

**OLYMPUS**

**KEYMED**

# **AUTO-DISINFECTOR 3**



***Instructions for Use***

**IMPORTANT**

The Auto-Disinfector 3 has been designed for cleaning and disinfecting the Olympus gastrointestinal and upper airway OES and EVIS ranges of immersible flexible endoscopes. Do not use the unit for any other purpose than that for which it is designed. It is not recommended for the decontamination of endoscopes to be used for surgically invasive procedures, as these instruments will require sterility.

This manual must be read carefully before using the equipment. It contains important information concerning its care and operation.

**Failure to observe these instructions and precautions could lead to damage to equipment, injury to personnel, or contamination of the machine, which may result in incomplete decontamination or recontamination of the endoscopic equipment.**

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## 1. INTRODUCTION

The Olympus-KeyMed Auto-Disinfector 3 has been designed specifically to aid the cleaning and disinfection process for Olympus gastrointestinal and upper airway OES and EVIS flexible endoscopes.

Incorporating a programmable disinfectant contact time to enable routine use in line with local or national recommendations, the Auto-Disinfector 3 enables repeated endoscope disinfection to a very high standard. Tests have shown that “between patient” decontamination with such machines is more effective and consistent than equivalent manual cleaning and disinfection techniques.<sup>1,2</sup>

For disinfection at the beginning and end of endoscopy sessions, between patients or after use on a known or suspected infected patient, the disinfectant contact time can be set according to the disinfectant manufacturer’s recommendations, national recommendations or to suit the local requirements of the Infection Control Committee or equivalent group.

Please read this instruction booklet carefully and familiarise yourself with the Auto-Disinfector 3 before use. Please also note that only Olympus gastrointestinal and upper airway endoscopes of the OES and EVIS types may be processed with the machine. It is not recommended for the processing of endoscopes to be used for surgically invasive procedures.

Figure 1 shows a general view of the Auto-Disinfector 3 with its major parts identified.

**CAUTION:** *THE MICROBICIDAL EFFECTIVENESS OF THIS WASHER/DISINFECTOR DEPENDS ON THE FOLLOWING FACTORS WHICH ARE ENTIRELY OUTSIDE THE CONTROL OF THE MANUFACTURER:*

- (a) *Rigorous manual cleaning of all accessible parts of the endoscope before connection to the machine.*
- (b) *Selection of an appropriate cleansing agent and disinfectant, used in accordance with the manufacturers’ instructions.*
- (c) *The total time allocated to the disinfection cycle.*
- (d) *The microbiological quality of the water used for rinsing.<sup>4</sup>*
- (e) *Frequent and regular disinfection of the machine, including containers and internal pipework.<sup>4</sup>*

Controlled tests, by an independent body<sup>3</sup> have demonstrated that machines of this design can make a significant contribution to endoscope disinfection procedures, but for the above reasons the ultimate responsibility for microbiological effectiveness rests with the user, and routine monitoring of the procedure, machine and processed equipment by the hospital infection control team will still be necessary.

Laboratory tests have shown that following manual cleaning, a gastroscope artificially contaminated with *Pseudomonas aeruginosa* will, if processed in an Auto-Disinfector with 1% neutral detergent and nominally 2% alkaline activated glutaraldehyde, yield a log reduction in bacterial count of 6 or higher, indicating a 99.9999%+ kill from an initial count of 10<sup>6</sup> or higher, using an 80 second disinfectant time. If other cleansing or disinfecting agents are recommended by the Hospital Infection Control Committee, their compatibility with each other, the endoscopes and the machine, and their effectiveness, should first be established.

The Auto-Disinfector 3 has an easy to use machine disinfection cycle, operated from the control panel, offering a user-programmable disinfectant contact time. In independent tests, this has been shown to keep the machine free from micro-organisms when used on a daily, pre-sessional basis.<sup>5</sup>

An additional feature of the Auto-Disinfector 3 is the ability to rapidly fill the machine’s disinfectant container from the original manufacturer’s container whilst minimising the release of disinfectant vapour. This, together with the ability to ‘power drain’ during emptying of the machines containers, can assist in controlling disinfectant vapours in the processing room.

## References:

1. Recent advances in the cleaning and disinfection of fiberscopes. Babb, J.R., Bradley, C.R., Deverill, C.E.A., Ayliffe, G.A.J. and Melikian, V. *Journal of Hospital Infection* (1981) **2**, 329-340.
2. Comparison of automated systems for the cleaning and disinfection of flexible fibreoptic endoscopes. Babb, J.R., Bradley, C.R. and Ayliffe, G.A.J. *Journal of Hospital Infection* (1984) **5**, 213-226.
3. Evaluation de la machine à désinfecter les fibroscopes Olympus (Evaluation of Auto-Disinfector). Bradley, C.R. and Babb, J.R. *Acta Endoscopica* (1987) **17**, **4**, XVII-XXII.
4. The mechanics of endoscope disinfection. Babb, J.R. and Bradley, C.R. *Journal of Hospital Infection* (1991) **18** (Supplement A), 130-135.
5. Machine disinfection validation: An Auto-Disinfector was artificially contaminated with in excess of  $10^9$ /ml *Pseudomonas aeruginosa* (UK disinfectant test strain NCTC 6749) and put through the machine disinfection cycle outlined in this document. Using activated alkaline glutaraldehyde at concentrations between 1.8 and 1.3% and 4 minute disinfectant contact times, a mean  $\log_{10}$  reduction of greater than 6 (99.9999%) test organisms was obtained. Additional validation tests were performed using chlorine releasing agents (NaDCC and NaOCl), with a solution of 1,000ppm available chlorine being flushed through the detergent and rinsing water pipework and container systems using the same test strain and again mean  $\log_{10}$  reductions of greater than 6 were obtained. Full reports on these tests are available on request.

## 2. WARNINGS AND CAUTIONS

**FAILURE TO OBSERVE THESE WARNINGS AND CAUTIONS COULD LEAD TO DAMAGE OR INJURY TO PERSONNEL OR EQUIPMENT, CONTAMINATION OF THE MACHINE OR INCOMPLETE DECONTAMINATION OF THE PROCESSED ENDOSCOPES.**

2.1 **IMPORTANT:** Note that the microbicidal effectiveness of this washer/disinfector depends on the following factors which are outside the control of the manufacturer:

- (a) Rigorous manual cleaning of all accessible parts of the endoscope before connection to the machine.
- (b) Selection of an appropriate cleansing agent and disinfectant, used in accordance with these and the solution manufacturers' instructions.
- (c) The total time allocated to the disinfection cycle.
- (d) The microbiological quality of the water used for rinsing.
- (e) Frequent and regular disinfection of the machine, including containers and internal pipework.

Controlled tests by an independent body have demonstrated that machines of this design can make a significant contribution to endoscopic disinfection procedures, but for the above reasons the ultimate responsibility for microbiological effectiveness rests with the user and the routine monitoring of the procedure, machine and processed equipment by the Hospital Infection Control Team will still be necessary.

2.2 **CAUTION:** TO AVOID MICROBIAL CONTAMINATION OF THE MACHINE ITSELF, A FREQUENT AND REGULAR MACHINE DISINFECTION PROCEDURE MUST BE PERFORMED. IT IS RECOMMENDED THAT MACHINE DISINFECTION SHOULD BE PERFORMED BEFORE EACH DAY'S USE.

DISINFECTANT USED FOR MACHINE DISINFECTION SHOULD BE WITHIN ITS POST-ACTIVATION (WHERE APPROPRIATE) OR USE LIFE (see Section 7.17).

THESE PROCEDURES SHOULD BE ENDORSED BY THE HOSPITAL INFECTION CONTROL COMMITTEE OR EQUIVALENT, WHO SHOULD TAKE INTO ACCOUNT A NUMBER OF FACTORS OUTSIDE THE MANUFACTURER'S CONTROL, INCLUDING:

- (a) THE MICROBIOLOGICAL QUALITY OF THE WATER USED FOR RINSING. SELECTION OF AN APPROPRIATE DISINFECTANT USED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- (b) THE DISINFECTANT CONTACT TIME ALLOCATED DURING THE MACHINE DISINFECTION PROCEDURE.

INSTRUCTIONS FOR MACHINE DISINFECTION ARE GIVEN IN SECTION 6.

2.3 **WARNING:** DO NOT USE THE AUTO-DISINFECTOR 3 WITHIN THE ZONE OF RISK OF ANAESTHETIC EQUIPMENT.

2.4 **CAUTION:** DO NOT BLOCK THE MAIN CHANNEL CONNECTOR (see Figure 3) OR SEVERE INTERNAL DAMAGE MAY OCCUR.

2.5 **CAUTION:** NOTE THAT IF EXCESSIVE FOAMING OF DETERGENT OR DISINFECTANT OCCURS, THE ENDOSCOPE MAY NOT BE FULLY RINSED DURING THE RINSE PART OF THE CYCLE, LEAVING RESIDUAL DISINFECTANT THAT MAY CAUSE HARM TO THE PATIENT OR USER. THE USE OF LOW-FOAMING SOLUTIONS OR THE ADDITION OF AN ANTI-FOAM AGENT IS RECOMMENDED.

2.6 **CAUTION:** ENSURE THAT THE AIR/WATER CHANNEL SYSTEM IS BLOWN THROUGH AND THE SUCTION CHANNEL ASPIRATED BEFORE ANY PROCESSED SCOPE IS REUSED ON PATIENT, TO REMOVE RESIDUAL RINSING WATER (WHICH MAY CONTAIN TRACES OF DISINFECTANT).

2.7 **IMPORTANT:** Olympus and KeyMed consider themselves responsible for the effects of safety, reliability and performance of the Auto-Disinfector 3 only if:

(a) The equipment is used solely for the purpose for which it was designed, that is to clean, disinfect and rinse the external surfaces and internal channels of Olympus OES and EVIS flexible endoscopes.

(b) The equipment is used in accordance with these Instructions for Use.

(c) Adjustments, modifications and repairs are carried out only by persons authorised by Olympus or KeyMed.

(d) The electrical installation of the room where the equipment is to be used complies with the relevant local or national regulations.

2.8 **CAUTION:** ENSURE ANY VENTILATION AND PERSONAL PROTECTIVE EQUIPMENT PRECAUTIONS ADVISED BY THE DISINFECTANT MANUFACTURER ARE OBSERVED.

**IMPORTANT:** Note that in the UK, aldehydes, including glutaraldehyde and formaldehyde, have been identified as 'substances hazardous to health' under the Control of Substances Hazardous to Health (COSHH) Regulations. Aldehydes are known to cause irritancy and sensitisation to the skin, eyes and respiratory tract (occupational asthma, rhinitis, etc.). The COSHH Regulations require the employer to perform an assessment of the effect of the use of such substances on the health of employees and to provide suitable and effective control measures such as local exhaust ventilation and personal protective equipment where necessary.

When using the Auto-Disinfector 3 as instructed, particular attention should be given to reducing exposure levels during the following activities:

- Activating the solution
- Filling the disinfectant container
- Priming the disinfectant circuit
- Removal of the disinfected endoscope
- Draining of the disinfectant container

In case of spillage of disinfectant, staff should be familiar with the 'Spill Procedures' and 'Special Protection Information' given in the 'Safety Data Sheet' for the disinfectant.

2.9 **IMPORTANT:** Note that the use of softened water is recommended if the Auto-Disinfector is to be used in a hard water region, to prevent lime-scale deposits building up in the bores of the internal tubing and connectors. Attention should be paid, however, to maintaining the microbiological quality of the water throughout the water softening process.

- 2.10 **IMPORTANT:** Note that if bronchoscopes are to be processed in the Auto-Disinfector, current recommendations in the UK<sup>1</sup> are that sterile water or water processed through a local bacteria-retaining filter ( 0.45 micron or finer) should be used for rinsing, in order to exclude the possibility of contamination (and subsequent infection) from water-borne micro-organisms. The machine should be disinfected in accordance with the instructions in Section 6 prior to use for disinfecting bronchoscopes.
- 2.11 **CAUTION:** WHEN APPLYING THE BRAKES, ENSURE BOTH BRAKES ARE APPLIED. ALSO, DO NOT ATTEMPT TO PUSH OR MANOEUVRE THE AUTO-DISINFECTOR WITH EITHER OF THE BRAKES APPLIED AS THIS MAY RESULT IN THE BRAKED CASTORS BECOMING LOOSE, LEADING TO A POTENTIALLY HAZARDOUS CONDITION.
- 2.12 **CAUTION:** TAKE EXTREME CARE IF MOVING THE UNIT WITH CONTAINERS FULL OF FLUID.
- 2.13 **IMPORTANT:** It is recommended that the machine is serviced in accordance with the instructions given in Section 13.

**Reference:**

1. British Thoracic Society. Bronchoscopy and infection control. Lancet (1989) **2**, 270-271.

### 3. MACHINE DESCRIPTION

#### 3.1 General

The Auto-Disinfector 3 has been designed to immerse the external surfaces and irrigate the internal channels of Olympus OES and EVIS endoscopes with cleansing, disinfectant and rinsing solutions. It should be noted that the endoscope must be manually cleaned before the scope is connected to the Auto-Disinfector 3.

The Auto-Disinfector 3 consists of the following main parts:

- (a) Three containers to hold detergent, disinfectant and rinsing water respectively, each having its own drain port.
- (b) A moulded tray which holds the scope being cleaned/disinfected.
- (c) An electronic/hydraulic circuit that controls the sequence of channel irrigation, top tray filling and draining, and disinfectant contact time during both endoscope and machine decontamination cycles.
- (d) An eye-level control panel.
- (e) A castor-mounted framework housing the above components.
- (f) A transparent cover for the top tray.

On receipt, the pod housing the control panel will be found packed separately and this will need to be assembled prior to use in accordance with instructions given in Section 4 of these instructions.

The Auto-Disinfector 3 is controlled by an electronic circuit via the control panel. During endoscope decontamination, the circuitry switches pumps and solenoid valves sequentially to enable filling and draining of the tray along with irrigation of the scope's internal channels. This irrigation is performed from the control body of the scope so any incipient blockages near the distal end are flushed out and not drawn further into the scope.

During machine disinfection with glutaraldehyde, the circuit controls the pumps and valves to move detergent, disinfectant and rinsing water sequentially through all fluid pathways, pausing as appropriate to allow the selected contact time for each area.

