

**FLUID MANAGEMENET SYSTEMS**

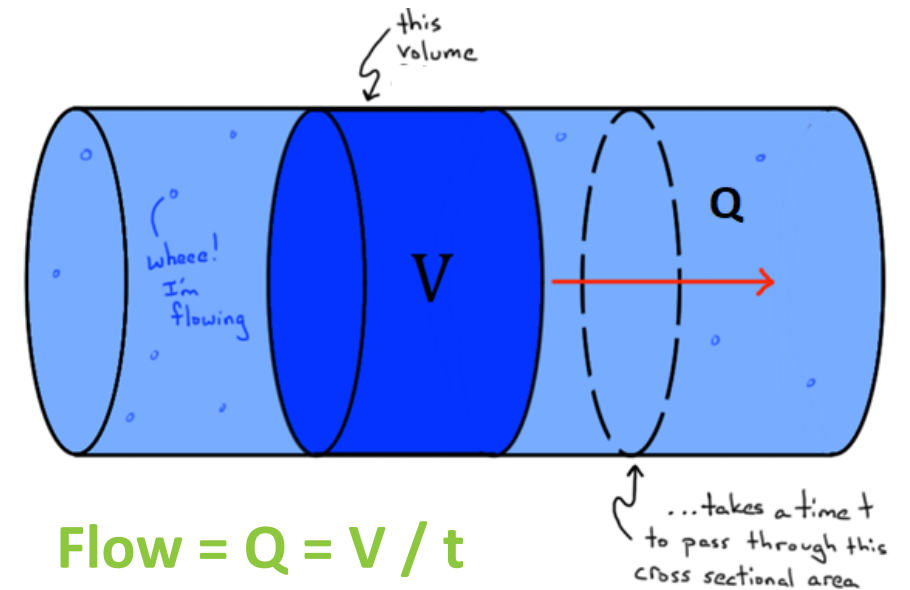
**INGENIOUS**

1. DEFINITIONS
2. GENERAL PRODUCT INFORMATION
3. SPECTRA PUMP
4. RECOMMENDED PARAMETRES
5. CAUTIONS
6. CLEANING METHOD
7. COMPARAISON

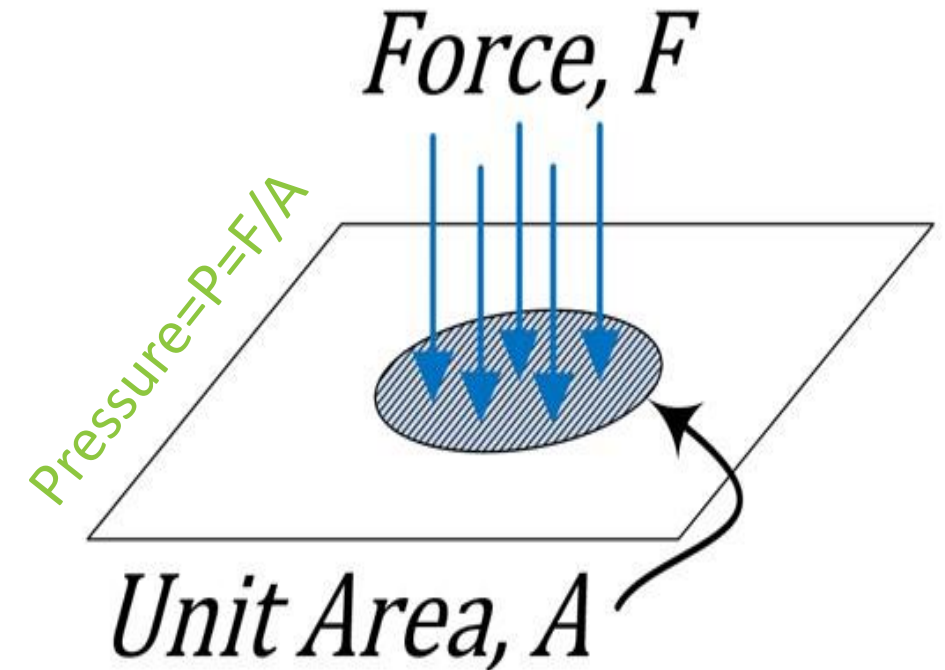
- A machine or device that is used to force a liquid to flow in a particular direction.
- The Fluid Pump is designed to deliver fluids to an operation area at a given pressure.
- The parameters defining its primary function are: flow - given in [l/min], and effective pressure - given in [mmHg].



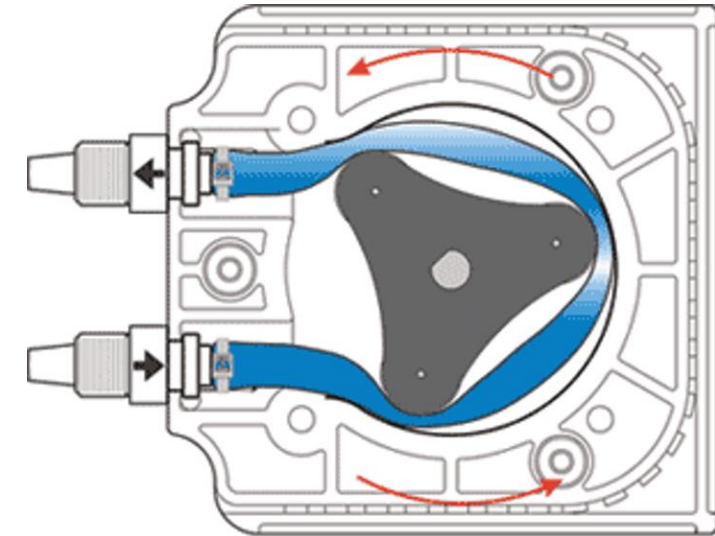
- **Flow (Q)** is the measure of liquid output volume per unit of time.
- The flow formula is  $Q = V / t$
- The common units are liters per minute (l/min) and cubic feet per minute (CFM).
- To ensure a fast fluid delivery >>> increase flow rate.



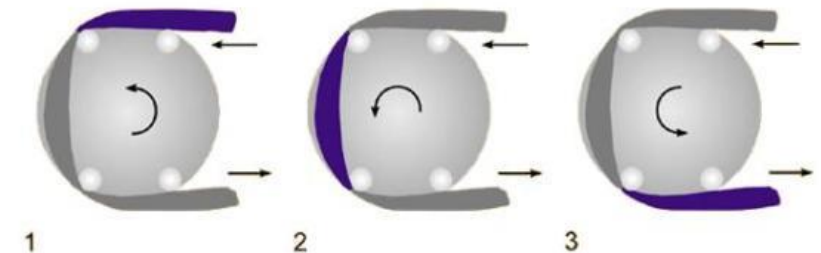
- **Pressure (P)** is defined to be the amount of force (F) applied per unit area (A).
- Pressure formula is  $P = F / A$
- The most frequently used units of pressure are:
  - pascal (Pa)
  - psi (pound per square inch)
  - torr (mmHg)



- Also commonly known as a roller **pump**, is a type of positive displacement **pump** used for **pumping** a variety of fluids.
- Transfers fluids sealed inside of a tube to prevent cross-contamination.
- This **pump** is the best choice for medical application purposes that require precise dosages of liquid.
- Most **peristaltic pumps** work through rotary motion.
- Only the **pump** tube touches the fluid, eliminating the risk contamination.



