far into the equipment and can damage the sensitive lens inside. This will result moreover in considerable loss of light, in the same way as a plug that is too short, or a plug of the wrong diameter, because of the wrong position of the contacts at the light entry.

All wiring has to be done before switching on the equipment. **After switching on a light source and the ensuing ignition of the lamp, the equipment should remain switched on for at least 1/4 hour. A shorter shining period will considerably shorten the life expectancy of the lamp.** After switching off a light source however, it may be immediately switched on again. A waiting period or cooling off period is not necessary.

Connect the Power Supply Cord

Use the protectively-earthed power supply cord, as supplied, to connect the control unit to the mains.

Connect the Camera Cable

Install the plug of the camera cable in the corresponding socket on the front panel as described above. You can connect all lenses and endoscope couplers to the camera head, which are equipped with a C-Mount thread. When you use objectives with CS-Mount thread, an additional intermediate ring is necessary.



Connect the Light Guide

Verify whether the light guide fitting matches the delivered adapter. The light guide must snap in securely and may not extend past the adapter end. Screw in the adapter and plug in the light guide.

Connect the External Output Devices

As described before, there are several standards of video signal available on the rear panel. Here you can connect external output devices such as monitor, video recorder, video printer, etc. If you are using standard VBS-signal (BNC-terminal), please always use high-quality 75Ω-coaxial cables. If the external output device has a switchable 75Ω-termination resistor, you should switch this on. If you connect several devices in a row, only the last device in the line needs to be terminated by the termination resistor. If the external device does not provide such a termination resistor, you should connect the coaxial cable via a T-connection adapter. The open end of the T-connection adapter is then terminated with the 75Ω-resistor.



Connect the Potential Equalization Conductor

Join the terminal device for potential equalization on the rear panel with the central potential equalization of the operating theater or of the equipment trolley.

5. Connecting and Operating the Equipment (Continued)

5.1 Preparing for Operation

After having installed all connections, the camera can be set to work.

Switch on the control unit using the mains switch on the front panel (1).

The green lamp inside the switch lights up and the light source starts with full intensity.

If all other devices are switched on, a picture appears on the monitor which may or may not be incorrectly colored. If color is incorrect, proceed with the white balance. First, aim the camera head on a homogeneously illuminated white sheet of paper or a well-illuminated multi-color object. Simultaneously, press the push button. The current WHITE BALANCE is stored in memory and is also saved when the camera is switched off. Take notice that the paper sheet or the multi-colored object is not irradiated, which means that the grain-structure of the paper is visible on the monitor.

Note: When turning on the light source and camera power switches there will be a noticeable delay before operation begins. This delay is normal and protects the electronic circuitry.

After the unit has been operating and is warm, there will be a significant delay (approximately 1 minute) before the lamp will re-ignite after being switched off and on again. This is also normal.

5.2 Working with the System

Now you can start the examination. There are no further adjustments necessary during operation. If the image is too bright, activate the window feature.

If you have finished the examination, please switch off the control unit immediately afterwards in order to allow maximum life expectancy of the lamp.

6. Service Manual / Maintenance of the Equipment

General Maintenance and Repair Information

The instructions and information given in this section are only for instructed personnel who are aware of the safety precautions necessary for repair and maintenance of medical electronic devices.

The manufacturer refuses any liability for unauthorized repair and modification.

The manufacturer will provide those circuit diagrams, itemized parts listings, descriptions, sets of adjustment instructions and other items of available documentation to suitably qualified user personnel duly authorized by the manufacturer for their use in repairing those components of the equipment that have been designated by their respective manufacturers as repairable.

The supply of such technical documentation relating to the equipment, however, shall not be construed as constituting manufacturer's authorization of user's personnel, regardless of their levels of technical training, to open or repair the equipment.

Explicitly exempted are those maintenance and repair operations scheduled in this manual.



6.1 Exchanging the Lamp

The built-in lamp is a Xenon low voltage lamp which is mounted in a cold light reflector. The manufacturer of the lamp states the median life expectancy is 500 hours.

The lamp is stressed the most when it is switched on and off.

If the life expectancy has nearly expired, it will blow when switching on the device. Therefore, always provide a spare lamp with the device, which can be installed as follows:

1. Switch off the equipment!
2. Pull out the mains plug!
3. Open the top cover by loosening the four (4) screws left and right
4. If the unit has run right before, the lamp is still **very hot**. Let the lamp cool down for about 10 minutes.
5. Pull out the lamp
6. Hold the lamp firmly and remove the lamp plug
7. Re-install the lamp plug to the new lamp
8. Re-install a new lamp in the holder
9. Re-install the cover
10. Plug in the mains plug and set the device to work

6.2 Exchanging the Fuses / Voltage Selection

Mains fuses are located on the rear panel of the control unit, directly above the mains terminal device in a small drawer.

The window inside the drawer indicates the current voltage setting.