A cover is provided for the tray to prevent splashing of cleaning and disinfectant solutions during the process and also to help minimise fluid loss through evaporation. This cover should always be in place on the top tray during the cleaning/disinfecting cycle.

The control panel also allows the fluid containers to be drained by the internal pumps, either individually or concurrently. Drainage tubing is supplied so that used fluids can be directed to waste.

The machine has a pre-set cycle for the cleaning and rinsing fluids, the disinfectant contact time being selected by the user. A detailed description of the cycle timings follows.

**NOTE:** *The Auto-Disinfector 3 contains a diaphragm-type irrigation pump that will require regular servicing. An annual service is recommended and a service kit is available.*

**IMPORTANT:** *Whilst the Auto-Disinfector 3 contains much common internal pipework which is disinfected during every cycle, some pipework is used exclusively for detergent or rinsing water and this will need to be disinfected frequently and regularly to ensure there is no proliferation of patient or environment-associated organisms and no 'bio-film' formation. Instructions for machine disinfection are given in Section 6.*



### 3.2 Cycle timings

The total elapsed time for the cycle is 10 minutes plus the time selected for disinfectant contact.

The containers should be filled with:

First container – detergent  
Second container – disinfectant  
Third container – rinsing water

For filling procedure see Section 5.

The complete cycle is as follows:

Detergent fill	48 seconds
Detergent soak/irrigate	1 minute
Detergent drain	1 minute 12 seconds
Disinfectant fill	48 seconds
Disinfectant/soak irrigate	Set by user - see below
Disinfectant drain	1 minute 12 seconds
Rinsing water fill	48 seconds
Rinsing water soak/irrigate	2 minutes 8 seconds
Rinsing water drain/air flush	2 minutes 4 seconds
<b>Total</b>	<b>10 minutes plus disinfectant contact time</b>

The disinfectant soak/irrigate time can be set by the user from 1 min to 9hrs 59 mins in 1 minute steps. The user should set a contact time in conjunction with the Hospital Infection Control Committee or equivalent. National, local or professional guidelines may be available for different endoscope types.

### 3.3 Control panel

The control panel is shown in Figure 2. It is provided with controls to set or clear the required disinfection contact time; a digital display to show the selected disinfection contact time; a countdown timer showing the time remaining to complete the decontamination cycle; controls for endoscope and machine decontamination cycle start, stop and fluid drain from the top tray and containers; and controls for displaying the number of cycles started, this being useful for determining when the various fluids should be changed.

Indicator lamps on the control panel illuminate to show that the power supply is on, that the machine is ready to start a cycle and that the cycle has been interrupted. Further indicators show the progress of the cycle through the detergent, disinfectant, rinsing and air flush stages.

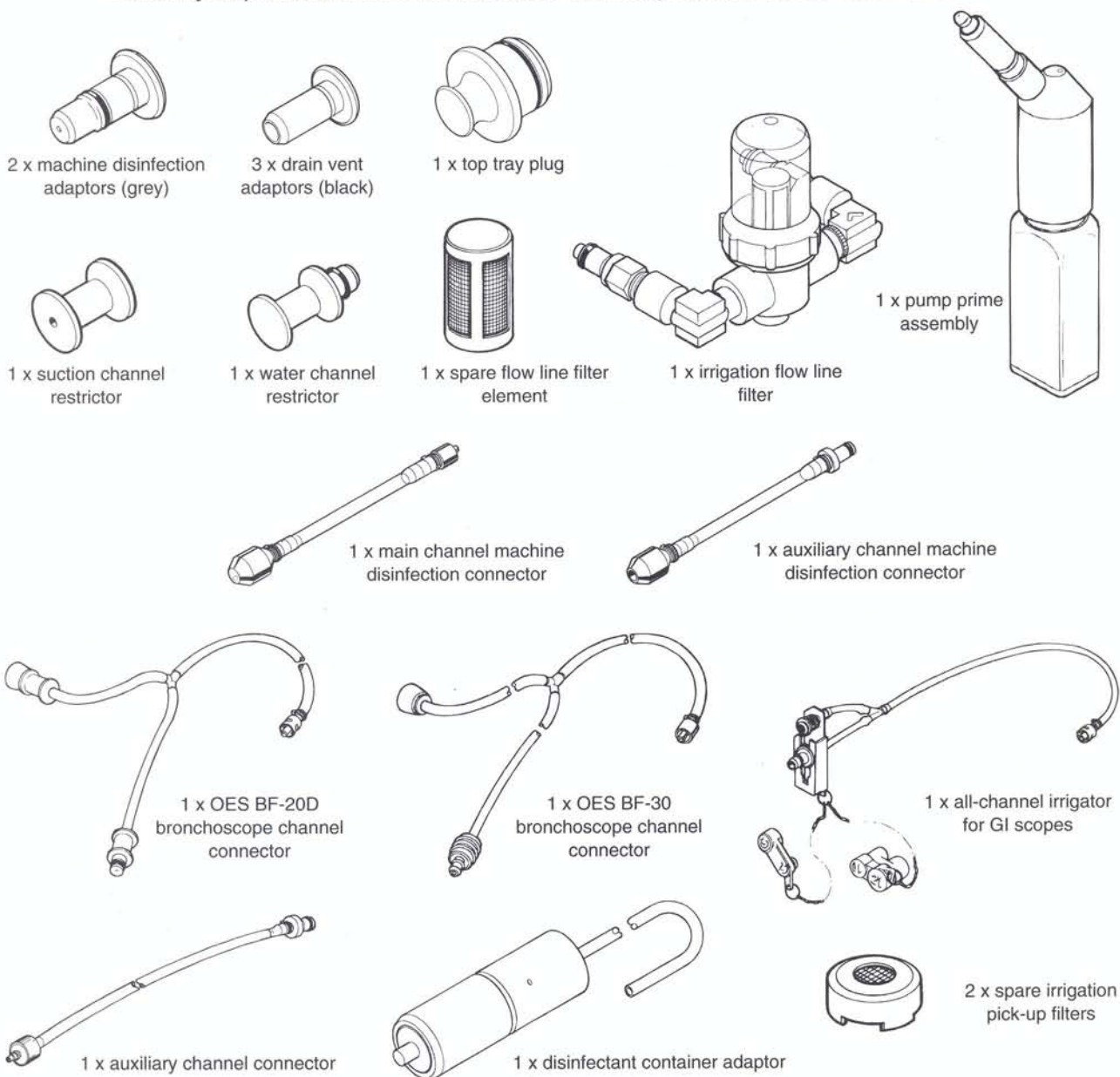
Should the power supply to the Auto-Disinfector 3 be interrupted the machine will, on reconnection to the supply, display a flashing 0:00 on the countdown timer and the 'Cycle Interrupted' indicator will also be lit. The 'Drain' control must then be depressed to reset the electronic circuit and drain any fluid in the tray into the appropriate container before restarting the cycle. This takes approximately one minute.

The message "Proc Int" (procedure interrupted) will then be displayed in the 'Cycle Time Remaining' and 'Disinfection Time' displays to indicate that the previous cycle was not completed.

## 4. ASSEMBLY INSTRUCTIONS

### 4.1 Contents of kit

Carefully unpack all boxes and examine the components. You should have:



plus the following items:

- 1 x main frame assembly
- 1 x control pod
- 2 x M4 socket head screws with washers
- 1 x socket wrench
- 2 x container lids, detergent & rinse water containers
- 1 x container lid, disinfectant container
- 1 x tray cover
- 2 x spare fuses F3.15A (220/240V version)
- 1 x spare fuse F8A (110V version)
- 5 x spare large O-rings for all-channel irrigator
- 5 x spare small O-rings for all-channel irrigator
- 2 x spare O-rings for irrigation flow line connectors
- 3 x self-adhesive label wallets with labels
- 1 x instruction booklet
- 2 x plastic encapsulated instruction cards
- 3 x drain tubes
- 1 x bottle silicone oil

## 4.2 Control pod assembly

**NOTE:** *This part of the assembly requires two people.*

- 4.2.1 Withdraw the flying lead and multi-way connector from the left-hand upright of the main frame assembly. While supporting the control pod in approximately the correct position, with the control pod facing the front of the machine, carefully connect together the two parts of the multi-way connector, the second part being in the bottom of the control pod support arm. Tighten the two captive thumbscrews, finger-tight only.

**CAUTION:** *INCORRECT CONNECTION WILL RESULT IN MALFUNCTION OF THE MACHINE.*

- 4.2.2 Lower the control pod support arm towards the main frame until it fully engages, while at the same time carefully replacing the flying lead in the upright of the main frame.
- 4.2.3 Secure in position with the two M4 socket head screws using the socket wrench provided.

## 4.3 Removal of protective tape

Remove the protective tape from around the castor wheels, or their anti-static effectiveness will be impaired.

## 4.4 Irrigation flow line filter

Connect the irrigation flow line filter to the connectors on the front right-hand side of the machine, underneath the top tray. The connections are a push fit and can be heard to 'click' into place when pushed fully home. **Ensure the filter is connected with the transparent bowl uppermost or increased fluid crossover will result.**

## 4.5 Drain/fill filters

Ensure that there is a drain/fill filter in each of the drain/fill openings in the tray and the three containers, and that they are properly located.

## 4.6 Channel irrigation attachments

- 4.6.1 For OES or EVIS GI scopes the all-channel irrigator should be attached to the main connector in the rear left hand corner of the top tray.

**IMPORTANT:** *Check the condition of the rubber O-rings on the all-channel irrigator and replace if worn or showing signs of deterioration.*

- 4.6.2 For OES or EVIS GI scopes that have an auxiliary water channel, the auxiliary channel connector should be attached to the auxiliary connector in the rear left hand corner of the top tray. If not attached, this connector is automatically closed.
- 4.6.3 For OES bronchoscopes, LF scopes and the Olympus OSF-2 flexible sigmoidoscope, the appropriate channel connector should be attached to the main connector in place of the all-channel irrigator.
- 4.6.4 On EVIS model endoscopes, ensure that the water resistant cap is fitted to the umbilical cord connector.

**NOTE:** *The forceps raiser channel on certain models of endoscope should be irrigated manually using the attachment supplied with the endoscope, following the manufacturer's instructions.*

## 5. PREPARING FOR USE

### 5.1 Connection to power supply

Before connection to the power supply check that:

- (a) The Auto-Disinfector 3 is of the correct voltage rating for the local power supply.
- (b) A power cable plug has been correctly connected to the cable, that is in Europe – brown lead to live connector, blue lead to neutral connector and green/yellow lead to earth connector, and in the USA – black lead to live ('hot') connector, white lead to neutral connector and green lead to earth connector.
- (c) The unit is correctly earthed via the power cable.
- (d) A 5 amp fuse is fitted to the power cable plug where appropriate.
- (e) The unit is fitted with the correct fuse(s) at the rear of the machine. For 220-240V operation 2 x F3.15A or for 110V operation 1 x F8A.

When these checks have been completed the Auto-Disinfector 3 is electrically ready for use and may be connected to the power supply.

### 5.2 Machine disinfection

The machine must be disinfected prior to use, following the instructions given in Section 6, in order to kill any micro-organisms that may have grown in the containers or internal pipework since its last use or during transit/storage. The main and auxiliary channel machine disinfection connectors must be attached, all filters fitted and the top tray lid in place on the top tray during this machine disinfection/rinsing procedure.

### 5.3 Filling procedure

5.3.1 Ensure that the drain tubes and drain vent adaptors are disconnected.

5.3.2 Fill each of the containers to the 'level' mark as follows:

**First container** (left-hand from front labelled "DETERGENT") – a cleaning agent. Most low foaming hospital or domestic liquid neutral or enzymatic solutions are compatible with both Olympus endoscopes and the Auto-Disinfector. Powdered detergents are not recommended. Note that machine validation tests were performed with 1% neutral detergent.

**NOTE:** *It may be found that certain detergents require the addition of an anti-foam agent to prevent excessive foaming during the cycle.*

**CAUTION:** *IF EXCESSIVE FOAMING OCCURS, THE ENDOSCOPE MAY NOT BE FULLY RINSED, LEAVING RESIDUAL DISINFECTANT THAT MAY CAUSE HARM TO THE PATIENT OR USER.*

**Second container** (centre, labelled "DISINFECTANT") – an appropriate disinfectant. The selection of disinfectant is the responsibility of the Infection Control Committee, or equivalent. Note that machine validation tests were performed with a nominal 2% alkaline activated glutaraldehyde. If other disinfectants are recommended by the Infection Control Committee, their compatibility with the detergent used, the endoscopes and the machine, and their effectiveness, should be established. (In the UK, guidelines for appropriate disinfectants are available from the British Society of Gastroenterology and the British Thoracic Society).

A disinfectant container adaptor is supplied which fits most disinfectant manufacturer's containers. Ensure the machine's disinfectant container lid (the one with the cut-out at the rear) is in place, then, after activation, screw the adaptor onto the disinfectant container, remove the top tray plug and invert the container so that the adaptor enters the disinfectant fill port in the top tray (see Figure 3). The disinfectant is then automatically emptied into the machine's disinfectant container. Remove the original container and unscrew the adaptor. Repeat as necessary until the machine's container is full to the 'level' mark (10 litres). Fit the top tray plug into the disinfectant fill port to prevent the release of disinfectant vapour.

**CAUTION:** IF A DISINFECTANT THAT HAS BEEN IDENTIFIED AS BEING A 'SUBSTANCE HAZARDOUS TO HEALTH' (E.G. GLUTARALDEHYDE) IS BEING USED, ENSURE THE VENTILATION AND PERSONAL PROTECTIVE EQUIPMENT PRECAUTIONS ADVISED BY THE DISINFECTANT MANUFACTURER ARE OBSERVED (see Section 2.6).

**Third container** (right-hand from front, labelled "RINSING WATER") – water. The rinsing water should be of a microbiological quality approved by the Infection Control Committee, or equivalent, as being appropriate for the type of instrument being processed. In the UK, sterile or filtered (0.45 micron or finer) water is currently recommended for bronchoscopes.

Note that the use of sterile or filtered water for rinsing will reduce the likelihood of bio-film formation in the internal pipework.

- 5.3.3 Place the remaining lids provided on the detergent and rinsing water containers.
- 5.3.4 **IMPORTANT:** After filling, in order to 'prime' each of the fluid circuits, drain a little fluid from each of the containers using the pump priming assembly.
- 5.3.5 Note that for the detergent and rinsing water containers, these can either be filled via a bucket or by use of a fill tube (available as an accessory), which can, if required, be adapted by the user to fit a local water tap. Pressing the trigger on the fill tube fitting will enable water flow.