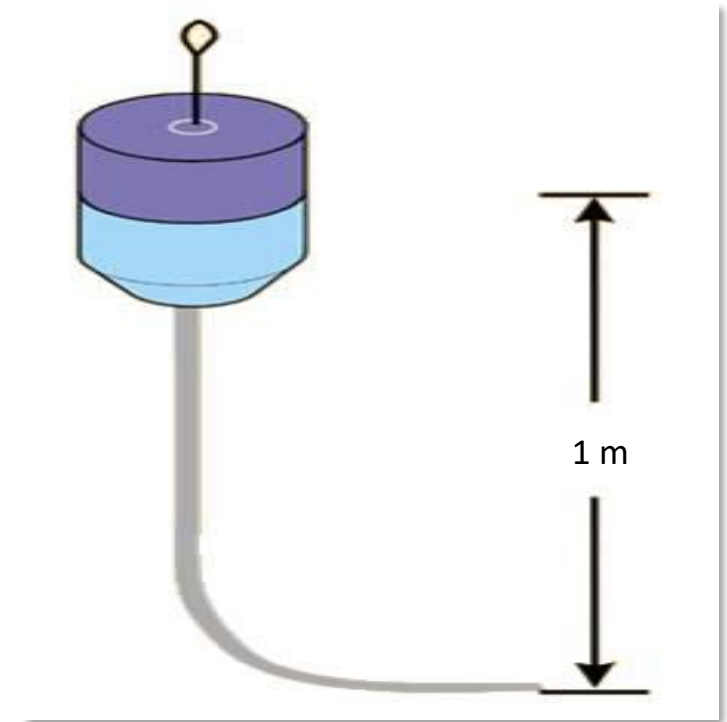
**Peristaltic Pump**  
progressive squeezing action  
few components



### FOR A SAFE INDICATION WE NEED STABLE PRESSURE AND CONTINUOUS FLOW

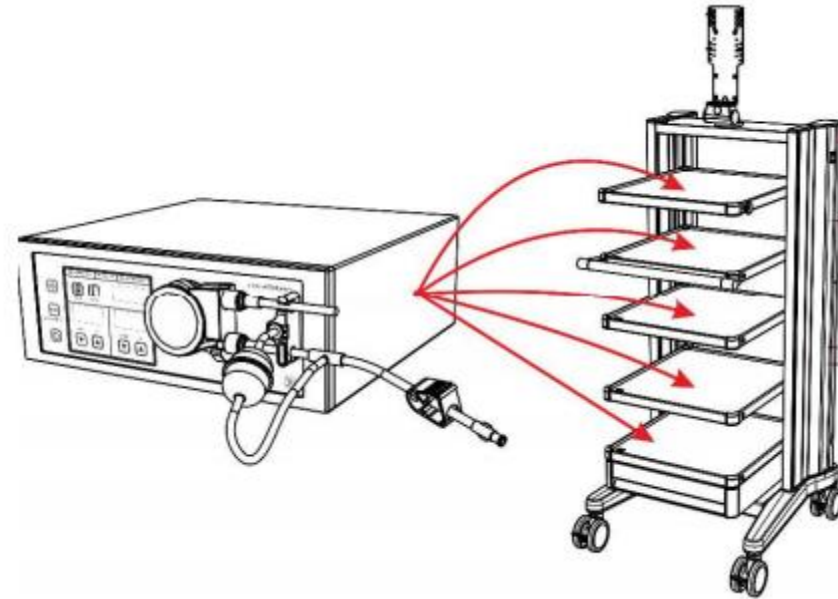
#### A NATURE BASED PRINCIPLE

- Elevation generates pressure
- Gravity can generate 75 mmHg of pressure per 1 meter elevation difference
- Pressure and resistance determine flow
- A limited amount of fluid emerges from the tube per minute
- Control over pressure and flow almost impossible with gravity!



### BASIC STEPS TO USE A PUMP:

1. Place the pump on the trolley
2. Power it up
3. Wait until the self test is running
4. Install the tubing
5. Set up working parameters
6. Press Pump





General surgery (Laparoscopy)



**SPECTRA SUCTION  
IRRIGATION PUMP**

Minimal Invasive surgery (HYS / URO / ARTH)



**SPECTRA UNIVERSAL  
IRRIGATION PUMP**

**SPECTRA SUCTION AND IRRIGATION PUMP** dedicated to laparoscopic surgeries. The optimum adjustment of pressure and flow parameters allows for effective tissue rinsing and effective aspiration of fluid during laparoscopic procedures.

The SPECTRA SUCTION / IRRIGATION PUMP offers:

1. **Autonomous suction and irrigation channels**
2. **Automatic controlled parameters**
3. **Multi – connectivity**
4. **Smart alarm system**
5. **Two interface modes (manually / remotely)**
6. **Silent device**



