

## USER MANUAL

### ECMO Trainer Professional TF400





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# 1 Introduction

## 1.1 The training torso

The ECMO Trainer Professional TF400 is a device for training of extracorporeal membrane oxygenation (ECMO). The training torso has a venous and arterial circulation. Both circulation circuits are operated with adjustable and if needed pulsatile circulation pumps.

The flow rate and pulse speed of the circuits are continuously adjustable to allow the simulation of a patient with all physiological variations that could occur during the operation. With the ECMO trainer the following variations of ECMO can be simulated:

- Venous-arterial ECMO (VA-ECMO)
- Venous-venous ECMO (VV-ECMO)

### Puncture and cannulation

The puncture and cannulation can be performed with real materials. The arteries do have a lumen of 8 mm and the veins of 10 mm. This assures the compatibility with all common catheter types. The puncture sites (one left and one right for femoral puncture as well as one for jugular puncture) are made of ultrasound capable material. This gives the advantage that the puncture can be guided by ultrasound until the vessel tube.

The training torso can be operated together with an ECMO machine in full function because it provides enough flow volume for real use of the machine. Additionally the ECMO Trainer Professional TF400 provides contact points for 4 lead ECG, which are wired to special connectors for an ECG simulator. An ECG simulator is not included in the scope of supply.

### Tubing replacement and transport

Because the cannulas will leave quite big puncture holes, the torso is equipped with a simple and effective tubing management system. It allows to pull the used part of the tube out of the torso and to cut it off. The tubing is hidden inside the transport case.

## 1.2 Target users

The user manual of the ECMO Trainer Professional TF400 ist intended for persons that are attending a medical training:

- Doctors
- Perfusionists
- Nursing staff



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### **INFORMATION**

#### **Qualification**

The people trained on the ECMO Trainer Professional TF400 do not need to have special skills related to the simulator.



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## 1.3 Conventions

### **Warning and other information**

In this user manual information are rated differently and marked with a pictogram.

Warnings are represented on the following ways:

Symbol	Signal word	Meaning
	<b>DANGER</b>	<b>Warning</b> <i>Direct danger. Death or severe injuries <u>will</u> occur.</i>
	<b>WARNING</b>	<b>Warning</b> <i>Probably dangerous situation. Death or severe injuries <u>may</u> occur.</i>
	<b>CAUTION</b>	<b>Warning</b> <i>Probably dangerous situation. Minor or medium injuries <u>may</u> occur.</i>
	<b>HINT</b>	<b>Hint</b> <i>Hints have to be followed for optimal results and for safe use of the device.</i>

- **Signal word**  
Indicates the severity of the danger.
- **Kind and origin of the danger**  
Indicates which kind of danger and where it occurs.
- **Reason and Result**  
Describes what is the reason for a danger and what is the result.
- **Solution**  
Describes how the danger can be avoided.

**Sample for a Warning:**

---

**DANGER****Danger for life or danger of severe injuries**

During operation of the ECMO Trainer Professional TF400 mechanical and electrical dangers may occur. To avoid personal injuries caused by these dangers you are only allowed to use the training torso as intended.

---

**Instructions**

Instructions are numbered to mark the order of the single steps. Results (if applicable) are mentioned directly underneath.

For example:

- 1 Press **Login**.
- 2 Enter your password.
  - ▶ Your are now logged in.

**Control elements**

Control elements are for example buttons or switches. These are marked in **bold**.

Sample: The **plug A** is located inside the case.



## 1.4 Manufacturers address

### **Erler-Zimmer GmbH & Co. KG**

Hauptstraße 27

77886 Lauf

GERMANY

**Internet** : [www.erler-zimmer.de](http://www.erler-zimmer.de)

**E-Mail** : [info@erler-zimmer.de](mailto:info@erler-zimmer.de)

**Phone** : +49 7841 / 6003-0

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## 2 Safety instructions

The training torso ECMO Trainer Professional TF400 was designed and produced in compliance with applicable regulations and safety rules. The torso is state-of-the-art technology when delivered for first use. Nevertheless hazards may occur for the user, for the device itself or for other properties.



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### **HINT**

#### **Safe use of the torso**

For a safe use of the torso please refer to the instructions in this chapter of the user manual. The manufacturer accepts no liability for damage resulting from nonobservance of the instructions.

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### 2.1 Intended Use

The training torso is designed for education and training in the medical field only. Use the torso only as described in this manual.

Any other use is considered as improper use and can lead to personal or substandard training results. The manufacturer is not liable for any damage caused by improper use.