**CAUTION:** DO NOT CONNECT THE OPTIONAL FILL TUBE TO THE CONTAINER PORTS IN ORDER TO FILL THE CONTAINERS – THE CONNECTIONS ARE NOT DESIGNED TO OPERATE AT MAINS WATER PRESSURE.

- 5.3.6 **NOTE:** By using the self-adhesive label wallets and labels provided, a note of the date of disinfectant activation can be made and affixed to the disinfectant container, if required.

## 6. MACHINE DISINFECTION INSTRUCTIONS

### 6.1 Introduction

The Auto-Disinfector 3 is equipped with an easy-to-use machine disinfection cycle to minimise the risks associated with machine microbial contamination. It is recommended that machine disinfection should be performed at the start of each day's use. The fill tube (available optionally) should also be disinfected prior to each day's use, as described in Section 6.4.

Two methods of machine disinfection have been validated, one using glutaraldehyde and the other using chlorine. Validation of these machine disinfection cycles has been established by tests performed by an independent test laboratory.

During the first test, activated alkaline glutaraldehyde was the disinfectant used, at concentrations between 1.3 and 1.8%, with a 4 minute contact time in each area of the machine's fluid pathways and containers. During the second test, chlorine releasing agents (NaDCC and NaOCl) were used, with a solution of 1,000ppm available chlorine being flushed through the detergent and rinse water pipework and container systems. Full reports on these tests are available on request. If other disinfectants or contact times are used, these should be evaluated in conjunction with the Hospital Infection Control Committee or equivalent.

**CAUTION:** APPROPRIATE PERSONAL PROTECTIVE PRECAUTIONS SHOULD BE TAKEN WHEN HANDLING DISINFECTANTS, IN ACCORDANCE WITH THE MANUFACTURERS' INSTRUCTIONS.

Patient infection and misdiagnosis<sup>1</sup> have been attributed to inadequate machine disinfection, so it is important that the Auto-Disinfector 3 is disinfected at the start of each day's use, using one of the methods described below:

Note that performing a machine disinfection cycle adds a count of one to the cycle counter display. Note also that 2 sets of plastic encapsulated abbreviated machine disinfection instructions are provided, one for glutaraldehyde and the other for chlorine, complete with chains to enable attachment to the machine.

**IMPORTANT:** The machine disinfection procedure should be endorsed by the hospital infection control committee or equivalent, who should take into account a number of factors outside the manufacturer's control, including:

- (a) the microbiological quality of the water used for rinsing.
- (b) selection of an appropriate disinfectant used in accordance with the manufacturer's instructions.
- (c) the disinfectant contact time allocated during the machine disinfection procedure.

### 6.2 Glutaraldehyde

#### 6.2.1 Preparation

In preparation for this machine disinfection cycle:

- 6.2.1.1 Drain and clean the detergent and rinse water containers. Remove drain tubes.
- 6.2.1.2 Clean and re-attach all filters and fit main and auxiliary channel machine disinfection connectors.

#### Reference:

- 1. Nosocomial infection and pseudoinfection from contaminated endoscopes and bronchoscopes – Wisconsin and Missouri. Morbidity and Mortality Weekly Report (1991), 40, No 39, 675-678.

- 6.2.1.3 If not already filled, fill the disinfectant container with disinfectant (10 litres) and prime the disinfectant circuit.

**NOTE:** Ensure the disinfectant being used is within its post activation life (where appropriate) or use life (see Section 7.17).

- 6.2.1.4 Fit the two machine disinfection adaptors (grey) to the DETERGENT and RINSING WATER drain ports.

## 6.2.2 Running the cycle

- 6.2.2.1 Switch on the power to the machine.

- 6.2.2.2 The display will show either 'Ready' or 'Cycle interrupted'. If the latter, press 'Drain Tray' to reset the machine to the 'Ready' but 'Proc int' condition.

**IMPORTANT:** Ensure the top tray lid is in position on the top tray to prevent splashing of disinfectant during the machine disinfection cycle.

- 6.2.2.3 To enable machine disinfection, press the 'Self dis' switch. The seven-segment displays should now read 'Self dis'.

- 6.2.2.4 The disinfectant contact time for machine disinfection may now be set by using the 'Clear', 'Mins' and 'Hrs' buttons as for a normal cycle. The machine will hold the last-set time in memory and displays this when entering the machine disinfection cycle, or will display a 'default' time of 4 minutes.

This contact time will be applied to disinfectant contact with the internal pipework, water container, top tray and detergent container.

- 6.2.2.5 Press 'Run' to confirm that the machine disinfection cycle should start.

The 'Cycle Time Remaining' display will show the time for completion of the cycle, which will be 30 minutes when a 4 minute contact time is set. The 'Time Set' display will flash the message 'dis' to remind the user that the machine disinfection cycle is in progress.

Note that the 'Stop' and 'Run' switches operate normally during this cycle.

- 6.2.2.6 The machine will now automatically disinfect the machine by following this sequence:

- Pump disinfectant to the internal pipework (some disinfectant will be seen in the detergent and water containers). Note that some increase in noise level will be heard during this part of the cycle.
- Pause for disinfectant contact time.
- Pump disinfectant to water container.
- Pause for disinfectant contact time.
- Pump disinfectant to top tray.
- Pause for disinfectant contact time (channel irrigation pump will operate).

At this point, a buzzer will give an intermittently repeated audible signal that 10 litres of water should be added to the rinse water container. This water may be added at any time whilst the buzzer continues to sound intermittently.

Once the water has been added to the rinse water container, prime the water circuit, then press 'Run' again and the buzzer will stop. The machine disinfection cycle will continue as follows:

- Pump disinfectant to detergent container.
- Pause for disinfectant contact time.
- Pump disinfectant to disinfectant container.

At this point, if water has not yet been added to the rinse water container nor the 'Run' switch pressed, the machine will stop and the seven-segment displays will flash the message 'FILL rin'.

Subsequent filling of the water container and pressing 'Run' will enable the machine to continue, as follows:

- Pump water to top tray.  
Channel irrigation pump will operate.
- Pump water to detergent container.

Note that during this cycle, the cycle stage indicators illuminate in a particular sequence, showing, in binary code, which part of the cycle is in progress. During normal use this can be ignored, but it may be useful during servicing.

6.2.2.7 The machine disinfection cycle is now complete, and the machine returns to the 'Ready' or 'Proc int' condition.

6.2.2.8 Note that the top tray plug is not fully immersed in disinfectant during the machine disinfection cycle. This should be cleaned separately, after the cycle is complete, by wiping with an alcohol-impregnated wipe.

### 6.2.3 Preparation for re-use

6.2.3.1 Remove the machine disinfection adaptors and connectors from the drain ports and top tray respectively.

6.2.3.2 The used water can now be drained from the detergent container and discarded.

6.2.3.3 Note that the seven-segment displays show '0:00' and blank. To make the machine ready for normal use, press 'Stop'.

The 'Time Set' display will now recall the last disinfectant contact time set for endoscope decontamination and the 'Ready' light will be on.

6.2.3.4 Fill the detergent and rinse water containers with 10 litres of detergent and rinse water respectively in accordance with Section 5.3. Ensure the disinfectant is still within its post-activation (where appropriate) or use life (see Section 7.17) before re-using.

## 6.3 Chlorine

### 6.3.1 Preparation

In preparation for this machine disinfection cycle:

6.3.1.1 Drain and clean the detergent and rinsing water containers. Remove drain tubes.

6.3.1.2 Clean and re-attach all filters and fit main and auxiliary channel machine disinfection connectors.



- 6.3.1.3 Fill the detergent and rinsing water containers with water (10 litres) and add sodium dichloro-isocyanurate (NaDCC) or sodium hypochlorite (bleach, NaOCl) to make a solution of 1,000ppm available chlorine.
- 6.3.1.4 Fit the two machine disinfection adaptors (grey) to the DETERGENT and RINSING WATER drain ports.
- 6.3.1.5 Note that the disinfectant used for endoscope decontamination may be left in the centre container.

### 6.3.2 Running the cycle

- 6.3.2.1 Switch on the power to the machine.
- 6.3.2.2 The display will show either 'Ready' or 'Cycle interrupted'. If the latter, press 'Drain Tray' to reset the machine to the 'Ready' but 'Proc int' condition.
- 6.3.2.3 Depress the 'Clear' switch to set the disinfectant contact time to zero.  
***IMPORTANT:** Ensure the top tray lid is in position on the top tray to prevent splashing of disinfectant during the machine disinfection cycle.*
- 6.3.2.4 To start machine disinfection, depress the 'Run' switch. The machine now commences a 'two fluid' cycle, sequentially filling the top tray from the detergent container, pausing for 1 minute and draining back into the container, then repeating with the solution from the rinsing water container, but pausing for 2 minutes and 8 seconds before draining.
- 6.3.2.5 The total time for this cycle is 8 minutes. The disinfection cycle is now complete, and the machine returns to the 'Ready' or 'Proc int' condition.

### 6.3.3 Rinsing

- 6.3.3.1 Remove the machine disinfection adaptors from the drain ports.
- 6.3.3.2 Drain the used chlorine solution from the detergent and rinsing water containers.
- 6.3.3.3 Refill the detergent and rinsing water containers with 10 litres of water.
- 6.3.3.4 Refit the machine disinfection adaptors to the detergent and rinsing water drain ports.
- 6.3.3.5 Depress 'Run' to repeat the above 8 minute cycle, to rinse the detergent and rinsing water pipework and container systems.
- 6.3.3.6 The machine returns to the 'Ready' or 'Proc int' condition.

### 6.3.4 Preparation for re-use

- 6.3.4.1 Remove the machine disinfection adaptors and connectors from the drain ports and top tray respectively.
- 6.3.4.2 Drain the used rinsing water from the detergent and rinsing water containers.
- 6.3.4.3 Depress 'Clear' and reset the disinfectant contact time required for endoscope decontamination.
- 6.3.4.4 Fill the detergent and rinsing water containers with 10 litres of detergent and rinse water respectively in accordance with Section 5.3.
- 6.3.4.5 If necessary, fill the disinfectant container with 10 litres of disinfectant in accordance with Section 5.3.

6.3.4.6 Note that the top tray plug is not fully immersed in disinfectant during machine disinfection. This should be cleaned separately, after the cycle is complete, by wiping with an alcohol impregnated wipe.

#### 6.4 Disinfection of fill tube (available optionally)

- 6.4.1 Remove the fill tube from the tap and insert the tap connector end of the fill tube into the disinfectant fill port.
- 6.4.2 Insert the nozzle end of the fill tube into the disinfectant drain connector – push in until it is heard to ‘click’ into place.
- 6.4.3 With the machine in the ‘Ready’ condition, depress ‘Power Drain’. The display will show ‘Pdrn drn’. Depress the ‘Dis’ switch. This causes the disinfectant to circulate through the fill tube. The power drain pump will stop automatically after approximately 2<sup>1</sup>/<sub>2</sub> minutes.
- 6.4.4 Remove the nozzle end of the fill tube from the drain connector by pressing the silver button at the top of the drain port fitting.

***CAUTION: THE FILL TUBE WILL CONTAIN DISINFECTANT – TAKE EXTREME CARE. DO NOT DEPRESS THE NOZZLE TRIGGER UNLESS IT IS HIGHER THAN THE DISINFECTANT FILL PORT.***

- 6.4.5 To drain the residual disinfectant back into the disinfectant container, hold the fill tube nozzle in the air, higher than the disinfectant fill port and higher than every other part of the fill tube, then press the nozzle trigger. Keeping the nozzle highest, raise all parts of the fill tube in turn so they are higher than the disinfectant fill port, thus draining all residual disinfectant into the disinfectant container. Release the nozzle trigger.
- 6.4.6 Remove the tap connector end from the disinfectant fill port and reattach to the tap.
- 6.4.7 Direct to waste and press the nozzle trigger to rinse the fill tube with fresh tap water. The fill tube is now ready for re-use.

## 7. INSTRUCTIONS FOR USE

- 7.1 Prepare the endoscope for total immersion according to the instructions given in the scope's instruction manual.

**IMPORTANT:** Ensure that the endoscope has been cleaned manually in accordance with the instructions supplied with the endoscope. In particular the 'blue' air/water channel cleaning adaptor should be used to flush through the air and water channels (GI scopes), the scope should be wiped down externally, and the suction/ biopsy channels sucked through and brushed to remove gross debris prior to connection to the Auto-Disinfector.

**IMPORTANT:** Ensure the endoscope has been leak-tested in accordance with its instructions for use before immersion.

**IMPORTANT:** Prior to each day's use, perform a machine disinfection cycle in accordance with instructions given in Section 6.

- 7.2 Remove the lid from the tray and place in its storage position, supported vertically at the right-hand end of the machine.

**IMPORTANT:** Ensure the top tray plug is in place before using the machine.

- 7.3 Place the endoscope in the tray as shown in Figure 4.

**IMPORTANT:** Only Olympus OES fiberscopes and EVIS video endoscopes may be connected to this machine.

**CAUTION:** ENSURE THE ETO VENTING CAP IS REMOVED FROM THE LIGHT GUIDE PLUG BEFORE CONNECTING TO THE AUTO-DISINFECTOR, OTHERWISE INTERNAL FLOODING OF THE ENDOSCOPE WILL OCCUR.

Attach the appropriate irrigation connector(s) as follows:

For OES GI scopes, attach the two channel restrictors, one to the suction port and the other to the water bottle connector of the light guide connector (see Figure 5a). Check the condition of the O-rings and the all-channel irrigator and replace if worn or damaged. Attach the all-channel irrigator to the scope. (See Figure 5b).

For OSF-2, LF or BF scopes, use the appropriate channel connector, (as shown in Figures 5d to 5j). Note that the side arm restrictor should not be attached when processing a BF-3C20.

For EVIS-1/10 scopes, the all-channel irrigator and suction port channel restrictor provided should be used, together with the optionally available water bottle connector/air nozzle channel restrictor set. The water resistant cap must be fitted to the umbilical cord connector. (See Figures 5l and 5m).

For EVIS-100/200 scopes, use the all-channel irrigator, suction port channel restrictor and water bottle connector channel restrictor provided. The water resistant cap must be fitted to the umbilical cord connector. (See Figures 5k to 5m).