## AUTONOMOUS SUCTION AND IRRIGATION CHANNELS

Independent suction and irrigation channels

## SUSTAINABILITY

Predefined suction and irrigation parameters

## SMART ALARM SYSTEM

Acoustic and visual warning in case of incorrect tubing placement

## AUTOMATIC CONTROLLED PARAMETERS

Working parameters controlled by suction-irrigation laparoscopic instrument

## REMOTE CONTROL

Remotely controlled suction & irrigation modes

## MULTI - CONNECTIVITY

Compatibility with various models of laparoscopic suction-irrigation instruments

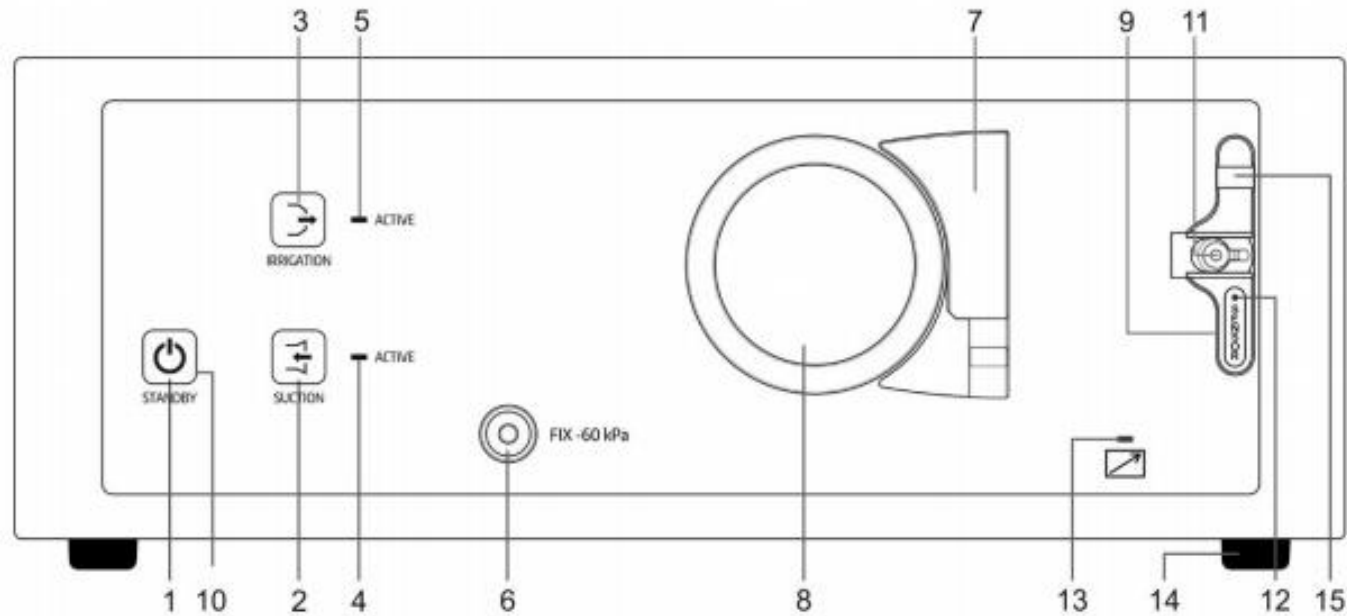
## SUCTION MODE

Suction based on the high quality vacuum pump module

## IRRIGATION MODE

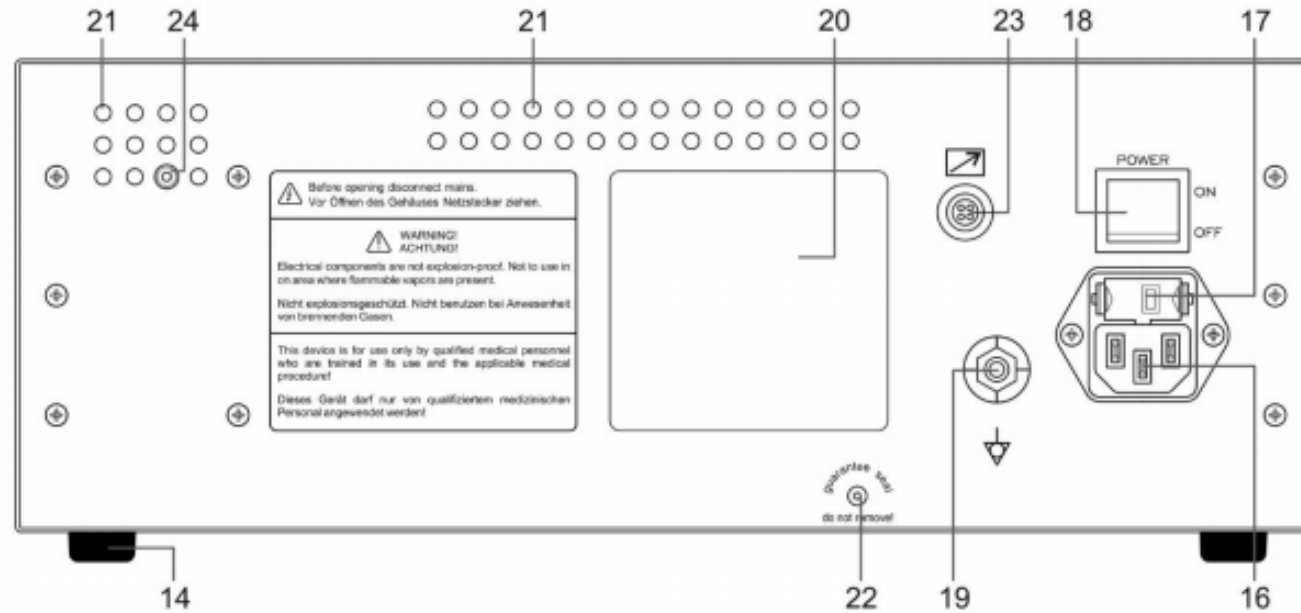
Irrigation based on the peristaltic pump module





- 1. STANDBY button for switching the unit on/off
- 2. SUCTION button for switching the suction
- 3. IRRIGATION button for switching the irrigation
- 6. Suction tube connection to secretion container
- 7. Tensioner - used for correct tubing installation on the drive wheel

- 8. Pump drive wheel - gives peristaltic motion to fluids transported in the tubing.
- 10. Button backlight - backlighting of edges and icons on buttons active in a particular mode
- 11. Sensor socket - socket of the pressure measurement system.



**16.** Electrical socket - socket with fuse drawer.

**18.** Power switch - two-pole ON/OFF-type switch for powering the unit on and off.

**19.** POAG equipotential stud - connector for levelling the electrical potential of the pump casing with the potential of other devices

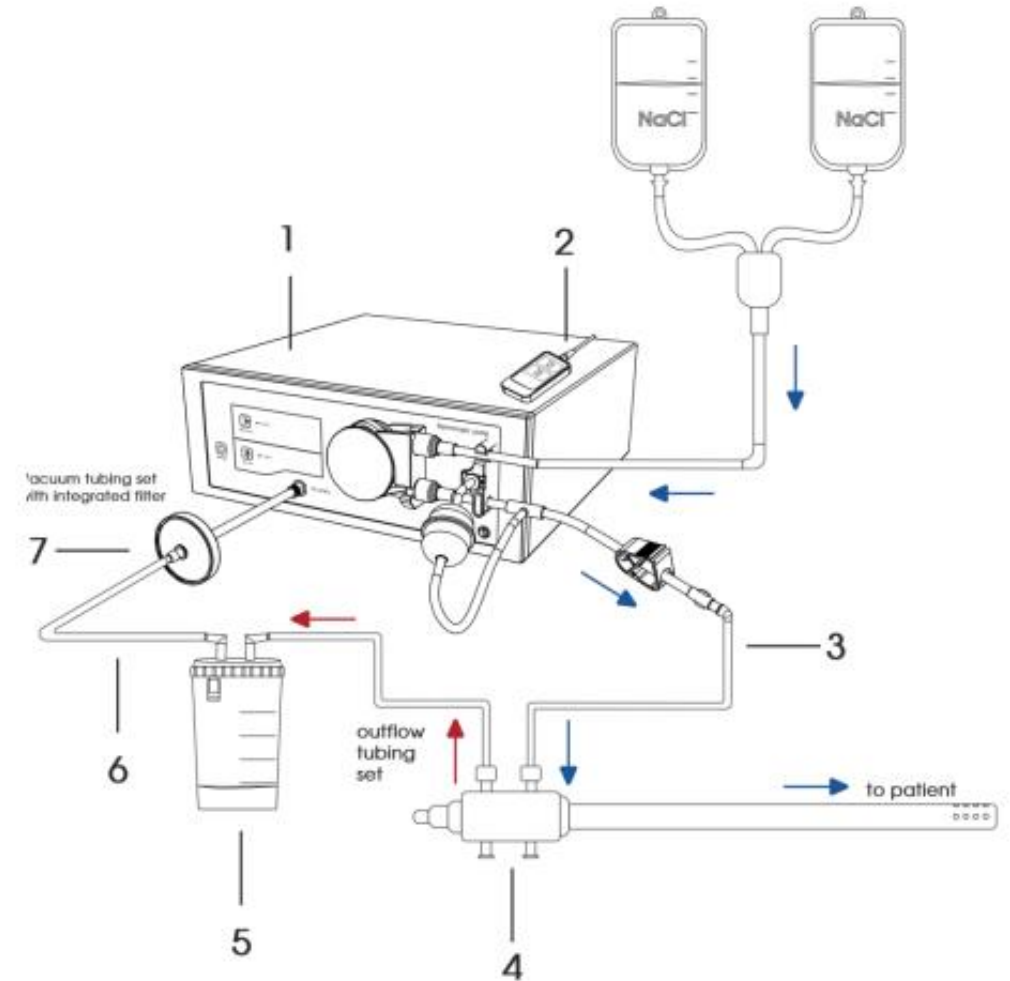
**21.** Ventilation opening - used for passive ventilation of the unit interior.

**23.** Socket for the remote control connection.

**24.** The outlet of suction system - used to vent air produced during emptying container installed in the suction system.