**The training torso may only be used as follows:**

- For simulation and training of Extracorporeal Membrane Oxigenation (ECMO)
- All activities on the training torso (setting up, installation, operation, cleaning and storage) may only be done by persons that attend or organize medical education.

- **Filling**  
The training torso may only be filled with water or suitable mock blood.
- **Operation**  
The torso may only be operated by persons attending or organizing medical education trainings. This persons have to read this manual before and they must follow all warnings and saftey regulations.
- **Place of use**  
The training torso may only be used on an even and stable base such as e.g. a table.
- **Cleaning and replacing consumable parts**  
The cleaning of the traning torso and the replacement of consumable parts does not require any special qualification and can be done by the user. (see chapter „1.2 Target users“ on page 6).

## 2.2 Improper use

If the training torso is used incorrect, dangers for persons and materials may occur. The training torso may only be used as described in chapter „2.1 Intended use“

**Improper use is for example:**

- Use for other purposes than training of extracorporeal memembrane oxigenation (ECMO)
- Operation of the torso if components are damaged or missing
- Operation with damaged power cord or plug
- Operation on a non-even base
- Operation during rain, snow, ice or in wet condition
- Operation by minors
- Operation by persons that are sick or overtired or who are under the influence of substances or drugs that may affect optical perception, coordination ability or ability to judge.
- Cleaning under running water

## 2.3 Dangers during transport and setup

### 2.3.1 Transport and setup

During transport and setup of the training torso there may be danger by heavy and tilting parts of the device. To avoid this please follow the instructions below:

- Take care to transport the torso smoothly and free of any shocks.
- Place the torso on an even, stable and sustainable base.
- Use the transport rollers of the torso case as transport aid.
- Do not place any heavy objects on top of the torso.
- Please notice the relevant documentations of the manufacturers of components.
- Do not stand on top of the torso or pump case.

## 2.4 Dangers during commissioning and operation

### 2.4.1 Mechanical dangers

The torso consists of loose and heavy components. Due to this there are risks of personal damage. To avoid this, please follow the safety instructions below:

- Secure the torso against tilting and shifting.
- Do not reach inside the cases with your hand. When closing the cases the hand might be crushed.
- Do not reach with your hand into the transport rollers of the case during transport.

### 2.4.2 Electric risks

The pumps are operated with electrical current. If live parts are touched, dangerous injuries and death can be the result. To avoid this, please follow the following safety instructions:

#### Power cord

- Use the training torso with the supplied power cord only. Using another cable can cause fire or electric shocks.

#### Fluids

- Be careful using fluids. If fluids penetrate electrical components, short-circuiting or an electrical shock may be caused.

#### Connected value

- Comply with the mentioned electrical connected value (see Chapter "8 Technical data" on page 49).

#### Continuous operation

- Limit the operation of the training torso at maximum flow volume to 30 minutes. Continuous operation of the training torso may cause damage on the pumps.

## 2.5 Dangers during cleaning

During cleaning and maintenance of the training torso personal or material damage may occur. To avoid this, please follow the safety regulations below:


- Make sure the training torso is switched off and disconnected from electrical current to avoid an electrical shock.
- Do not use scourers or sharp objects for cleaning to avoid material damage.
- Please notice the safety sheet of the manufacturer for the product „AlgExit“.

## 2.6 Warning and instruction labels

Positions with potential risks under certain conditions are marked with warning and instruction labels.

- Do not remove the warning and instruction labels.
- Replace damaged or removed warning and instruction labels immediately.

The following warning and instruction signs are used on the training torso:

Label	Meaning	Label	Meaning
	Warning against hand injuries		





### 3 Technical data

In this section you will find the technical data for the training torso as well as for the applications and utilized components.

#### 3.1 Dimensions, Weight and connected value

Information	Pump case	Body case
Height × width × depth	700 × 550 × 400 mm	1070 × 565 × 420 mm
Empty weight of the case	21 kg	38 kg
Voltage	230 V – 50/60 Hz	n/a

#### 3.2 Temperatures and filling capacity

Information	Value
Water temperature for filling	10–30 °C
Water temperature during operation	5–45 °C
Maximum filling capacity	24 l

#### 3.3 Tubing system

Information	Artery tube	Vein tube
Inner diameter	Ø8 mm	Ø10 mm
Length	5 m	5 m

### 3.4 Spare parts and accessories


**HINT**
**Complete technical data of all accessories**

In the following chapter the important technical data of accessories that are used are mentioned. Complete technical data are mentioned in the documentation of the manufacturers (see list in chapter "9 relevant documents").