For OES and EVIS GI scopes with an auxiliary channel, use also the auxiliary channel connector (as shown in figure 5c). When not being used, the auxiliary channel connector should be disconnected, automatically blocking the flow from the connector.

For OES and EVIS GI scopes with a forceps raiser channel, this channel should be irrigated manually with detergent, disinfectant and rinsing water, then flushed with air in accordance with the manufacturer's instructions, before running a cycle on the Auto-Disinfector 3.

- 7.4 After manual cleaning, the endoscope pistons and valves may be placed in the small accessory recess in the centre island of the tray.

**IMPORTANT:** Ensure the irrigation pick-up filter is fitted to the tray and in clean condition or the irrigation circuit may become blocked.

**IMPORTANT:** Ensure the irrigation flow line filter is correctly fitted (transparent bowl uppermost), otherwise endoscope channel irrigation will not take place.

- 7.5 Place the cover over the top tray.

- 7.6 Switch on the power supply by means of the switch at the left hand side of the machine behind the control pod upright. The integral indicator light should illuminate. The 'ON' position is shown as I and the 'OFF' as O.

On the control panel, the 'Power On' and 'Ready' indicators will illuminate along with the 'Cycle Time Remaining' display, which will read 0:00, and the 'Time Set' display, which will read the last endoscope disinfection contact time set. Alternatively, if the last cycle was interrupted, the display will show 'Proc int' to indicate that the last cycle was not completed.

- 7.7 If a new disinfectant contact time is required, depress the 'Clear' switch to erase the previously set time, then use the 'Hrs' and 'Mins' controls to set the required disinfection time. Each part of the display will count up from zero in 1 hour or 1 minute steps, as appropriate.
- 7.8 Depress the 'Run' switch and the machine will start the selected cycle, with the 'Cycle Time Remaining' display starting at the total of the 10 minutes pre-set cycle time plus the selected disinfection time, this display reading in hours and minutes.

**NOTE:** Olympus EVIS scopes should not be immersed in disinfectant for longer than one hour, in accordance with their Instructions for Use.

The machine will now automatically go through the selected cycle as described in Section 3.2.

**CAUTION: DO NOT BLOCK THE MAIN CHANNEL CONNECTOR (see Figure 3) OR SEVERE INTERNAL DAMAGE MAY RESULT.**

- 7.9 The 'Display Counter' control allows the 'Disinfection Time' display to show the cumulative number of cycles the machine has performed since it was last reset.

To display this information depress the 'Display Counter' switch. To reset, depress both 'Display Counter' and 'Reset Counter' switches simultaneously.

- 7.10 If it is required to stop the machine midway through a cycle, depress the 'Stop' switch; the 'Cycle Interrupted' indicator will illuminate. To restart, depress the 'Run' switch.
- 7.11 If required, after stopping the machine by depressing the 'Stop' switch, the contents of the top tray can be drained back into the appropriate container by depressing the 'Drain Tray' switch. The drain operation lasts approximately one minute, after which the machine resets itself to the start of a new cycle with the 'Cycle Time Remaining' display showing 'Proc int' (procedure interrupted).

**IMPORTANT:** If the Auto-Disinfector 3 has been stopped in mid-cycle and the fluid drained from the tray, do not use the endoscope on-patient until it has undergone a further complete cycle.

- 7.12 In the event of a power supply failure the cycle will be terminated. When power resumes, the 'Cycle Time Remaining' display will show 0.00 and flash continuously. The yellow 'Cycle Interrupted' LED will illuminate. The 'Run' switch is disabled so that a new cycle cannot be initiated. The 'Drain' switch must first be depressed to reset the electronic circuit and open the current solenoid valve to drain any liquid in the top tray into the appropriate container.

This operation takes approximately one minute, after which the machine will return to its starting condition, showing 'Proc int' in the displays.

**IMPORTANT:** *The endoscope should not be used on-patient until it has undergone a further complete cycle.*

- 7.13 On completion of the selected cycle, an audible signal will sound for approximately 3 seconds. Disconnect and remove the endoscope from the machine and dry it thoroughly, replacing the valves and pistons as appropriate. Before re-use, blow through the air and water channels using the air pump in the light source or maintenance unit to expel any residual rinsing water. On GI scopes with separate auxiliary water channels (i.e. GIF-1T10, GIF-2T10, GIF-1T20, GIF-1TV10, GIF-1T100, GIF-2T100 and GIF-2T200) the auxiliary water channel will need to be flushed with air to remove residual rinsing water. Also ensure the suction channel is aspirated before reusing the scope on patient.
- 7.14 To empty a container of its contents, attach a drain hose to the appropriate drain port(s) and direct to waste.

With the machine in either the 'Ready' or 'Proc int' condition, depress 'Power Drain', the display will show 'Pdrn drn'. Each drain pump is now controlled independently by the 'Det', 'Dis' and 'Rinse' switches under the 'Disinfection Time' display. Depress the appropriate switch(es) to drain the selected container(s). The power drain function is automatically time controlled, stopping after 2<sup>1</sup>/<sub>2</sub> minutes. Depress 'STOP' to return the machine to normal operation.

**CAUTION:** *THE DRAIN TUBES WILL CONTAIN FLUID – TAKE EXTREME CARE.*

To drain residual fluid from the drain tubes, remove the drain tube connector from the drain port and hold it in the air, higher than the other end of the tube, and depress the button in the end of the connector. Keeping the connector highest, raise all parts of the drain tube in turn so they are higher than the other end of the tube, thus draining all residual fluid to waste. Release the button on the connector.

- 7.15 **CAUTION:** *CHANGE THE RINSING WATER REGULARLY TO MINIMISE CONTAMINATION WITH DISINFECTANT, WHICH MAY RESULT IN IRRITANCY TO THE PATIENT OR ENDOSCOPE USER. IT IS RECOMMENDED THAT THIS SHOULD BE CHANGED AT LEAST ONCE EVERY FIVE CYCLES.*
- 7.16 It is recommended that detergent solution should also be changed regularly, **AT LEAST** once every five cycles. With all automatic washing machines, a small amount of disinfectant dilution occurs so disinfectant should be changed regularly. Tests by an independent body have shown that if 2% glutaraldehyde is used, each processing cycle of the Auto-Disinfector results in a small decrease in disinfectant concentration due to dilution by fluid carry-over from the detergent container. It is therefore recommended that the disinfectant is changed after processing a maximum of 30 scopes, when the concentration of nominal 2% glutaraldehyde may have fallen to approximately 1.5%. In addition, ensure that the disinfectant's recommended post-activation life is not exceeded.

Some glutaraldehyde manufacturers are unable to support their labelling claims for anti-microbial activity below 1.5% concentration<sup>1</sup>. For other disinfectant types, refer to the solution manufacturers in liaison with the Hospital Infection Control Committee or equivalent.

- 7.18 Overnight, ensure the detergent and rinsing water containers are drained and wiped dry and the drain vent adaptors connected, to help dry the internal fluid pathways – the dryer the internal pipework, the less microbial growth from any residual organisms from the water used for mixing detergent and rinsing.

**Reference:**

1. Question and answer. Babb, J.R., Bradley, C.R. and Barnes, A.R.  
Journal of Hospital Infection (1992) **20**, 51-54.

## 8. EQUIPMENT CARE

- 8.1 **CAUTION:** TO AVOID MICROBIAL CONTAMINATION OF THE MACHINE ITSELF, A FREQUENT AND REGULAR MACHINE DISINFECTION PROCEDURE MUST BE PERFORMED. IT IS RECOMMENDED THAT MACHINE DISINFECTION SHOULD BE PERFORMED AT THE START OF EACH DAY'S USE, FOLLOWING THE INSTRUCTIONS GIVEN IN SECTION 6.

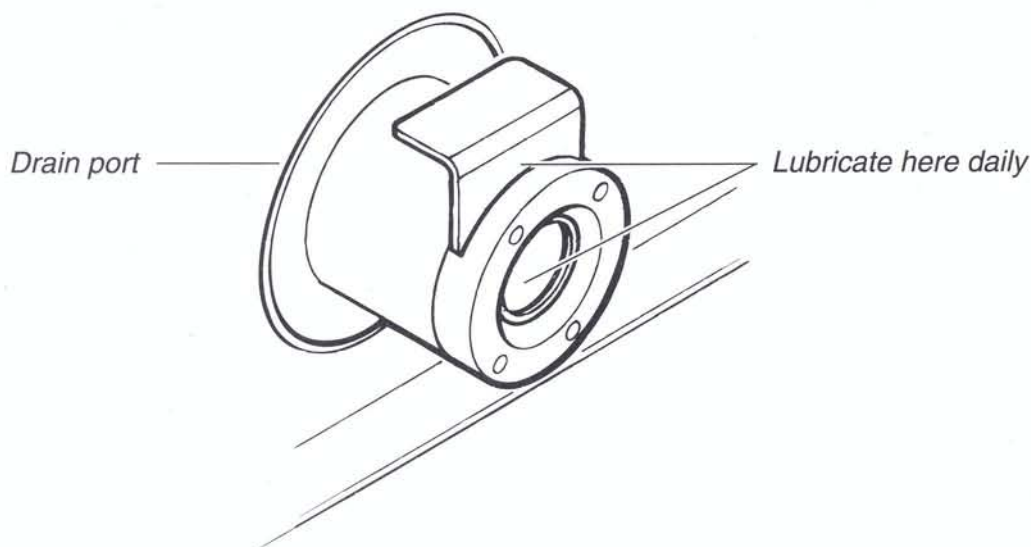
DISINFECTANT USED FOR MACHINE DISINFECTION SHOULD BE WITHIN ITS POST-ACTIVATION (WHERE APPROPRIATE) OR USE LIFE (see Section 7.17).

THIS PROCEDURE SHOULD BE ENDORSED BY THE HOSPITAL INFECTION CONTROL COMMITTEE OR EQUIVALENT, WHO SHOULD TAKE INTO ACCOUNT A NUMBER OF FACTORS OUTSIDE THE MANUFACTURER'S CONTROL, INCLUDING:

- (a) THE MICROBIOLOGICAL QUALITY OF THE WATER USED FOR RINSING.
  - (b) SELECTION OF AN APPROPRIATE DISINFECTANT USED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
  - (c) THE DISINFECTANT CONTACT TIME ALLOCATED DURING THE MACHINE DISINFECTION PROCEDURE.
- 8.2 Overnight, the detergent and rinsing water containers should be drained and dried, and the drain vent adaptors (black) connected.
- 8.3 Always ensure that the tray, tray cover, containers and container lids are cleaned and dried immediately after use.
- 8.4 Clean and dry the drain/fill filters, tray irrigation pick-up filter, channel restrictors and fluid containers daily.
- 8.5 Check the condition of the rubber O-rings on the all-channel irrigator daily. Replace if worn or showing signs of deterioration. Lubricate these O-rings daily with the silicone oil supplied (also supplied with OES and EVIS endoscopes).

**CAUTION:** NOTE THAT ENDOSCOPE CHANNEL IRRIGATION MAY NOT OCCUR IF THESE O-RINGS ARE NOT IN GOOD CONDITION.

- 8.6 Lubricate all three drain port retaining clips daily, as shown below, with silicone oil supplied (also supplied with OES and EVIS endoscopes).



- 8.7 Clean the irrigation flow line filter body and element daily. Remove the filter assembly by pressing the two silver buttons on the top of the filter connections. The connections are spring-loaded and will release the filter assembly once pressed. The filter can then be taken to a sink for further disassembly. Unscrew the transparent bowl anti-clockwise from the body and pull out the filter element. All components can then be washed under running water before reassembling in the reverse order.

On reassembly, ensure that the filter element is correctly located within the filter body and that the filter assembly is connected to the machine in the correct orientation, with the transparent bowl uppermost.

- 8.8 Keep the casing of the control pod, top tray, container covers and framework clean by regular wiping with a soft, lightly dampened cloth or a 70% alcohol impregnated wipe. Proprietary polishes may also be used sparingly.
- 8.9 A removable drip tray is provided under the drain ports, to allow easy cleaning. Similarly, a splash tray under the containers may be slid out from the rear of the machine to allow cleaning.
- 8.10 For transportation, always remove the flow-line filter and control pod/support arm, and pack separately.

Avoid contact of the castor rubbers with oil and avoid a build-up of floor cleaning wax and polish because these will impair the anti-static effectiveness.

- 8.12 **IMPORTANT:** *The Auto-Disinfector 3 contains a diaphragm-type irrigation pump that will require regular servicing to ensure performance to manufacturer's specification is maintained. Such a preventive maintenance service can be performed annually by your local Olympus-KeyMed dealer or by hospital electro-medical engineering staff if the service instructions contained in Section 13 are followed.*
- 8.13 **IMPORTANT:** *The use of water of poor microbiological quality and/or insufficiently frequent machine disinfection may result in the formation of a bio-film in the detergent and rinse water system internal tubing. Regular inspection should be performed in accordance with the preventive maintenance instructions in Section 13.*



## 9. REPLACEMENT PARTS AND ACCESSORIES

Item	Part No.
Tray cover	7271701
Container lid (Detergent/Rinse water)	7271727
Container lid (Disinfectant)	7329059
Drain port drip tray	7321961
Container splash tray	7321953
All-channel irrigator MD-538	7321414
Auxiliary channel connector assembly	7301294
OES BF-30 bronchoscope channel connector	7321601
Drain tube	7329032
Top tray plug	7329229
Disinfectant container adaptor	7271875
OES BF-20D bronchoscope channel connector	7321325
Drain/fill filter	7302703
Irrigation pick-up filter (with retaining clip)	7340231
Suction port channel restrictor (OES and EVIS scopes)	7301545
Water bottle connector channel restrictor (OES scopes)	7301375
Replacement O-ring for all-channel irrigator, large (pack of 10)	7006691
Replacement O-ring for all-channel irrigator, small (pack of 10)	7006641
Replacement O-ring for irrigation flow line filter connectors	3040321
Replacement O-ring for irrigation flow line filter bowl	3040330
Replacement element for irrigation flow line filter	3002900
Replacement irrigation filter assembly (complete with connectors)	7321147
Irrigation pump service kit	7321376
Pump prime assembly	7329377
Drain vent adaptor (black)	7329393
Machine disinfection adaptor (grey)	7329423
Main channel machine disinfection connector	7328991
Auxiliary channel machine disinfection connector	7329008
Bottle of silicone oil	1053591
Fuse 110V operation F8A (pack of five)	7332254
Fuse 220-240V operation F3.15A (pack of five)	7332246
Fill tube (available optionally)	7329521
Olympus OSF-2 channel connector (available optionally)	7302738
OES BF-2T10 bronchoscope channel connector (available optionally)	7321392
OES-10 bronchoscope channel connector (available optionally)	7302452
OES-20 bronchoscope/LF-2 channel connector (available optionally)	7302827
LF-1 channel connector (available optionally)	7074310
Water bottle connector/air nozzle channel restrictor set (EVIS-1/10 scopes, available optionally)	7302509
Self adhesive label wallet	3098702
Maintenance and Repair Manual	5055831
Plastic encapsulated instruction card and chain – glutaraldehyde	7329458
Plastic encapsulated instruction card and chain – chlorine (NaDCC)	7329466

**NOTE:** For other replacement parts refer to the *Auto-Disinfector 3 Maintenance and Repair Manual*, available from your Olympus-KeyMed dealer.