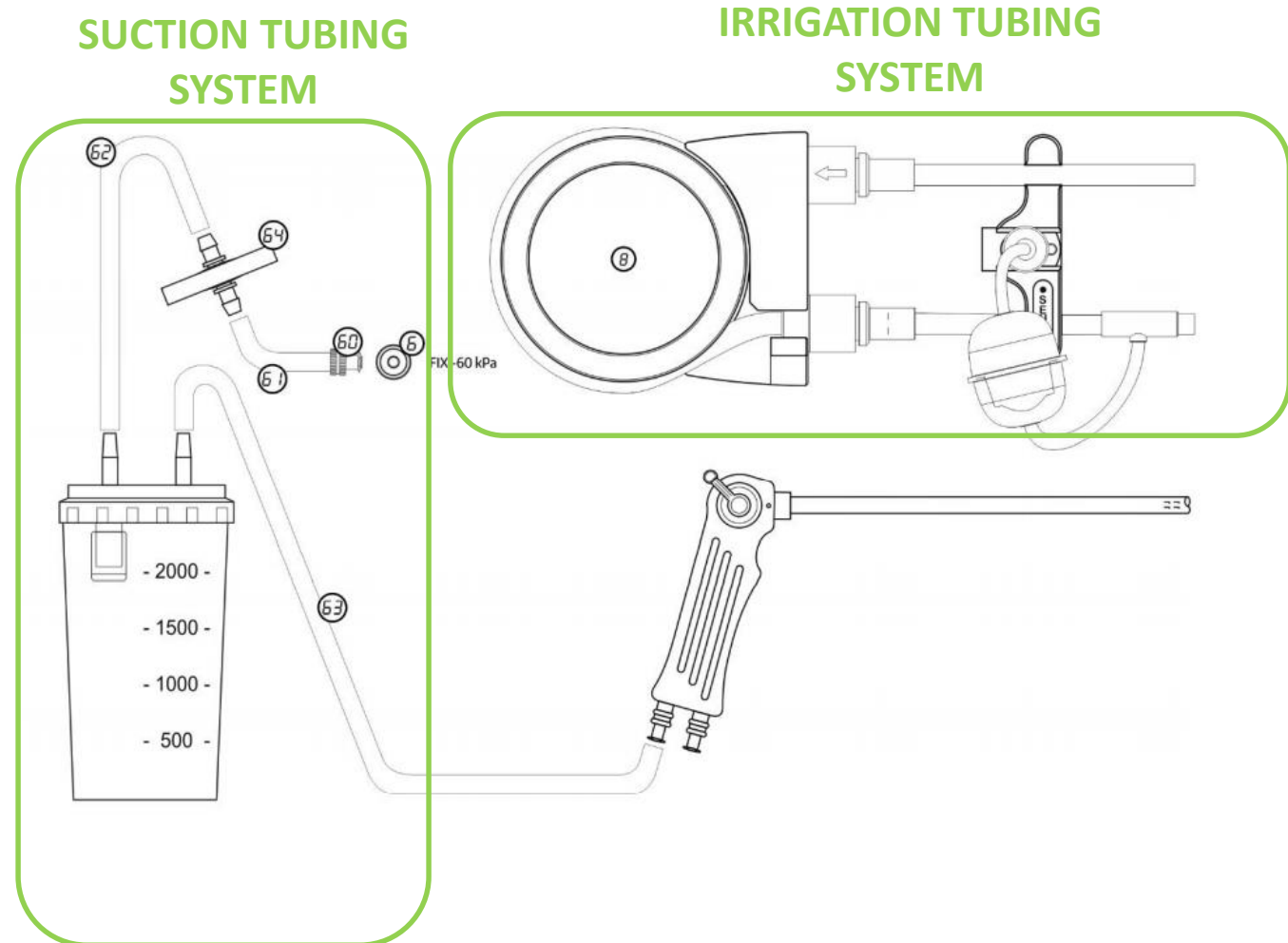
<b>Power connection</b>	<b>100-240 VAC; 50/60 Hz</b>
Irrigation flow rate	1.8 l/min (+/- 10%)
Suction flow rate	1.8 l/min (+/- 10%)
Max pressure in irrigation	400 mmHg (+/- 50%)
Suction pressure	50 Kpa to – 60
Suction noise level	55 dB (A)

- 1 Suction-Irrigation pump
- 2 Remote control
- 3 Tubing set
- 4 Suction irrigation tool
- 5 Suction canister
- 6 Suction tubing
- 7 Hydrophobic filter + filter connection tubing



We distinguish two tubing systems:

1. Irrigation system tubing
2. Suction system tubing



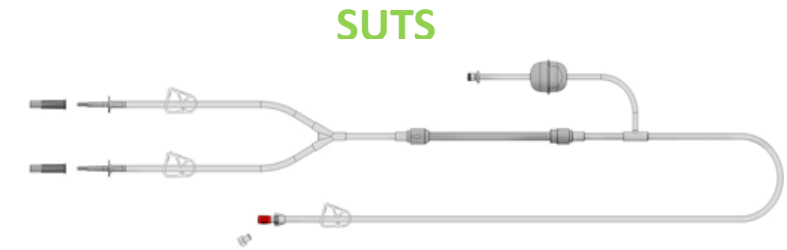


## THE IRRIGATION TUBING SYSTEM CONSISTS OF 2 OPTIONS:

### A. Single-Use Tubing Set (SUTS)

This type of tubing requires replacement after each usage. Usage of SUTS forces also replacement of FLUID BAG each time.

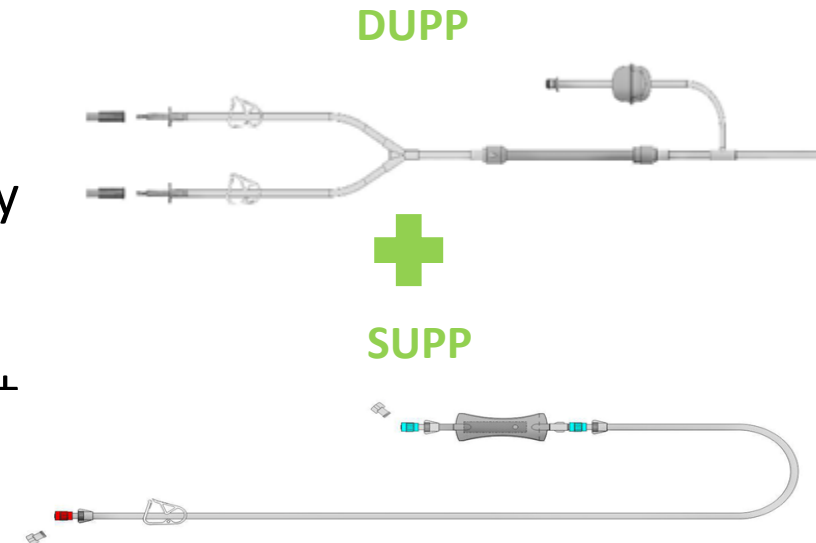
COST OF SINGLE TREATMENT = price of SUTS + price of FLUID BAG.



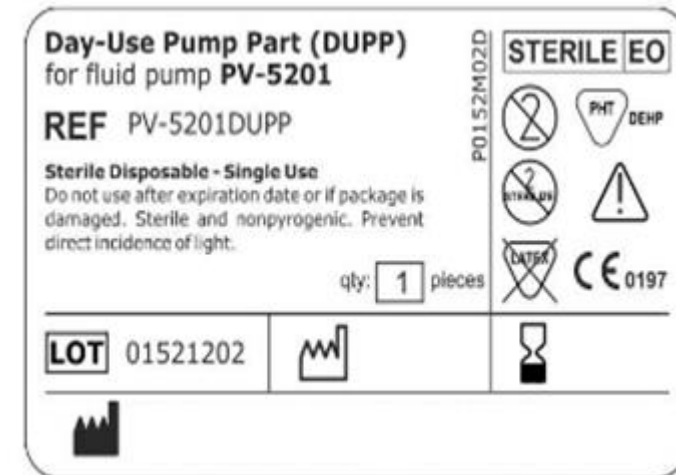
### B. Day-Use Pump Part (DUPP) + Single-Use Patient Part (SUPP)

Economical approach allows to use **DUPP** for entire surgical day and replace only **SUPP** for each surgery.