For the training torso the following spare parts and accessories are available:

Reference no.	Qty	Description
TF220	1	Spare puncture pad jugular
TF228	1	Spare tubing coil, length 5m
TF235	2	Spare puncture pads, femoral
7024	1	Artificial blood (250ml-bottle)
TF238	1	AlgExit (250ml-bottle)

## 4 Product description

The ECMO Trainer Professional TF400 is a device for training of extracorporeal membrane oxigenation (ECMO). The training torso is only designed for training and education in the medical field. The following medical procedures can be trained:

- Veno-Arterial ECMO (VA-ECMO)
- Veno-Venous ECMO (VV-ECMO)



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### **HINT**

#### **Technical data**

Information about technical data like dimensions or weights can be found in section "3 technical data" on page 17.

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### 4.1 Scope of supply

The ECMO Trainer Professional TF400 consists of the following basic components:

- Body Case
- Pump Case

The trainign torso is delivered with the following consumable parts:

- 2 pcs spare puncture pads femoral



- 1 pc spare puncture pad jugular



- 1 set tubing



- 1 pc manual pump

Additional accessories and spares such as water chemicals (AlgExit) or artificial blood are available at the manufacturer. An overview can be found in section „3.4 Spare parts and accessories" on page 18.

## 4.2 Training torso overview

In the following chapter the training torso with its basic components is described. The training torso consists of the following basic components:

- Body case (see chapter "4.2.1 body case" on page 21)
- Pump case (see chapter "4.2.3 pump case" on page 26)

The body case and the pump case are supplied on a pallet. The body case is equipped with transport rollers.



Picture 4-1: The basic components at delivery

- A Pump case
- B Body case
- C Transport rollers (not visible)

### 4.2.1 Body case



Picture 4-2: Overview of the parts of the body case

- A Puncture pad femoral (2x)
- B Femoral vein (2x)
- C Femoral artery (2x)
- D Lower part of body case
- E ECG connections (4x)
- F Puncture pad jugular
- G Jugular vein
- H Artery (Carotis)
- I Screw clamps (6x)

### **Puncture pad femoral**

The puncture pads femoral represent the upper limb area of the patient and are used for palpation of the pulse and for puncture of the femoral vessels.



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#### ***HINT***

#### **Changing the puncture pads**

Please change the injection pads when replacing the tubing latest. Information about spare parts can be found in chapter „3.4 spare parts and accessories“ on page 18.

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### **Femoral veins**

The femoral veins are located in the upper limb of the torso and represent the venous vessels.

### **Femoral arteries**

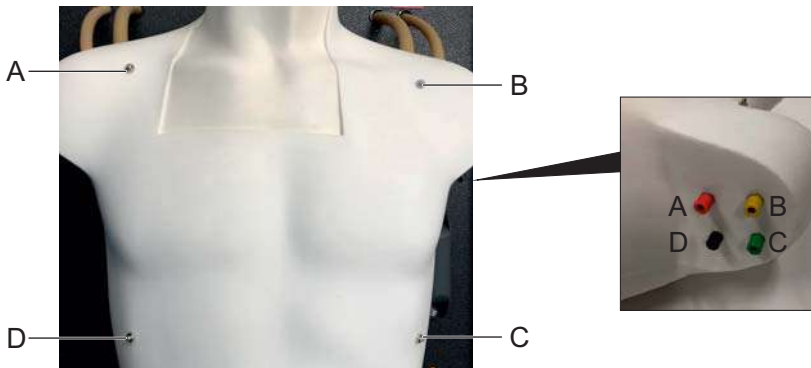
The femoral arteries are arteries that run through the upper limb. Both femoral arteries are equipped with Luer-lock connectors inside the lower part of the case, next to the connectors for the artery tubes. The can connectors can be used for connecting measuring devices for flow volume.

### **Body case**

The body case protects the torso against damage during transport. The tubing system is located inside the lower part of the body case.

### ECG connection points

The lead connection points represent the augmented limb lead after Goldberger. It consists of 3 electrodes (aVR, aVL, aVF) and a ground electrode (N). The Electrodes are coloured like a traffic light and located as follows:



Picture 4-3: ECG lead connections and connection for simulator

- A aVR (red = connection right hand\*)
- B aVL (yellow = connection left hand\*)
- C aVF (green = connection at foot\*)
- D N (black = connection right leg\*)

### Puncture pad jugular

The puncture pad jugular represents the neck region of the patient and is used for palpation and for puncture of the jugular vein.