## 10. SPECIFICATION

Product title:	Olympus-KeyMed Auto-Disinfector 3
Place of manufacture:	Made in UK by KeyMed (Medical & Industrial Equipment) Ltd
Dimensions:	965mm (38") L x 570mm (22 <sup>1</sup> / <sub>2</sub> ") D x 950mm (37 <sup>1</sup> / <sub>2</sub> ") H (to tray) 1370mm (54") H (to pod)
Weight (dry):	75kg (165lb)
Power supply:	Versions available: 110V~, 50/60Hz - part number 7321902 220-240V~, 50Hz - part number 7321899
Power consumption:	220-240V – 450VA, 110V – 720VA
Container capacity:	3 x 10 litres
Cycle time:	10 minutes plus selected disinfection contact time.
Maximum disinfectant contact time:	9 hours 59 minutes
Castors:	5" anti-static, two with brakes (diagonally opposite corners)
Electrical safety:	220-240V version: Designed in conformance with the requirements of BS 5724 pt. 1/IEC 601.1/VDE0750 pt. 1/MedGV.  (a) Type of protection against electric shock: Class 1  (b) Degree of protection against electrical shock: Type B. The unit is marked with the symbol  to indicate that it provides an adequate degree of protection against electrical shock, particularly regarding the allowable leakage currents and the reliability of the protective earth connection.  (c) Degree of protection against liquids: Drip proof. The unit is marked IPX1 to indicate that it is provided with an enclosure that prevents entry of such an amount of falling liquid which might interfere with its satisfactory and safe operation.  (d) Power switch marking I - ON O - OFF  (e) Mode of operation: Continuous  (f) Earth leakage current: less than 0.5mA normal condition less than 1.0mA single fault condition
Electrical safety:	110V version: Designed in conformance with UL 544.  The symbol  on the product indicates it is Listed by Underwriters Laboratories Inc.  (a) Earth leakage current: less than 0.5mA

Olympus and KeyMed reserve the right to alter the above specification without notice.

## 11. TECHNICAL DESCRIPTION

11.1 The main electronic assemblies, electro-mechanical and hydraulic components are located as follows:

Item	Location	Comprises
Pod	Above tray, locating in frame upright.	Control Panel CPU Board Assembly
Tray	Above frame	Drain/Fill Filter Irrigation Pick-up Filter
Power board	Under tray, rear left-hand side from front	On/off Switch Fuses Power Board Assembly
Irrigation pump	Under tray, rear right-hand side from front	Pump P5 Irrigation Flow Line Filter
Containers x 3	Above lower tier of frame	Drain/Fill Filter x 3
Skirt and cover	Under lower tier of frame	Pumps P1, P2, P3 and P4 Drain Ports Solenoid Valves Manifold

### 11.2 Electrical circuit

#### 11.2.1 Introduction

The control circuit is built on two printed circuit boards:

1. CPU board
2. Power board

The operation of these is described below and a block diagram is shown in Figure 6. Also given is a table showing which pumps and valves are operational at various times during the cycle.

#### 11.2.2 CPU board

This contains all components used to control the selected cycle. The circuit is based around a Z80 microprocessor and is configured as follows:

The Z80 has an 8 bit bi-directional data bus which enables it to communicate with:

RAM  
ROM  
Display Controller  
Control Panel Scan Circuitry  
Mode Select Circuit  
Counter/Timer Circuit Buzzer  
Cycle Status LEDs  
Relay Driver Port /Status LEDs

These devices are selected by the Z80's address bus and their operating modes selected by the Z80's control bus.

A non-maskable interrupt line connects a power-fail detector to the Z80.

The data lines, address lines, control lines and interrupt line are pulled up to +5V via 10K resistors.

A 'watchdog' circuit monitors the activity of the Z80 to ensure it is running correctly. If the watchdog does not receive a regular signal from the Z80 at any time when the unit is powered up and set in normal operating mode, indicating correct operation, the watchdog resets the Z80 and indicates that the cycle has been interrupted on the control panel.

A clock circuit generates two signals – one at 4MHz for the Z80 and the other at 62.5KHz for the counter/timer circuit.

The power-fail detector circuit compares the input voltage with an internally generated reference voltage. If the input voltage falls below a pre-set level, the 'cycle interrupt' LED illuminates on the control panel. Once activated, the power-fail circuit must receive a 'power off' then 'power on' sequence before the unit can recommence operation.

A battery back-up circuit is used to ensure the last operating mode is retained in RAM should the power be interrupted.

A switching regulator circuit, using a pulse width modulation technique, converts the incoming +15V DC to +5V DC for the logic ICs. The switching ratio automatically adjusts to maintain a close tolerance on the output for a relatively wide range of input voltages.

'Soft-start' circuitry is included to limit any surge currents that might otherwise damage components.

The RAM is configured as a 2,048 word x 8 bit device, with 11 address inputs, 8 data lines and chip select, output enable and write enable pins, together with appropriate power connections.

The ROM is a 16,384 word x 8 bit ultraviolet erasable CMOS device. This holds the cycle program, constants and translation tables needed to run the machine.

The device decoder circuit comprises a 3 to 8 decoder with OR and NOR gate outputs. The Z80 addresses the decoder with a coded 'in-out request', causing one of the eight outputs to go low, depending on the code, activating the appropriate peripheral IC via either the OR or NOR gate.

The display control circuit consists of a display controller, digit drive and segment select/drive. The digit driver uses a 7 bit code to create the display, the segment selector supplying the base current for the appropriate transistor associated with each seven segment display. The display itself is multiplexed, only one display digit being energised at a time, but being energised consecutively at a sufficiently high speed to eliminate observable flicker.

The control panel switches are arranged in a 3 x 3 matrix. The circuit periodically monitors each of the columns in turn and, if a switch is pressed, a signal is output and a code unique to the switch is fed to the Z80.

The counter/timer circuit uses two integral counters to provide 20 millisecond and 0.5 second pulses. Counter 1 (20 millisecond) is used for control panel scanning, display refresh and other circuit monitoring. Counter 2 (0.5 second) is used to control the timing of the various cycle events. The output of the first counter is input to the second, so when counter 1 decrements to zero, counter 2 decrements one count. The output of both counters is monitored by the Z80 and when either counter reaches zero, it is automatically reloaded with its preset value to enable the cycle to continue.

At appropriate times in each cycle, a code is sent to the buzzer circuit, activating the buzzer for a preset time.

The cycle status LEDs are controlled via an 8 bit latch which is signalled by the Z80 at the appropriate times in the cycle.

Similarly, the relays (situated on the power board) are controlled via two 8 bit latches, the first of which is addressed by an 8 bit code from the Z80. The second IC buffers the output of the first to enable the appropriate relay(s) to be switched on or off. As a test feature, each relay has an associated LED on the CPU board (not visible to the operator) which mirrors the state of the relays. This enables the CPU board to be tested without being connected to a unit.

The mode selector circuit monitors the positions of the dual in-line (DIL) switch and the Z80 runs the program appropriate to the switch positions. For normal operation, all the switches should be in the 'on' position. Other switch positions enable various board tests to be performed (detailed in the Maintenance and Repair Manual), the main one being an automatic feature check.

To perform this check, set DIL switch segment 1 to 'off' and supply power to the board (15V to test point 3; OV to test point 4). The 'power on' LED should illuminate. If the display reads 'Err 1' or 'Err 2', the board is faulty and should be replaced. If no error messages show, the board will run through a series of interactive tests, as follows:

- (a) The unit description, software version no. and date will each be displayed for approximately 3 seconds. Check that the version no. and date are the same as printed on the label on IC6.
- (b) A figure '8' will be shown consecutively in each display. Check that only one operates at once and that each of the display segments is operating.
- (c) All displays will then simultaneously illuminate each of the display segments in turn. Check that only one segment per display is illuminated at once and that all display segments are operating.
- (d) The display will then count time up from "tinE 0" to "tinE 9" in approximately 1 second intervals. Check the timing and that the counting is sequential.
- (e) Each of the status LEDs is then illuminated in turn. Check that they all illuminate in the following order:
  - Ready
  - Cycle interrupted
  - Detergent
  - Disinfectant
  - Rinse
  - Air
  - Disinfectant time colon
  - Cycle time colon
- (f) Signals will then be sent to each of the relays in turn. Check that the relay monitor LEDs illuminate in the following order:
  - Pump 1
  - Pump 2
  - Pump 3
  - Valve 1
  - Valve 2
  - Valve 3
  - Drain pump
  - Channel pump

Note that the auxiliary relay LED is permanently on and that the final LED in the display is not used, so is permanently off.

- (g) The buzzer circuit will then operate. Check that the buzzer sounds.
- (h) The cycle time display will now read 'Push'. Check that by pressing each switch a switch description and number are displayed as follows:

Hours ..... "HrS 1"  
 Minutes ..... "nins 2"  
 Clear ..... "CLr 3"  
 Drain ..... "drAN 4"  
 Display ..... "diSP 5"  
 Reset ..... "rSEt 6"  
 Run ..... "run 7"  
 Stop ..... "StOP 8"  
 Display & Reset together ..... "drES 9"  
 Self disinfect ..... "SdiS A"

The automatic test sequence is then complete.

If operating correctly, reset the DIL switch segment 1 to 'on'.

### 11.2.3 Power board

This board is mounted separately from the CPU board and contains the high voltage components. These include the power transformer, relays and their associated suppressors.

### 11.2.4 Pump and valve operation tables

During endoscope processing and chlorine machine disinfection, the timings are as follows:

Sequence No.	*Display			Pumps				Solenoid Valves			Channel Pump (P5)
	Start	Finish	Duration (Secs)	Fill 1 (P1)	Fill 2 (P2)	Fill 3 (P3)	Drain (P4)	SV 1	SV 2	SV 3	
1	0.14	0.14	48	X				X			X
2	0.14	0.13	60								X
3	0.13	0.12	72				X	X			X
4	0.12	0.11	48		X				X		X
5	0.11	0.07	240								X
6	0.07	0.06	72				X		X		X
7	0.06	0.05	48			X				X	X
8	0.05	0.04	128								X
9	0.03	0.00	124				X			X	X

\*Timings shown are if a disinfectant contact time of 4 minutes has been set.

If a 'zero' disinfectant time is set, the cycle jumps directly from sequence no. 3 to no. 7, with a resultant cycle time of 8 minutes.

During glutaraldehyde machine disinfection, the timings are as follows:

Sequence No.	*Display			Pumps				Solenoid Valves			Channel Pump (P5)
	Start	Finish	Duration (Secs)	Fill 1 (P1)	Fill 2 (P2)	Fill 3 (P3)	Drain (P4)	SV 1	SV 2	SV 3	
1	0.30	0.29	50		X		X	X	X	X	
2	0.29	0.28	40	X	X	X	X	X	X	X	
3	0.28	0.28	5		X	X	X	X	X	X	
4	0.28	0.28	5	X	X		X	X	X	X	
5	0.28	0.25	180**	X	X	X	X				
6	0.25	0.22	140	X	X		X	X	X	X	
7	0.22	0.18	240								
8	0.18	0.16	120			X				X	X
9	0.16	0.12	240								X
10	0.12	0.10	120				X	X			X
11	0.10	0.06	240								
12	0.06	0.04	120	X			X	X	X		
13	0.04	0.02	120			X				X	X
14	0.02	0.00	120				X	X			X

\* Timings shown are if a disinfectant contact time of 4 minutes (the default time) has been set.

\*\* The user selected contact time minus 60 seconds

### 11.3 Hydraulic circuit

This is shown as a block diagram in Figure 6. Pumps P1, P2, P3 and P4 are all magnetically coupled centrifugal pumps, P5 is a diaphragm pump.

#### 11.3.1 Detergent fill

Detergent is raised from the left-hand container to the tray by pump P1 via the container drain/fill filter, solenoid valve SV1 (open), manifold, pump P4 (off and free-wheeling) and the tray drain/fill filter. Solenoid valves SV2 and SV3 are closed, thereby isolating the other two liquids.

#### 11.3.2 Detergent drain

Detergent is returned to the left-hand container by gravity and pump P4 via the tray drain/fill filter, manifold, solenoid valve SV1 (open) and pump P1 (off and free-wheeling) and the container drain/fill filter. Solenoid valves SV2 and SV3 stay closed to isolate the other two liquids.

### 11.3.3 **Disinfectant fill**

Disinfectant is raised from the centre container to the tray by pump P2 via the container drain/fill filter, solenoid valve SV2 (open), manifold, pump P4 (off and free-wheeling) and the tray drain/fill filter. Solenoid valves SV1 and SV3 remain closed, thereby isolating the other two liquids.

### 11.3.4 **Disinfectant drain**

Disinfectant is returned to the centre container by gravity and pump P4 via the tray drain/fill filter, manifold, solenoid valve SV2 (open) and pump P2 (off and free-wheeling) and the container drain/fill filter. Solenoid valves SV1 and SV3 stay closed to isolate the other two liquids.

### 11.3.5 **Water fill**

Water is raised from the right-hand container to the tray by pump P3 via the container drain/fill filter, solenoid valve SV3 (open), manifold, pump P4 (off and free-wheeling) and the tray drain/fill filter. Solenoid valves SV1 and SV2 remain closed, thereby isolating the other two liquids.

### 11.3.6 **Water drain**

Water is returned to the right-hand container by gravity and pump P4 via the tray drain/fill filter, manifold, solenoid valve SV3 (open) and pump P3 (off and free-wheeling) and the container drain/fill filter. Solenoid valves SV1 and SV2 stay closed to isolate the other two liquids.