If you want to change the voltage settings, you have to change the fuses to the corresponding rating.



1. Pull out the mains plug!
2. Loosen the drawer by unfastening the two clamps located to the left and to the right of the drawer with a pointed tool and pull out the drawer.
3. Remove the two fuses.
4. Check the fuses. A blown fuse is indicated by the blackened glass cylinder or the visibly melted fuse conductor. If necessary, check the fuse with an ohmmeter.
5. If the voltage setting should be changed, take out the white insert inside the fuse-drawer and re-insert it turned over 180°. The window of the drawer now shows the valid voltage setting.
6. Install the corresponding fuses. You will find the right fuse ratings in section 6.2. They are also printed on the rear panel.
7. Re-install the fuse drawer.
8. Switch on the equipment again. If you have exchanged a defective fuse against a new one and the fuse blows again, the unit is malfunctioning. If so, return the device to your dealer for testing and repair.

6.3 Troubleshooting

In case of malfunction, you should check the wiring connections first. Most errors are based on wrong connections.



Symptom	Possible Cause	Solution
no picture on the monitor	mains supply cord not installed	install mains supply cord
	mains switch off	switch on mains switch
	mains fuses blown	check/exchange mains fuses
	internal fuses blown	check/exchange internal fuses
	lamp defect	check lamp / change lamp
	lamp connector not installed correctly after lamp change	check the correct installation
	camera cable not installed	install camera cable
	no mains voltage	check mains voltage
	video cable not installed/defective	install/exchange video cable
	monitor switched off	switch on monitor
	malfunction inside CCU	check voltages: mains voltage: as shown on the voltage selector output voltage of power supply: +12VDC voltage on CCU main board: J2-8 -9VDC J2-11 +15VDC
image too dark	window feature turned on	turn off window feature if not required
	termination resistor on an external output device switched on	switch off/remove termination resistors if not required
	lamp is too old	check lamp / change lamp
	illumination not sufficient	increase illumination
	monitor settings not in neutral position	set monitor settings to neutral values
image too bright	monitor settings not in neutral position	set monitor settings to neutral values
	shutter not working	return device to manufacturer for repair
poor image quality	AGC emphasis causes noise	improve illumination conditions
	illumination too dark	improve illumination conditions
bad colors	white balance not performed	perform white balance
	monitor chroma settings misplaced	set chroma to a neutral value
no colors	Y/C terminal (if available) or cable defective / broken	check cable and Y/C terminal
	monitor chroma settings misplaced	set chroma to a neutral value

6.4 Cleaning / Disinfecting

NOTE: PULL OUT THE MAINS PLUG!

All parts of the outer surfaces of the equipment are totally insensitive to all the usual cleaning and disinfecting materials so that you can use any of these without limitation. Apply liquids using a soft cloth or soft blotting paper in order to avoid scratches on the surfaces and in order to be able to control the amount of liquid. With flammable liquids, like alcohol especially, you should apply with a cloth.



Do not autoclave any part of the equipment.

Do not allow any liquids to enter the equipment.

After cleaning with flammable liquids, leave the equipment to dry for one hour before it is switched on again. There is danger, for example, that an alcohol air explosive mixture could form after cleaning.

7 Technical Data

TV System	NTSC PAL
Resolution	NTSC: 768 H x 494 V 470 TV-lines horizontal PAL: 752 H x 582 V 470 TV-lines horizontal
Video Terminals	1 X VBS (1 Vpp/75Ω), BNC 1 X Hosiden (Y/C), Mini-DIN-jack
White Balance	Automatic, with memory
Shutter	Floating, cycles from 1/50 to 1/2,000,000 sec.
Freeze Memory (optional)	Amount of pixels: 752 H x 580 V Frame Storage Color depth: 8 bit
AGC	Automatic Max. emphasis +30db
Light Measurement	Integral
Power Supply	115 VAC ± 10% 230 VAC ± 10%
Power Consumption	70 Watts (Combo/24) 170 Watts (Combo/50)
Fuses	Located on rear of control unit Fine fuses, 5x20mm, delay acting (slow-blow) For 115 VAC: 2.5A, 2 pieces (same for Combo/24 or Combo/50) For 230 VAC: 1.25A, 2 pieces
Certificates	CE
Dimensions	Control Unit: W X H X D = 355 x 110 x 320 mm
Weight	Control Unit: 4kg (approximately) Shipping Weight: 5.5kg (approximately)

8. Spare Parts

Mains Fuses	Located on rear of control unit Fine fuses, 5x20mm, delay acting (slow-blow) For 115VAC: 2.5A (same for Combo/24 or Combo/50) For 230VAC: 1.25A
Internal Fuses	Located on the camera control pcb Miniature fuses, pitch 2.54mm, fast acting 300mA, 1.6A
Spare Lamp	Xenon reflector lamp 24W (Combo/24) Xenon reflector lamp 50W (Combo/50)

NOTES

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