#### HINT

#### Changing the puncture pads

Please change the injection pads when replacing the tubing latest. Information about spare parts can be found in chapter „3.4 spare parts and accessories“ on page 18.

### Jugular vein

The jugular vein runs through the neck region of the training torso. The anomya as well as the subcalvia are not present.

### Artery (Carotis)

The jugular artery represents the main artery (Carotis) of the neck.

### Screw clamps

With the screw clamps the tubing system is connected to the connectors of the body case.

#### 4.2.2 Tubing system inside the body case



Picture 4-4: Overview of the tubing system of the body case

- A Tubing coil jugular vein
- B Stopcocks of the tubing system
- C Connections for connection tubes (not visible) - see chapter „5.3 connecting the cases“ on page 32
- D Tubing coil femoral vein left
- E Tubing coil femoral vein right
- F Tubing coil femoral artery right
- G Tubing coil femoral artery left





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**HINT****Clumping of artificial blood inside the tubing system**

If art. blood is kept inside the tubing, it may clump.

- Use the artificial blood of the manufacturer only to avoid material damage on the torso.
  - Empty the tubing system after use of the torso.
- 

**Tubing coil of the jugular vein**

The tubing coil of the jugular vein is pulled out and cut off after each puncture. If the full length of the tubing is used, replace the tubing coil by a new one.

**Stopcocks tubing system**

The stopcocks of the tubing system are used to open and close fluid circulation.

**Tubing coil of the femoral vein left**

The tubing coil of the femoral vein left is pulled out and cut off after each puncture. If the full length of the tubing is used, replace the tubing coil by a new one.

**Tubing coil of the femoral vein right**

The tubing coil of the femoral vein right is pulled out and cut off after each puncture. If the full length of the tubing is used, replace the tubing coil by a new one.

**Tubing coil of the femoral artery left**

The tubing coil of the femoral artery left is pulled out and cut off after each puncture. If the full length of the tubing is used, replace the tubing coil by a new one.

**Tubing coil of the femoral artery right**

The tubing coil of the femoral artery right is pulled out and cut off after each puncture. If the full length of the tubing is used, replace the tubing coil by a new one.

### 4.2.3 Pump case



Picture 4-5: Overview about the parts of the pump case

- A Power cord
- B Pump arterial circulation (Pump 1)
- C Person protection switch
- D Switch for tubing filling pump
- E Pump venous circulation (Pump 2)



#### **HINT**

##### **Relevant documents**

Detailed information can be found in the documents of the pumps, see chapter „9 relevant documents“ on page 51.

## Power Cord

The power cord is located inside the pump case and allows the connection of the pump case to the electrical power.

## Pumps, arterial and venous circulation

The pump for the arterial circulation is marked with a red sign with the letters "Pump 1". The pump for the venous circulation is marked with a blue sign with the letters "Pump 2". The pumps create adjustable values for pulse frequency and flow volume.

Each of the pumps is supported by a tubing filling pump which is located in the lower part of the pump case. The tubing filling pumps are used for venting the tubing system and to support the circulation pumps if the tubing is empty.

Pump 1 and Pump 2 do have the following controls:



Picture 4-6: controls of the pump

- A Pulse frequency
- B Display
- C MODE switch
- D Flow volume
- E START switch
- F STOP switch

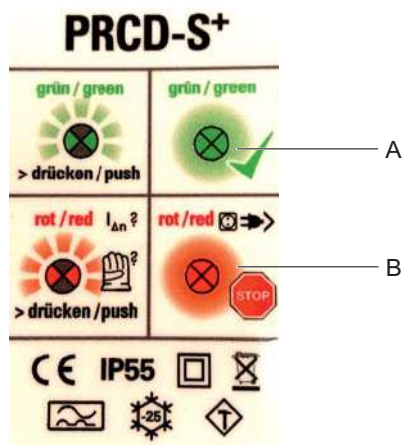

**HINT**
**MODE**

With the switch **MODE** the following modes can be chosen:

- M1: Continuous flow (venous)
- M2: Pulsation (arterial)

**Person protection switch**

The person protection switch analyzes if a safe power supply is connected. If the training torso is connected to a faulty or unsafe power supply, the person protection switch cuts off the power.