### 11.3.7 **Container evacuation**

Liquid may be evacuated from a container by attaching a drain hose, pressing the 'Power Drain' button and then the appropriate button(s) to drain the detergent, disinfectant and/or water container(s).

This is achieved by running pump P4 together with the appropriate fill pump(s) P1, P2 and P3.

### 11.3.8 **Filtration**

All filtration is achieved by particle filters. Coarse filters ensure that any gross debris is confined to the tray or containers so that it can be easily seen and removed, to protect the mechanisms of the pumps and valves from excessive contamination. A fine filter is also fitted to the irrigation circuit to give extra protection to pump P5.

### 11.3.9 **Fluid transfer**

During machine disinfection, fluid is transferred from one container to another. This is achieved by running the original container's fill pump (P1, P2 or P3) together with P4, with the appropriate two solenoid valves open.

### 11.3.10 **Irrigation**

Pump P5 draws air and liquid in sequence from the tray via a coarse filter in the tray, situated below the 'water line' and a fine flow-line filter, then pumped to the main and auxiliary channel connectors, the auxiliary channel only being open when the connector is attached.

For safety, the inlet connector of the flow-line filter incorporates a valve that closes automatically on removal of the filter, so preventing fluid leakage from the tray by gravity.

The outlet connector of the flow-line filter is of the permanently open type so the irrigation pump will pump air through the irrigation circuit if the filter is removed.

#### 11.3.11 **Air flush**

Under cycle control an air flush through the scope is achieved after each fluid is drained below the level of the coarse pick-up filter in the tray.



## 12. FAULT FINDING GUIDE

### 12.1 Power switch indicator lamp fails to illuminate

- Check:** Fuse in power plug (if fitted).  
Power circuit fuse(s) housed in side panel.

### 12.2 No power to control panel

- Check:** Correct assembly of pod multi-way connector in the left-hand upright.

### 12.3 Fluid does not flow from container to tray

- Check:** The fluid circuit has been 'primed' by draining a little fluid from each container.  
The drain/fill filters are clean and uncontaminated.  
Correct assembly of the pod multi-way connector in the left-hand upright.  
Correct operation of CPU board (see paragraph 11.2.2).

### 12.4 Fluid does not drain from tray to container

- Check:** The drain/fill filters are clean and uncontaminated.  
Correct assembly of the pod multi-way connector in the left-hand upright.  
Correct operation of CPU board (see paragraph 11.2.2).

### 12.5 No fluid irrigating through scope

- Check:** The irrigation pick-up filter is not blocked.  
The irrigation flow-line filter is fitted and uncontaminated.  
The all-channel irrigator O-rings are present and in good condition.  
For leakage from irrigation circuit connections.  
Operation of irrigation pump (see Servicing Section 13).

### 12.6 Fluid is raised from or drained to the wrong container

- Check:** Correct assembly of the pod multi-way connector in the left-hand upright.  
Correct operation of CPU board (see paragraph 11.2.2).

### 12.7 Fluid leakage from irrigation pump mounting box

- Check:** That all pipework connections within the box are secure.  
Condition of irrigation pump diaphragm (see Servicing Section 13).

If the fault cannot be identified and corrected by the use of the above guide, contact your local Olympus-KeyMed dealer, or refer the problem to hospital electro-medical engineering staff. A Maintenance and Repair Manual is available.

## 13. SERVICING

**IMPORTANT:** The Auto-Disinfector 3 must only be serviced by suitably qualified trained electro-medical technical personnel.

**IMPORTANT:** Olympus and KeyMed will not be responsible for damage or injury to equipment or personnel caused by unauthorised repair or modification to this unit.

**IMPORTANT:** The machine should be decontaminated prior to service. A machine disinfection cycle (see Section 6) should be performed, then all containers drained and dried.

### 13.1 Preventive maintenance

The following procedures should be performed at the intervals shown in order to help keep the unit clean and operational. If this is not done, the disinfection status of the processed scopes and the machine may be compromised.

#### 13.1.1 Daily – by user

##### **Before use:**

Perform a machine disinfection cycle, following the instructions given in Section 6.

##### **During use:**

Check during the detergent stage of the cycle that fluid is irrigating through the scope's channels. Low flow indicates pick-up filter blockage or damaged/missing O-rings on all channel irrigator.

##### **After use:**

Drain and dry the detergent and rinsing water containers, and fit the drain vent adaptors, which should be left attached overnight, to help dry the internal fluid circuits.

Clean and dry the drain/fill filters, tray irrigation pick-up filter, channel restrictors, tray, tray cover and container lids.

Clean the irrigation flow line filter, following the instructions given in Section 8.7.

Check the condition of the O-rings on the all-channel irrigator and replace if worn or showing signs of deterioration. Lubricate with silicone oil (supplied with OES and EVIS endoscopes).

Lubricate all three drain port retaining clips with silicone oil (supplied with OES and EVIS endoscopes).

#### 13.1.2 Weekly – by user

Clean the casing of the control pod, top tray, container lids, tray cover and framework with a soft, lightly dampened cloth or a 70% alcohol impregnated wipe. Proprietary polishes may also be used sparingly. Clean the drain ports and container drip trays.

#### 13.1.3 Six-monthly – by Olympus-KeyMed Agent or hospital engineer

Full functional check, including assessment of irrigation circuit fluid flow (use flow meter if available).

Examine externally, checking for missing screws, damage, etc.

Disconnect unit from power supply. Remove rear panel and skirt cover. Inspect hoses for the presence of a bio-film. Replace any hoses that have a bio-film or are damaged, kinked, discoloured, etc. Replace any hose clips removed. Check other hose clips for security.

Run a machine disinfection cycle, following the machine disinfection instructions in Section 6.2, but with 10 minutes contact time, using NaDCC (sodium dichloro-isocyanurate) chlorine releasing tablets or NaOCl (sodium hypochlorite) at 1,000ppm available chlorine concentration. This will help prevent bio-film formation in the internal pipework.

Check all adaptors and fittings for easy operation, condition of O-rings, etc.

Test the anti-static properties of the castors in accordance with local approved procedures.

Check the security of castors. If loose, tighten to a torque of 40Nm (29lbf/ft).

#### 13.1.4 **Annually – by Olympus-KeyMed Agent or hospital engineer**

Service channel irrigation pump, as described in Section 13.2 below. Perform safety tests.

### 13.2 **Service instructions (Figure 8)**

The channel irrigation pump (P5) is a diaphragm type, and is fitted with flat rubber check valves housed within both the inlet and outlet ports. The pump circulates either air or fluid from within the top tray through the endoscope being processed. The pump is in continuous operation and therefore it is strongly recommended that it is serviced annually.

The Auto-Disinfector 3 has been designed to enable the service to be performed easily by hospital engineering or technical staff. This service consists of replacement of the pump diaphragm, diaphragm plates, pump head and associated fixings. A service kit, part number 7321376, is available comprising the required parts and detailed instructions. A Maintenance and Repair Manual is also available, if required, part number 5055831.

If any difficulty is experienced, or should there be no technical staff or facilities available, contact your local Olympus-KeyMed dealer to arrange for this service to be performed.

13.2.1 Disconnect unit from power supply.

13.2.2 Prise off each screw cap from the eight screws securing the rear panel to the machine, unscrew and remove the screws, then remove the panel.

13.2.3 Remove the two pipe retaining clips securing the hoses to the pump head, then pull off the two hoses from the pump connectors, noting their positions.

13.2.4 Unscrew and remove the four screws and washers securing the pump head to the pump, then carefully remove the pump head assembly, noting its orientation. The pump head, screws and washers may be discarded.

13.2.5 Unscrew and remove the screw securing the diaphragm and diaphragm plates and discard.

13.2.6 Remove the diaphragm plates and diaphragm and discard.

**NOTE:** *The new con-rod in the service kit need not be used – this is included for when earlier models are serviced using the same kit.*

- 13.2.7 Place the new bottom diaphragm plate, diaphragm and top diaphragm plate in position and secure with the new screw.

**NOTE:** *The top diaphragm plate has a countersunk hole in the centre to accept the securing screw and that the radiused edge of **both** plates should be **towards** the diaphragm.*

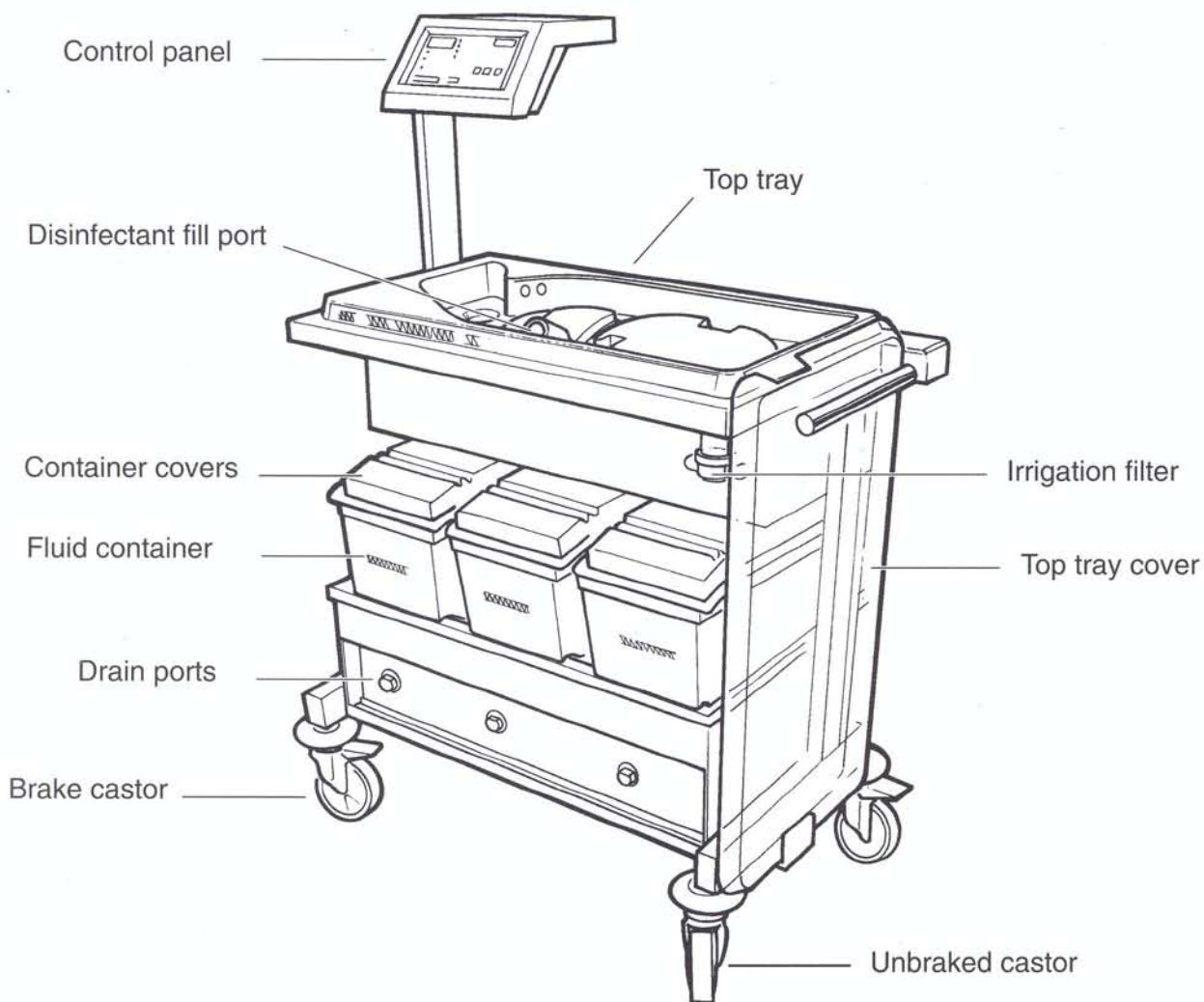
- 13.2.8 Ensure the diaphragm is correctly seated onto the raised portion of the pump, then install the new pump head assembly in the same orientation as the one removed. Secure into place with the four screws and washers, tightening progressively to a torque of 13lbf-in.

- 13.2.9 Install the two hoses onto the appropriate pump connectors, the tube from the top tray/flow-line filter to the lower inlet (IN) port.

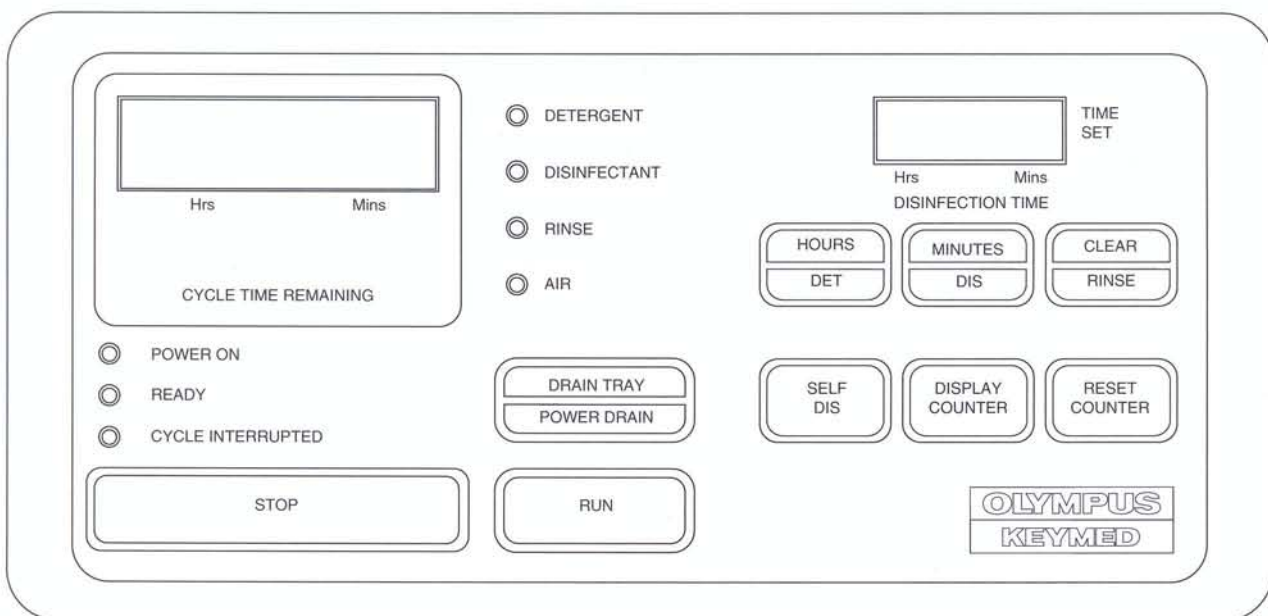
- 13.2.10 Connect the Auto-Disinfector 3 to the power supply and perform a function test of the pump, checking that no leaks occur.