COST OF SINGLE TREATMENT = price of SUPP + [(price of DUPP + price of FLUID BAG) / number of treatments during a surgical day]

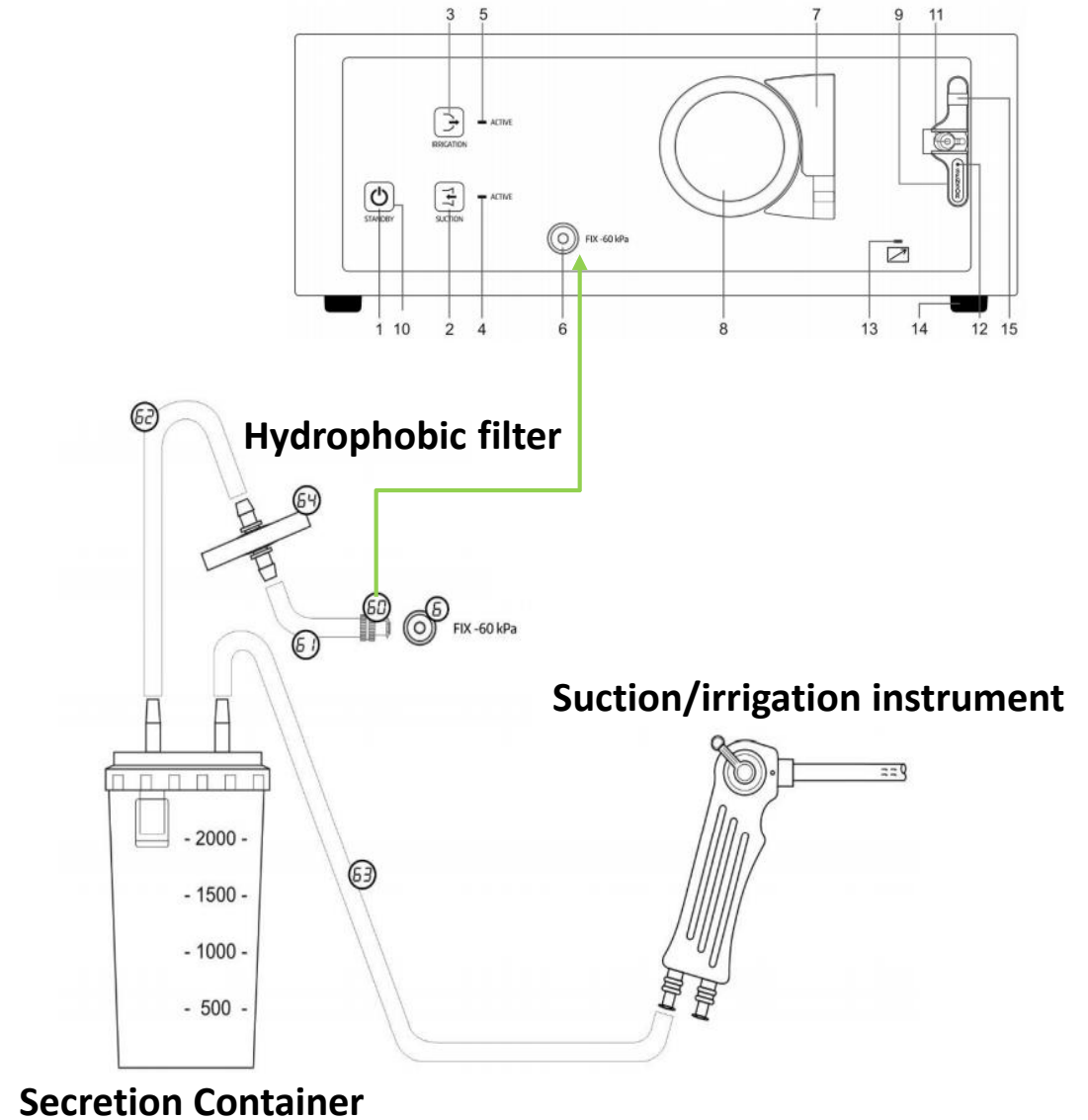


- Designed in the way to make it easy for medical staff to prepare a pump for a surgery.
- Installed directly to the pump control unit
- Includes sensor for device identification
- Sterile and Single use tubes
- 5 years of shelf life
- Working Length – 2.4m
- Economical



## THE SUCTION TUBING SYSTEM CONSISTS OF :

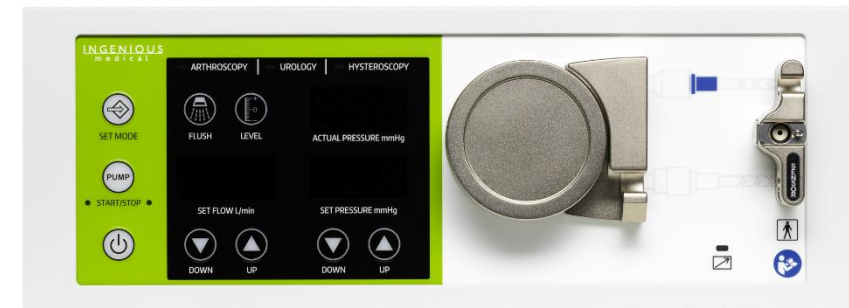
- a) Silicone tube for hydrophobic filter connection (PV-5512STF)
- b) Secretion container tubing
- c) Suction-irrigation instrument tubing
- d) Hydrophobic filter type 2200/02



**SPECTRA UNIVERSAL IRRIGATION PUMP** dedicated for arthroscopic, hysteroscopic and urologic surgeries is a medical fluid pump designed to deliver fluid under a given pressure to an operating area. Controlled by a control unit panel and a remote controller.

The **SPECTRA UNIVERSAL IRRIGATION PUMP** offers:

1. **Universality (3 modes)**
2. **Intelligent auto test feature**
3. **Smart alarm system**
4. **Two interface modes (manually / remotely)**
5. **FLUSH function**
6. **Level function**



## UNIVERSALITY

3 modes are available:  
arthroscopy, hysteroscopy and  
urology

## INTUITIVE INTERFACE

Simple and easy to learn user  
interface for all modes

## SMART ALARM SYSTEM

Acoustic and visual warning in  
case of incorrect tubing  
placement / leak detection