Picture 4-7: The signal unit of the person protection switch

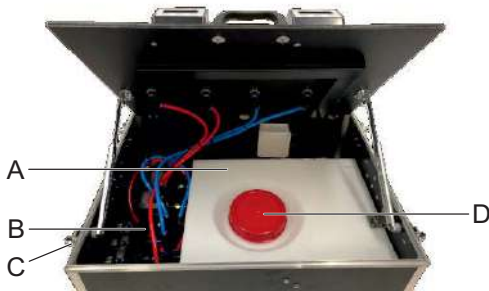
A Green: Power supply free of any faults, training torso can be used. B Red: Power supply is faulty, training torso cannot be used.

**HINT****Switching on the training torso**

Information for switching on the training torso can be found in section „6.2. switching on“

**Switch for tubing filling pumps**

The switch for the tubing filling pumps activates the two tubing filling pumps which push water into the circulation pumps and fill the tubing system for venting.

**4.2.4 Tubing system pump case**

Picture 4-8: Overview over the tubing system of the pump case

- A Tank
- B Stopcocks tubing system
- C Connectors for the connecting tubes - see chapter „5.3 Connecting the cases“ on page 32
- D Filling opening

**Tank**

The Tank is filled with fluid and supplies water to the tubing system and the pumps. Pump 1 and Pump 2 transport fluid in different circulation systems through the body case in order to simulate blood circulation.

### **Stopcocks tubing system**

The stopcocks of the tubing system allow to open and close the system for fluid circulation.

### **Filling opening**

The filling opening allows to open the tank and to fill the tank with fluid. The opening can be closed with a screw-cover.

## 5 Preparation for use

### 5.1 Transport

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#### **HINT**

##### **Dimensions and weight**

Information about dimensions and weight can be found in chapter „3.1 Dimensions, weight and connected value“ on page 17.

---

The separated design as two rugged body- and pump cases guarantees safe transport. For easy transport the body case is equipped with transport rollers.



#### **ATTENTION**

##### **Danger of injury by open case**

By open body or pump case personal or material damages may occur during transport.

- Always keep the cases closed during transport.
- 



#### **ATTENTION**

##### **Danger of injuries by uneven base**

By a non-even base personal or material damages may occur.

- Always place the training torso on an even, firm and stable base.
-

## 5.2 Setup

The training torso is shipped packed. Please follow the Hints for setup of the device:



---

### **ATTENTION**

#### **Danger of injuries by weight**

The body and pump cases are heavy. If lifted careless, injuries may occur when carrying the cases.

- Use the transport rollers of the body case to move it.
  - Examine the cases for possible transport damages and completeness before beginning setup.
  - Always place the training torso on an even, firm and stable base.
- 



---

### **ATTENTION**

#### **Danger of injuries by pinching**

Opening and closing the parts of the cases bears the danger of pinching – Make sure to open the cases completely before operation.

---

## 5.3 Connecting the cases



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### **ATTENTION**

#### **Danger of injuries by stumbling**

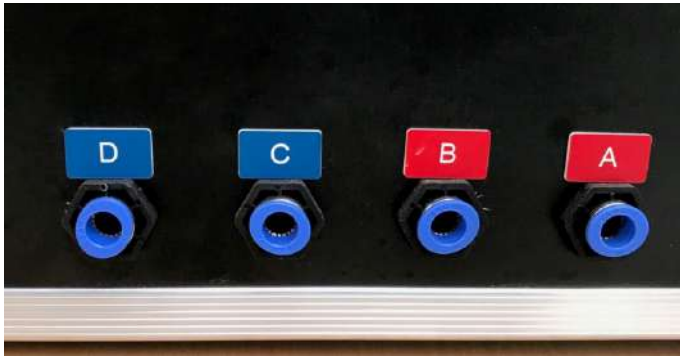
Laying cables and tubes may cause the risk of stumbling for persons.

- Make sure to avoid stumbling dangers. If impossible, mark dangers clearly.
-



The body and pump case do have 4 connectors to allow connection of pump case with body case using the supplied tubes. The connectors are marked "A-B-C-D". To connect the both cases, please do the following:

- 1 Connect A of the Body case with A at the pump case
- 2 Push the tube ends into the connectors as deep as possible.
- 3 Repeat the same for B, C and D.



Picture 5-9: Connectors „A-B-C-D“

- Now the cases are connected to each other.



## 6 How to use



---

### **HINT**

#### **Controls**

The parts and controls referred to in the text are described in chapter „4 Product description“ on page 19.

---

### 6.1 Conditions for starting the system

Before starting the system make sure that the following conditions are fulfilled:

- Make sure the training torso has no transport damage.
- Check if the training torso is complete.
- Check before starting to operate the system if the torso or the power cord is damaged. If anything is unclear, contact the manufacturer.
- If the system is incomplete or damaged, do not start the system.