**WARNING: EXTREME CARE MUST BE TAKEN IN THE VICINITY OF LIVE ELECTRICAL EQUIPMENT.**

- 13.2.11 Reinstall the rear panel to the machine and secure into position using the eight screws and their screw caps.



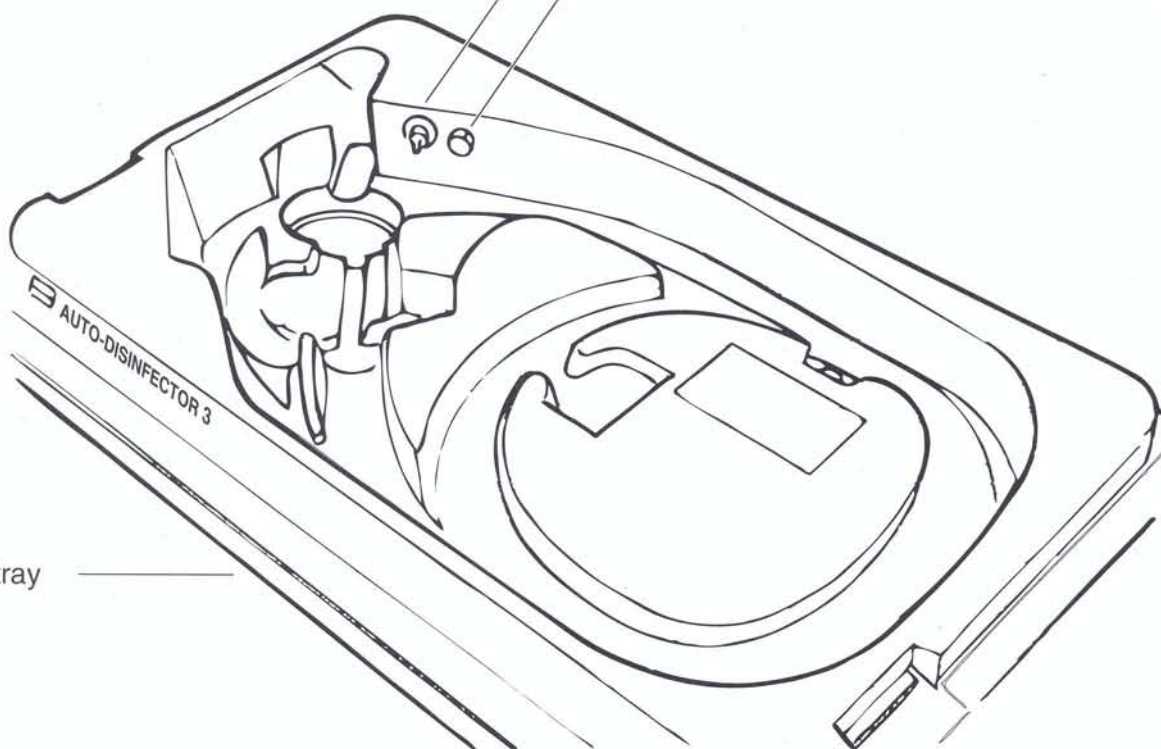
**FIGURE 1  
GENERAL VIEW**



**FIGURE 2  
CONTROL PANEL**

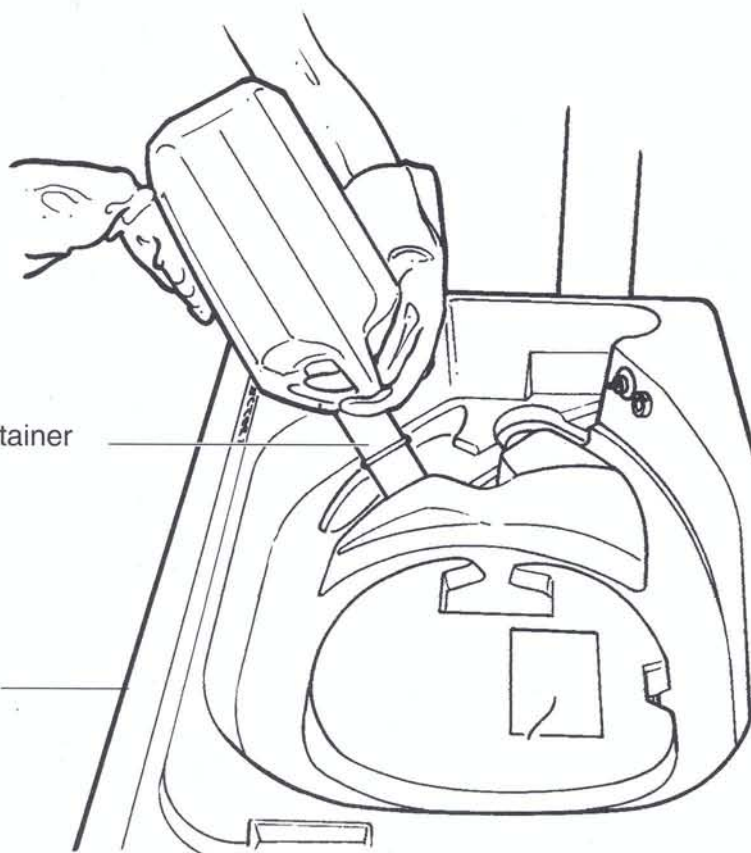
Main channel connector

Auxiliary channel connector



Top tray

**FIGURE 3**  
**ENDOSCOPE CONNECTIONS**



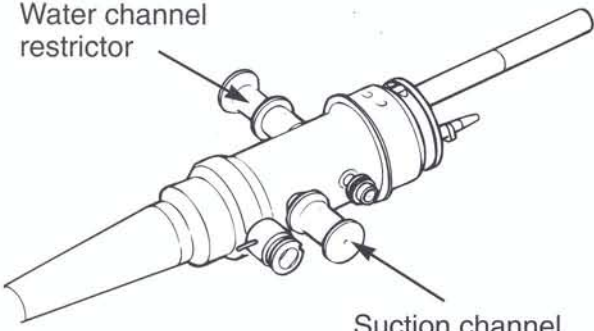
Disinfectant container  
adaptor

Top tray

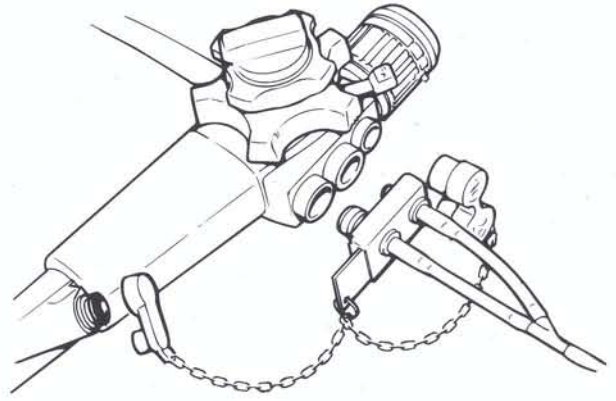
**FIGURE 4**  
**DISINFECTANT FILLING**

Water channel  
restrictor

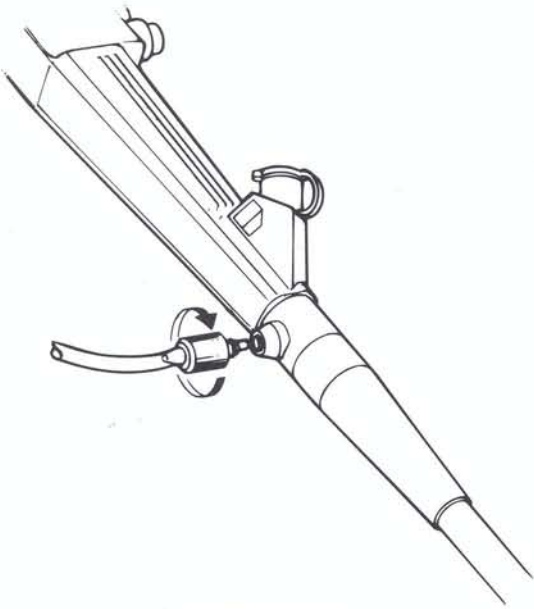
Suction channel  
restrictor



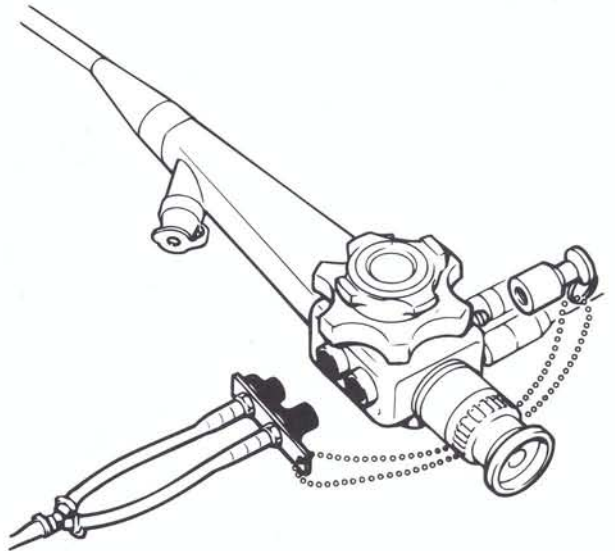
**FIGURE 5a**  
OES GI scopes – light  
guide connector restrictors



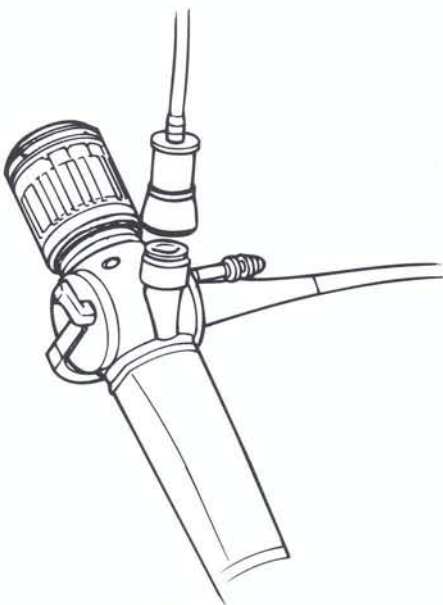
**FIGURE 5b**  
OES & EVIS GI scopes



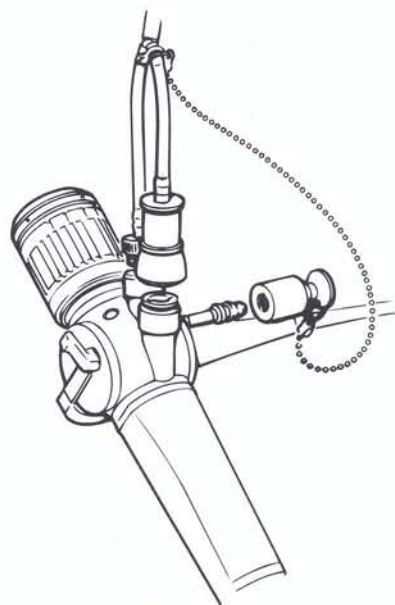
**FIGURE 5c**  
Auxiliary channel connector –  
OES & EVIS GI scopes



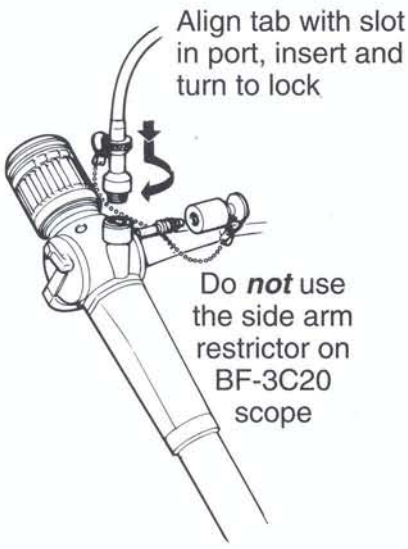
**FIGURE 5d**  
OSF-2



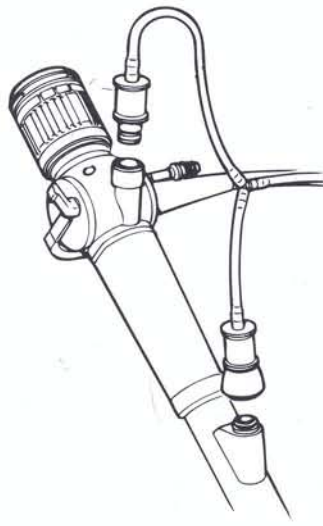
**FIGURE 5e**  
BF-10 series



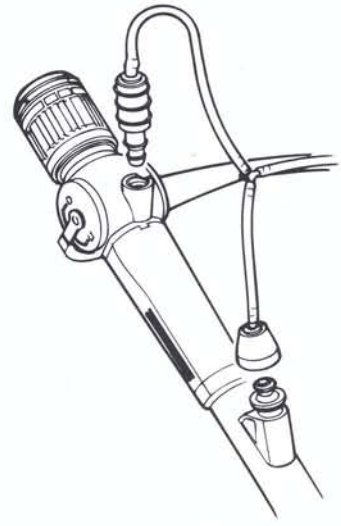
**FIGURE 5f**  
BF-2T10



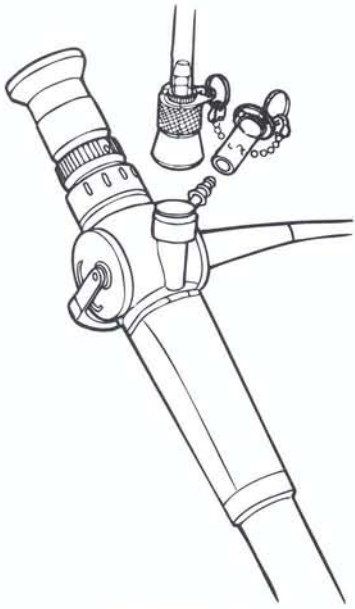
**FIGURE 5g**  
BF-20 series/LF-2



**FIGURE 5h**  
BF-20D series



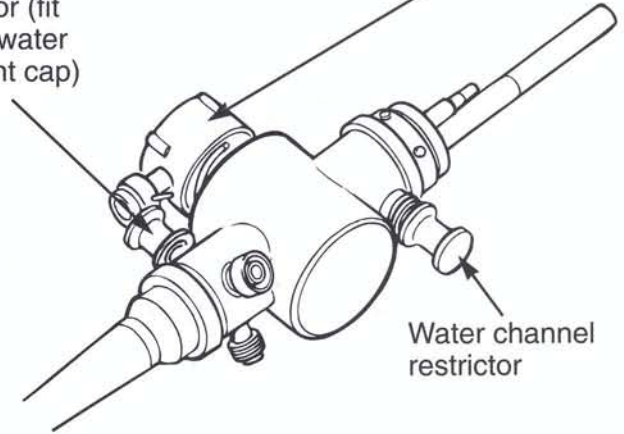
**FIGURE 5i**  
BF-30 series



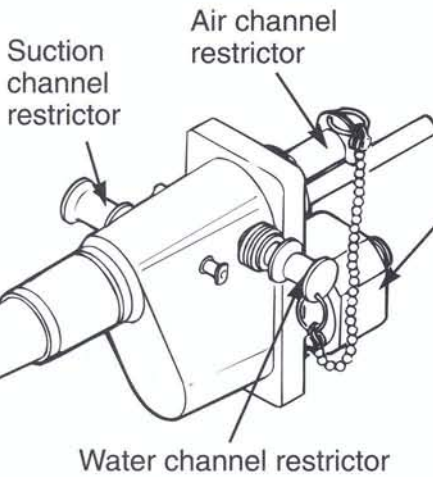
**FIGURE 5j**  
LF-1

Suction channel restrictor (fit before water resistant cap)