## INTELLIGENT AUTO-TEST FEATURE

The device checks the status  
of: sensors, motors, displays  
and buttons



## REMOTE CONTROL

Remotely controlled suction &  
irrigation modes

## SENSOR REDUNDANCY

2 independent pressure  
sensors one checks the other  
one

## NON-VOLATIL MEMORY

Pump always remembers starting  
values

## AUTOMATED FLOW ADJUSTMENT

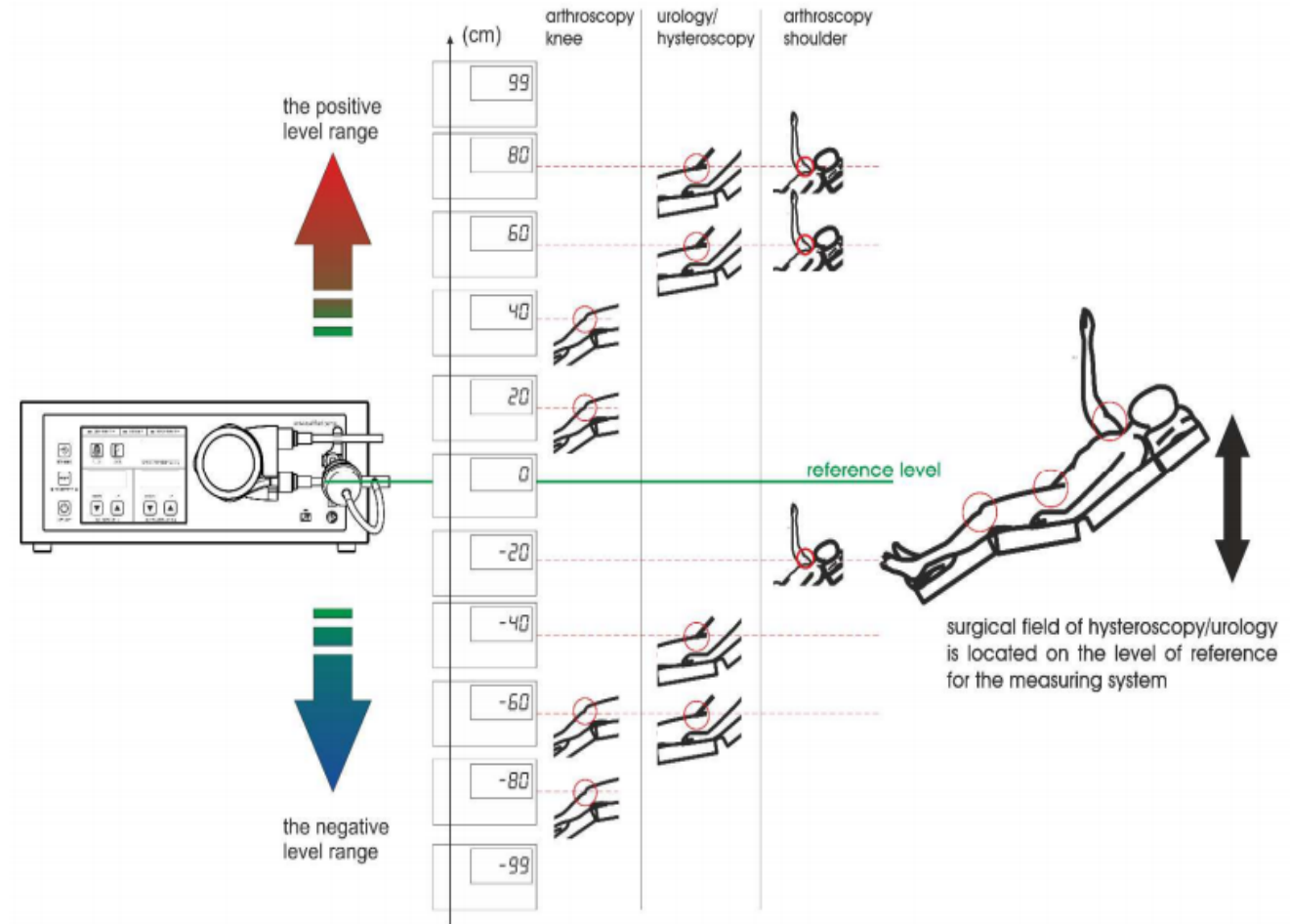
Automatic, stepless flow rate  
adjustment during pump operation

## LEVEL FUNCTION

- Used to determine the position of the patient in relation to the plane of the unit and corrects for this difference using hydrostatic pressure equalization.

Steps to adjust level of peristaltic pressure:

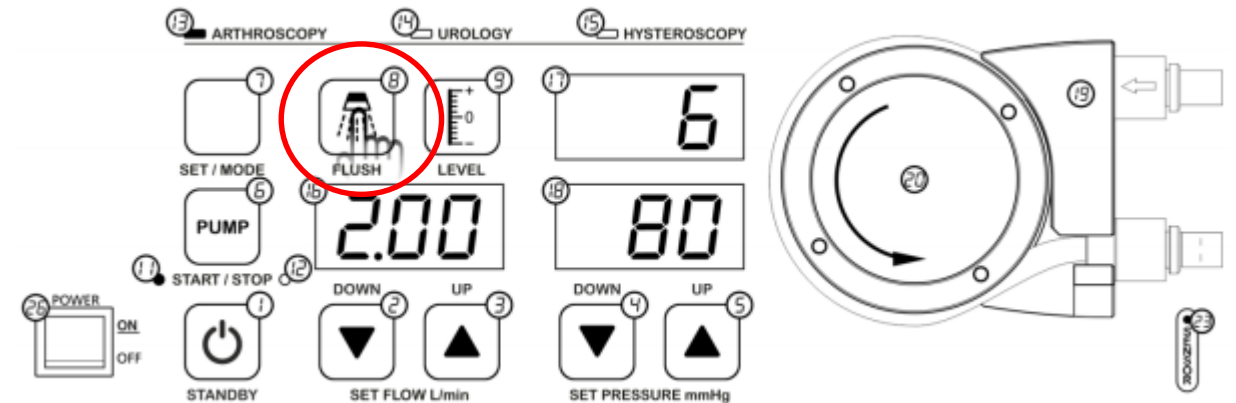
- If Patient is above then increase level value else if the patient is below then decrease level value
- Estimate level value in cm.
- Confirm level value.