### 6.2 Starting the system

#### 6.2.1 Switching on



---

### **DANGER**

#### **Danger for life by liquids and electric current**

The training torso works with electric current. Entering liquids may cause a short or electric shock. Before using the torso, check for liquids and remove them if necessary.

---

To switch on the training torso, follow this instructions:

- 1 Connect the power cord to the socket.



---

**HINT****Connected value**

Before connection check if the electrical data comply with the required data of the simulator, see chapter „3 Technical data“ on page 17.

---

- 2 Switch the training torso on by pressing the ON/OFF switch on the person protection switch
    - ▶ The signal unit shines in green color.
    - ▶ The training torso is switched on and ready for operation.
- 

**HINT****Signals of the person protection switch**

Recognize the signals of the person protection switch (see page 28), to operate the training torso safe and reliable.

---

## 6.2.2 Preparation of the tubing system

To prepare the tubing system before operation of the training torso, the tubes have to be vented. This can be done by following these steps:

### Requirements

- The training torso has to be switched on as described in chapter "6.2.1 switching on" on page 35.
- Body and pump case are connected as described in chapter "5.3 Connecting the cases" on page 32.

### Procedure

- 1 Open the pump case.
  - ▶ The stopcocks of the tubing are visible.
- 2 Close the stopcocks of the tubing system.
- 3 Open the screw cover of the tank.
- 4 Fill the tank completely with water or suitable artificial blood.



---

**HINT****Filling with water**

Using water from the tap may result in lime deposits. Fill the tank with distilled water and add a suitable algae protection agent (e.g. AlgExit – see „3.4 spare parts and accessories“ on page 18), to protect the tubing system from deposits. In case of leaking stop filling immediately!

---



---

**HINT****Filing with artificial blood**

Traditional artificial blood may stain clothes. Use the artificial blood offered by the manufacturer (see „3.4 spare parts and accessories" on page 18), to avoid this.

---

- 5 Close the screw cover of the tank.
- 6 Open the stopcocks of the tubing system.
- 7 Close the pump case.
- 8 Press and hold the switch of the tubing filling pumps for about 20-30 seconds
  - ▶ The tubing system is filled with water and vented.
- 9 Switch both pumps on in MODE "pulsation". To do this press the MODE button twice.
  - ▶ The display shows „M2“.
- 10 Adjust pump 1 and 2 with the control to maximum flow volume.
- 11 Press the **START** button on both pumps.
  - ▶ The pumps are started. The tubing is vented by circulation.



---

**HINT****Faster venting**

By repeated pressing of the tube filling switch the venting can be speeded up.

---

- 12 Press STOP on both pumps.
  - ▶ The pumps are stopped.
- 13 Disconnect the power cord from the plug.
- 14 If necessary refill the tank as described in steps 1-7.
- 15 Re-connect the training torso to the power supply.
- 16 Switch both pumps to pulsation mode. Press MODE twice to do this.
  - ▶ The display shows „M2“ .
  
- 17 Switch pump 1 and 2 to maximum flow volume.
- 18 Press button **START** on both pumps.
  - ▶ The pumps are started.
- 19 Let the pumps operate for 10 to 15 minutes until the air is completely removed from the tubing system



---

**HINT****Remaining air bubbles in the tubing system**

Remaining air bubbles may cause sub-standard training results. To remove them, move the tubing inside the lower part of the body case while pumps operate to loosen the bubbles inside the tubes.

---

- ▶ The training torso is ready for training.

### 6.3 Simulation of ECMO and adjusting the pumps

To use the training torso for ECMO simulation, the pumps can create a continuous and a pulsating blood flow. To activate this, specific settings have to be done on the pumps. To adjust the pumps for ECMO simulation please follow the steps below:

#### Requirements

- The training torso is set up as described in chapter „6.2 setting up“ on page 35.

#### Procedure

- 1 Press START on both pumps.
  - ▶ The pumps are started.
- 2 Adjust the Pump 1 to mode "pulsation". Press the MODE button twice to make this setting.
  - ▶ "M2 is shown on the display.
- 3 Adjust pump 2 to the required pulse frequency and flow volume using the controls.
- 4 Adjust pump 2 to model "continuous flow". Press MODE button once to set mode.
  - ▶ "M1" is shown in the display.
- 5 Set pump 2 to the required flow volume using the controls.