Ensure water resistant cap is fitted before immersion

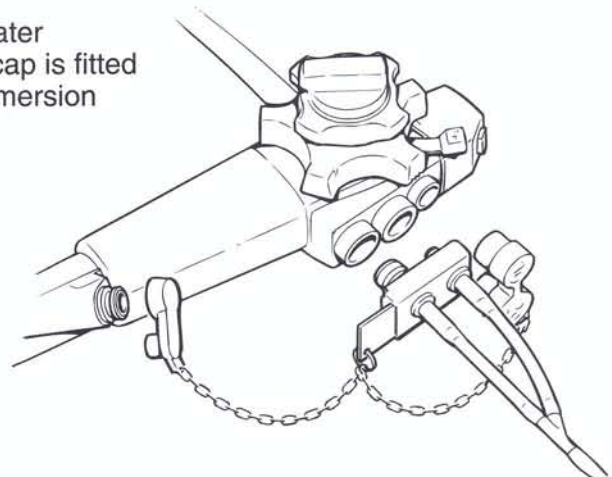


**FIGURE 5k**  
EVIS-100/200  
light guide connector



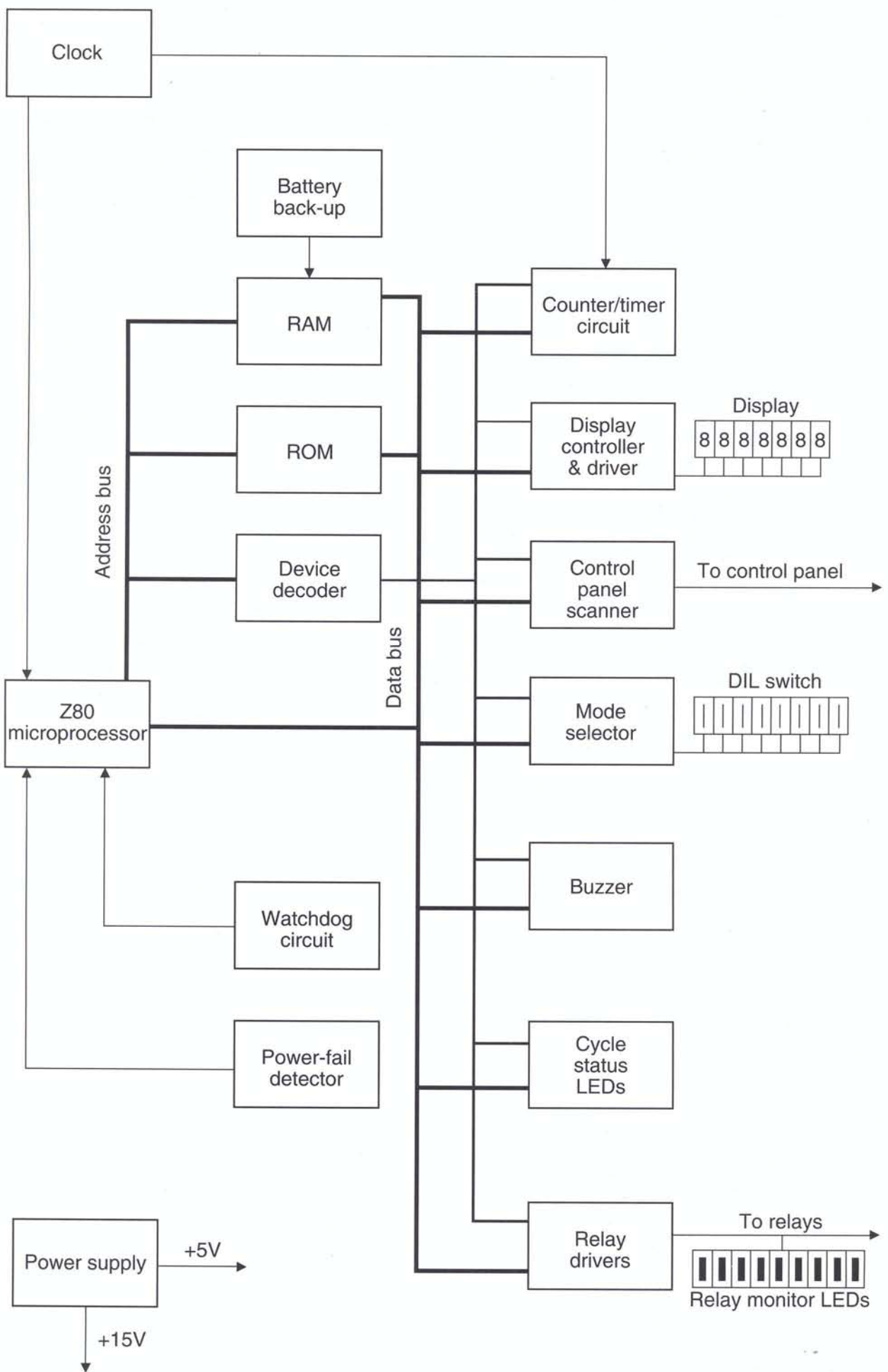
**FIGURE 5l**  
EVIS-1/10  
light guide connector

Ensure water resistant cap is fitted before immersion

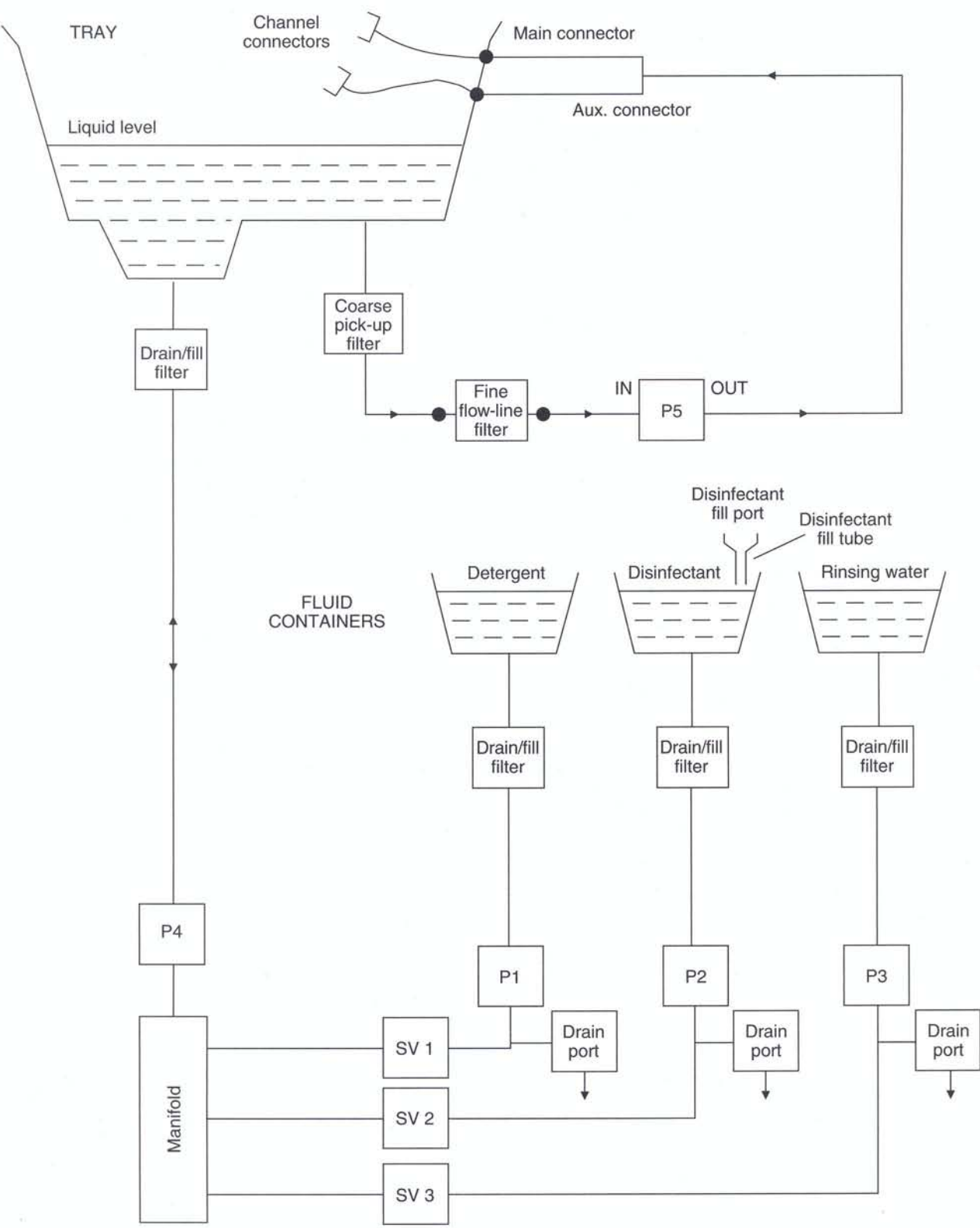


**FIGURE 5m**  
All EVIS scopes





**FIGURE 6**  
**BLOCK DIAGRAM – ELECTRONIC**

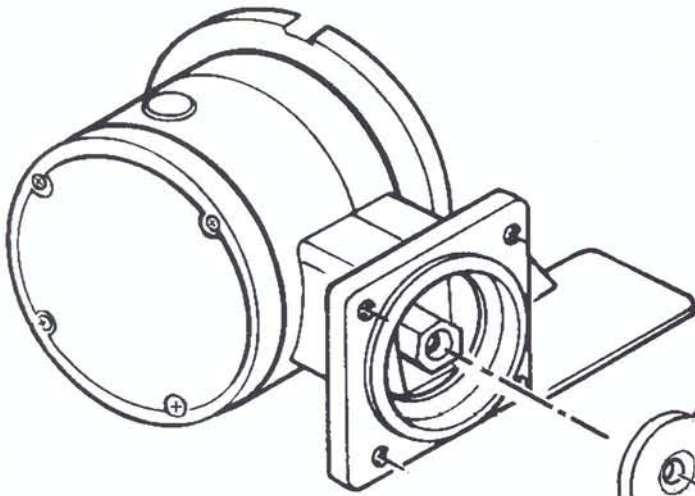
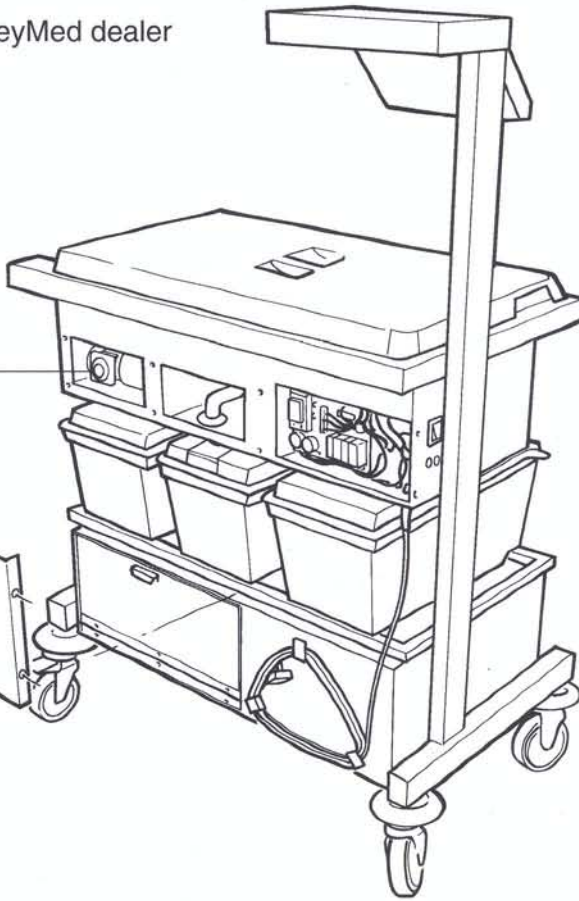


**FIGURE 7**  
**BLOCK DIAGRAM - HYDRAULIC**

Contact your local Olympus-KeyMed dealer for additional parts.

Access panel  
Screw caps  
M4 Screws

Pump housing



Bottom diaphragm plate \*

Diaphragm \*

Top diaphragm plate \*  
(countersunk hole)

Screw \*

Pump head assembly \*

4 x washers \*

4 x screw \*

KEY: \* Components marked thus are included in Service kit part no. 7321376.

**FIGURE 8**  
**IRRIGATION PUMP SERVICE**

## 14. GUARANTEE

The Auto-Disinfector 3 is guaranteed for 12 months against faulty workmanship and materials.

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