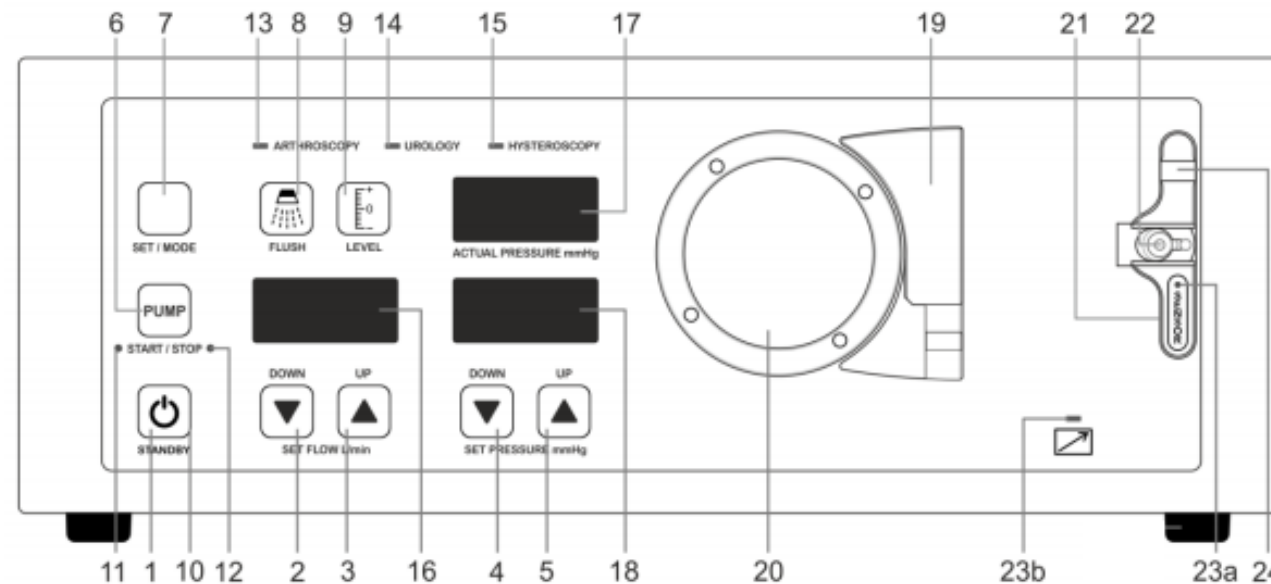


## FLUSH FUNCTION (available only for Arthroscopy mode):



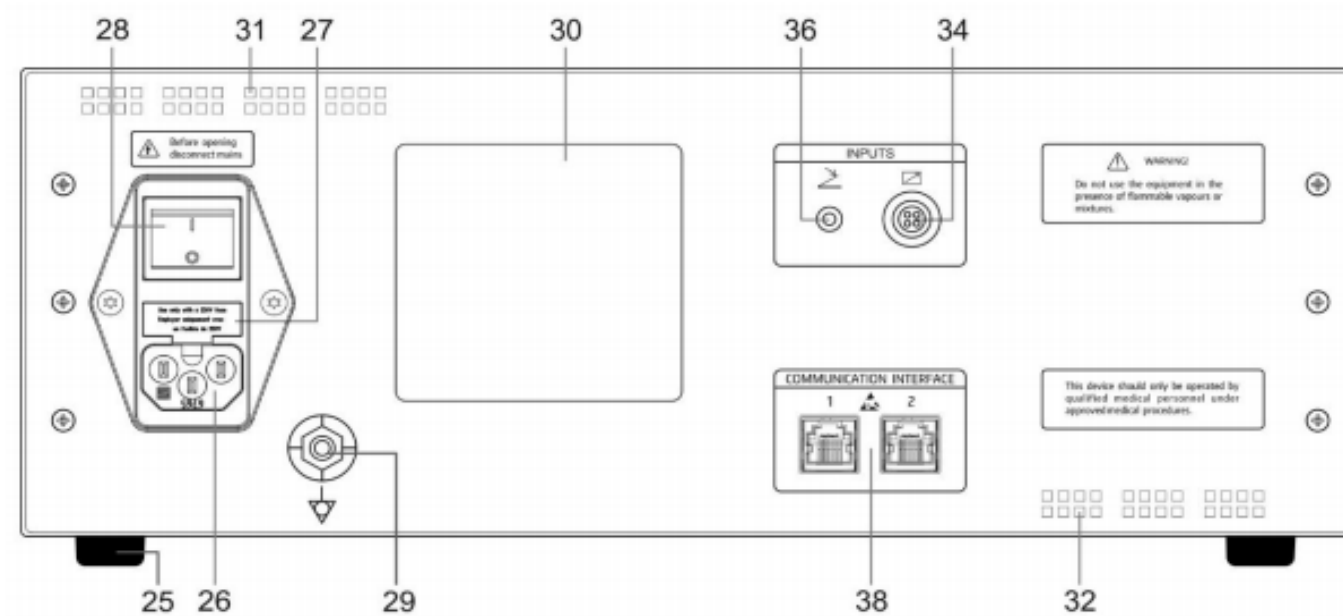
- Rapid pressure increase by 50% of current pressure for 20 sec helpful in e.g. arm arthroscopy
- Flow increase up to 2l/min to clean the operating area.





- 1. STANDBY button for switching the unit.
- 2. SET FLOW DOWN button.
- 3. SET FLOW UP button.
- 4. SET PRESSURE DOWN button.
- 5. SET PRESSURE UP button.
- 6. PUMP button for switching the pump on/off.
- 7. SET/MODE button for confirmation of one of the three operation modes .
- 8. FLUSH button for switching on the flushing.
- 9. LEVEL button for activating the. hydrostatic pressure equalization function
- 16. Display window for desired flow
- 17. Display window for measured pressure
- 18. Display window for desired pressure.
- 22. Sensor socket - socket of the pressure measurement system.





- 26.** Electrical socket with fuse drawer.
- 28.** Main switch to switch on/off.
- 29.** POAG equipotential stud connector for levelling the electrical potential of the pump casing.

- 34.** Socket for the remote control connection.
- 38.** COMMUNICATION INTERFACE RJ-11 socket dedicated to pass the information to endoscopic camera about device status.

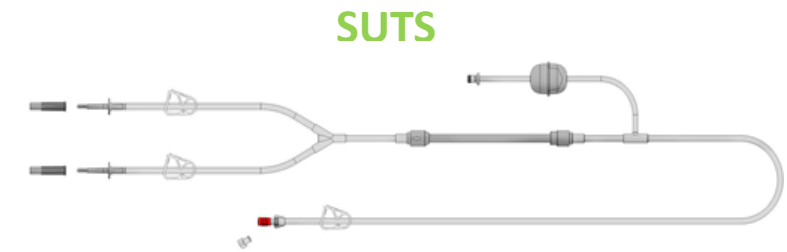
<b>Power connection</b>	<b>100-240 VAC; 50/60 Hz</b>
Power consumption	65 VA
Pressure range	10-200 mmHg(+/-10%)
Flow range	0.1 – 2l/min(+/- 10%)

## THE IRRIGATION TUBING SYSTEM CONSISTS OF 2 OPTIONS:

### A. Single-Use Tubing Set (SUTS)

This type of tubing requires replacement after each usage. Usage of SUTS forces also replacement of FLUID BAG each time.

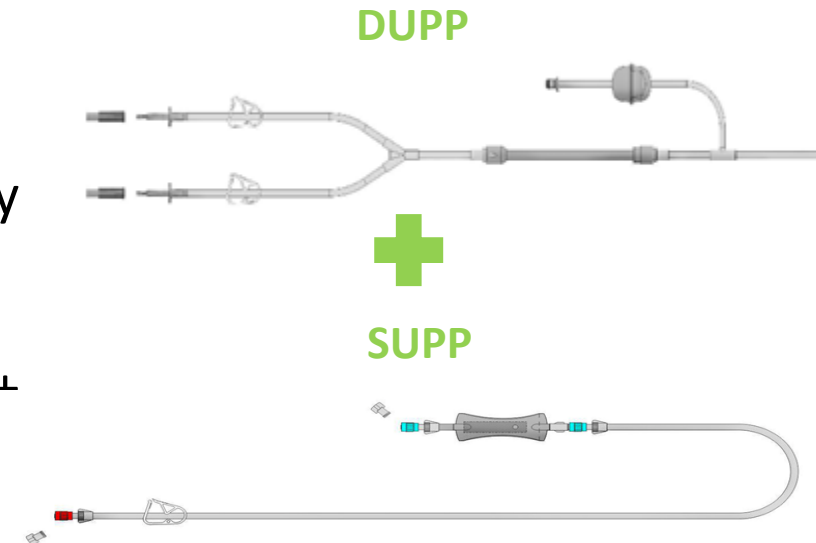
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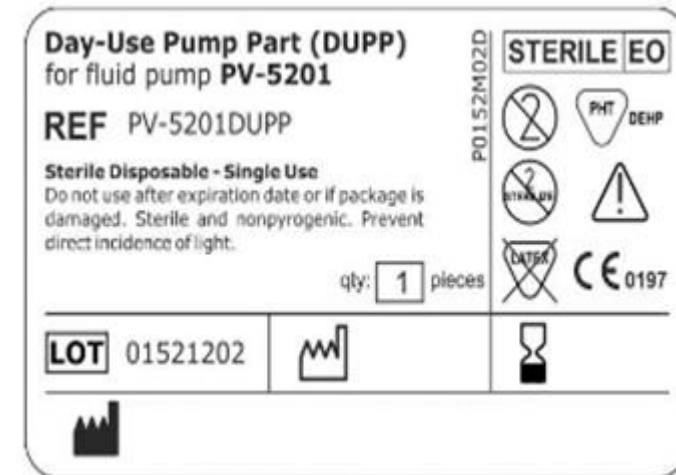
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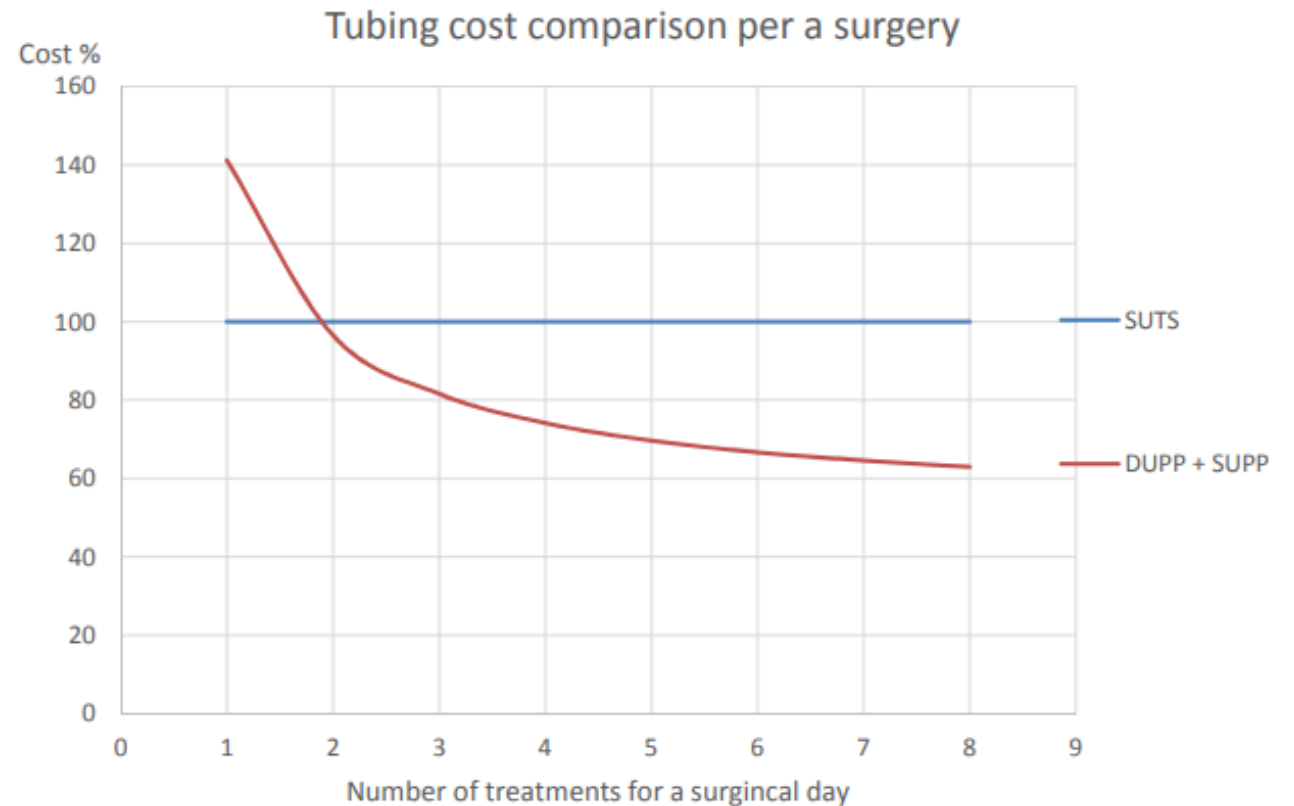
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- Designed in the way to make it easy for medical staff to prepare a pump for a surgery.
- Installed directly to the pump control unit
- Includes sensor for device identification
- Sterile and Single use tubes
- 5 years of shelf life
- Working Length – 2.4m
- Economical