---

#### **HINT**

#### **Changing patient parameters**

If training requires changed patient parameters, you may modify flow volume and pulse frequency on the pumps at any time.

---

- ▶ The pumps are adjustet now. You may use the training torso for ECMO simulation now.

**HINT****Continuous operatin of the pumps**

If pumps are operated continuously on maximum flow volume for a longer time, damages on the pumps may occur. Limit the coninuous operation in maximum flow mode to 30 minutes.

To switch the pumps off after finishing the simulation or for changing the tubing follow this procedure:

- 6 Press the STOP button on pump 1 and pump 2.

▶ The pumps are switched off.

## 6.4 Handling the tubing system

The tubing system is big and long enough to take normal catheters completely. In principle the tubing material is kind of self-sealing. However, as holes are quite big due to dilatation and catheter size, fluid may leak. In this case the tubing coil can be pulled out and cut off. Please follow the steps below:

- 1 Press the STOP button of pump 1 and 2.  
▶ The pumps are switched off.
- 2 Use a hemostat to close the tube nect to the screw clamp.
- 3 Open the screw clamp on the case belonging to the tube.
- 4 Pull off the tube ending.
- 5 Pull the tube out of the body until the puncture hole is visible.
- 6 Close the tube behind the puncture hole using a hemostat.





Picture 6-10: Pulling out the tube

- 7 Cut the tube off between puncture hole and hemostat. Dispose the punctured part of the tube (see chapter "7.3 Disposal" on page 46).
- 8 Pull the tube out of the body until it can reach the connector.
- 9 Slide the screw clamp onto the tube and push the tube end onto the connector.
- 10 Tighten the screw clamp.
- 11 Remove the hemostat.

- ▶ The tube was replaced using the tubing coil. The training torso is ready for use.



### **HINT**

#### **Changing the tubing coil**

The training torso is supplied with tubing coils 5 m long. The tubing can be pulled out and cut off about 10 times. If the coil is consumed, the tubing coil has to be replaced. (see chapter "8.2.1 Changing the tubing coil" on page 48).



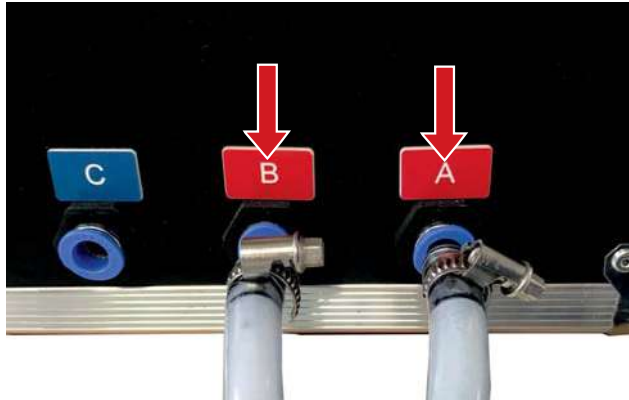
## 7 Disassembly, storage and disposal

### 7.1 Disassembly

#### 7.1.1 Emptying the tubing system

To empty the tubing system follow the instructions below:

- 1 Close all stopcocks.
- 2 Prepare a big container, e.g. a bucket.
- 3 Disconnect the connection tube from connector A on the body case. Put the end of the tube into the bucket.
- 4 Open the stopcock of connector A inside the pump case.
- 5 Disconnect the connection tube from connector C on the body case. Put the end of the tube into the bucket.
- 6 Open the stopcock of connector C inside the pump case.
- 7 Press the switch for the tubing filling pumps and hold it.
  - ▶ The pumps empty the tank into the bucket.
- 8 After the tank is empty, release the switch to stop the pumps.
  - ▶ The pump case is empty.
- 9 Disconnect the connection tube from connector B on the pump case. Put the tube end into the bucket.
- 10 Open the stopcock of connector B inside the body case.
- 11 Connect the manual pump to the connector A of the body case.
- 12 Open the stopcock of connector A inside the body case.
- 13 Use the manual air pump to push the water completely out of the tube.
- 14 Disconnect the connection tube from connector D on the pump case. Put the tube end into the bucket.
- 15 Open the stopcock of connector D inside the body case.
- 16 Connect the manual pump to the connector C of the body case.
- 17 Open the stopcock of connector C inside the body case.
- 18 Use the manual air pump to push the water completely out of the tube.
  - ▶ The body case is empty now.



Picture 7-11: Connections of the red circuit on the pump case



#### HINT

##### Residual water

Residual water inside the tank may be removed by lifting and tilting the pump case towards the pumps.



Picture 7-12: Lifting and tilting the pump case



---

**HINT****Longer decommissioning**

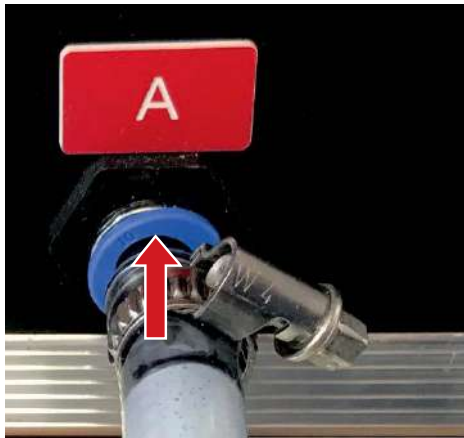
If the training torso is not used for a longer period, the remaining moisture should be removed from the tank using a dry cloth.

---

### 7.1.2 Disassembly of the tubing system

To disassemble the tubing system follow the instructions below:

- 1 Press the blue ring on the connector towards the case.
- 



---

*Picture 7-13: Pressing the blue ring on the connector*

- ▶ The tube is released.
- 2 Pull out the tube end.

## 7.2 Storage

For storage of the training torso follow the instructions below:

- 1 Empty and disassemble the tubing system as described in chapter "7.1 Disassembly" on page 43.
- 2 Let all components like tubes and pumps air dry.
- 3 Close the body and pump cases.
- 4 Store the components in appropriate conditions (dry, temperature between 10°C and 35°C)

## 7.3 Disposal

Dispose packaging materials, defect components and water/blood correctly and environmentally friendly. Follow laws and regulations in your country.

## 8 Cleaning and maintenance

### 8.1 Cleaning

To guarantee trouble-free operation, the training torso has to be kept in clean and functional condition.



---

#### **DANGER**

##### **Danger for life due to liquids and electrical power.**

The training torso is operated with electric power. Penetrating liquids may cause a short or electrical shock. Disconnect the power cord before cleaning the training torso.

---

After use the components of the training torso have to be cleaned. Follow the instructions below:

#### **Requirements**

- The tubing system is empty and disassembled as described in chapter "7.1 Disassembly" on page 43.

#### **Procedure**

- 1 Remove remaining moisture from the tank using a dry cloth.
- 2 Wipe the body and pump case with a wet cloth and if necessary with a mild detergent.
- 3 Change the puncture sites of the torso in case they are worn out.



---

#### **HINT**

##### **Changing the puncture sites**

**Change the puncture sites when changing the tubing coils latest.**  
(see chapter "8.2.2 Changing the puncture sites" on page 49).

---

## 8.2 Maintenance

The training torso is free of maintenance to the largest extent. If used carefully and frequent cleaning no other action is needed to keep the training toros in good condition.

Some components are worn out during use. In the following chapters you will find information how to exchange them.



---

### **HINT**

Information about available spare parts can be found in chapter "3.4 Spare parts and accessories" on page 18.

---

### 8.2.1 Changing the tubing coils

If one of the tubing coils contained in the lower part of the body case for pulling the tubes is used, it has to be replaced.

To replace a tubing coil, follow the steps below:

- 1 Empty the tubing system as explained in chapter "7.1.1 emptying the tubing system" on page 43.
- 2 Switch off the pumps and disconnect the power cord from power supply.
- 3 Open the body case and open the inner cover.
- 4 Open both screw clamps of the tubing coil that has to be exchanged.
- 5 Pull the remaining tubing out of the body.
- 6 Connect the new coil to the connector inside the case.
- 7 Insert the new tubing into the torso.



---

### **HINT**

#### **Puncture site**

To insert the new tube into the puncture site, use talkum powder for less friction.

---

- 8 Connect the tube end to the connector on top of the inner cover and fix it using the screw clamp.



- ▶ The tubing coil is successfully exchanged

- **8.2.2 Changing the puncture sites**

To change a puncture site follow the instructions

- 1 Remove the used puncture site from the cavity in the torso.
- 2 Remove the tubing from the puncture site.
- 3 Insert the tubing into the new puncture site.
- 4 Push the new puncture site into the cavity in the torso.
  - ▶ The puncture site is successfully exchanged.



## 9 Relevant documents

This user manual is valid together with the following documents:

- EC-Certificate of conformity
- Security data sheet „AlgExit“
- Operation manual of person protection switch PRCD-S+
- User manual 1048 3148 (Universal pump)
- User manual centrifugal pump



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## Your contact



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