- The economical tubing approach (DUPP+SUPP) may decrease the cost of each single treatment up to 40% with reference to single use approach (SUTS).





## UROLOGY

Pressure: 50 mmHg

Flow: 1.0 l/min



## HYSTEROSCOPY

Pressure: 50mmHg

Flow: 0.5 l/min

- All above values are assumed for proper LEVEL set up
- The following values should be treated as good starting values which may be modified according to needs of the operator
- The Pump always remembers starting values.



## ARTROSCOPY

	Pressure W/O Torniquet (mmHg)	Pressure With Torniquet (mmHg)	Flow (l/min)
Shoulder	50-60		1.5
Knee	50-65	40	1.5
Wrist	65	30	1.5
Elbow, ankle	65	40	1.5
Hip	65		1.5

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- The Pump always remembers starting values.

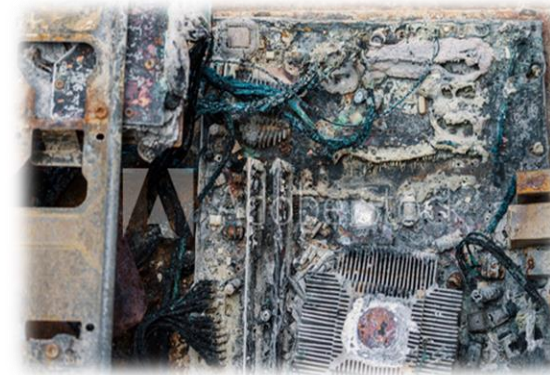
- Use sterile irrigation fluids only adjusted to a treatment.
- The tubing set in a suction path up to the hydrophobic suction filter hydrophobic including secretion container, must be sterile. If a reusable silicone tubing is used after each procedure it must be washed, disinfected and sterilized.
- Pay special attention to not bend or tension tubing set when the fluid pump operates.
- In order to protect the device from contamination, disposable hydrophobic filters must be used. Hydrophobic filter requires replacement after every treatment.
- Always keep a filled fluid bag on hand ready for replacement in order to don't interrupt surgery due to a lack of fluid.





- Never place a PUMP unit in an autoclave.
- For cleaning and dis-infection device could be

**ONLY WIPPED.**



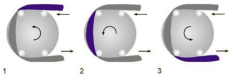
**INDEPENDENT SUCTION AND IRRIGATION CHANNELS**  
SUCTION AND IRRIGATION CHANNELS ARE AUTONOMOUS

**AUTOMATIC CONTROLLED PARAMETERS**  
CONTROLLED BY SUCTION-IRRIGATION LAPAROSCOPIC INSTR.

**REMOTE CONTROL**



**IRRIGATION MODE**  
DONE BY MEAN OF A PERISTALTIC PUMP



**SEVERAL TUBING OPTIONS**  
DAY / SINGLE USE TUBING SETS



**LOW NOISE LEVEL**



**SUCTION MODE**  
DONE BY MEAN OF A VACUUM PUMP


**SMART ALARMING SYSTEM**  
VISUAL AND AUDIBLE ALARM




**SYSTEM SAFETY**  
SUCTION MODULE CONNECTED TO EXTERNAL FILTER TO AVOID LIQUID BACKFLOWS



**MULTIPLE MODE**  
ARTHRO / URO / HYS




**LEVEL FUNCTION**  
FLOW ADAPTATION IN REFERENCE  
TO PATIENT POSITION



**REMOTE CONTROL**




**SMART CALIBRATION**  
COMPONENTS CHECK BEFORE  
STARTUP



**AUTOMATED FLOW ADJ.**  
STEPLESS FLOW RATE ADJUSTMENT  
DURING IRRIGATION


**LEAK DETECTION**  
AUDIBLE ALARM FOR LEAK




**FLUSH FUNCTION**  
USEFUL IN ARTHROSCOPY




**NON-VOLATIL MEMORY**  
PUMP ALWAYS REMEMBER  
STARTING VALUES

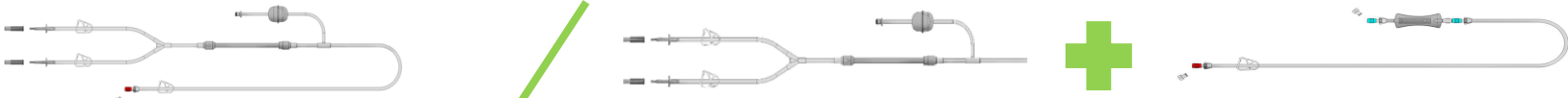


**SENSOR REDUNDANCY**  
2 INDEPENT PRESSURE SENSORS

**SMART ALARMING SYSTEM**  
VISUAL AND AUDIBLE ALARM



**SEVERAL TUBING OPTIONS**



**SINGLE-USE TUBING SET (SUTS)**      **DAY USE PUMP PART (DUPP)**      **SINGLE-USE PATIENT PART (SUPP)**

■ INGENUITY  
■ FOR  
■ HEALTH

THANK YOU

INGENIOUS

INGENUITY  
FOR  
HEALTH



INGENIOUS