



**WATER AND AIR UV STERILIZERS**

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**WATER STERILIZERS  
MODELS: AM1; AM2; AM3; AM4; AM5;  
AM6; AM8; AM10; AM12; AM15**



***MANUAL***

Patent nr A61L2/10, AA61L9/20

## **User Safety**

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### **Warning**

This device may only be operated and installed by qualified personnel. Before installation, servicing or repairs verify the qualifications of personnel and limit these activities to such personnel. Any activities on this device can only proceed after thorough familiarization with this instruction. Noncompliance with the precautions listed hereon might expose personnel to serious bodily harm (damage to human skin from UV radiation), or damage to the device alone. The manufacturer, TMA, is not responsible for damage to the device caused by improper installation, maintenance and operation.

#### **1. READ THE MANUAL.**

Before proceeding with any activity with the sterilizers read the manual.

#### **2. RETAIN THE MANUAL.**

Retain the manual for reference during the whole time the device is in operation. All precautions and warnings shall be obeyed by the user all times during the operation of the device.

#### **3. POWER SUPPLY AND GROUNDING.**

Device is exclusively designed to be supplied from 220-230V 50Hz mains. It shall be installed and grounded in accordance with this manual and the local electrical code. To guard against electrical shock, unplug the device every time work is to be done on it.

#### **4. GROUNDING.**

Operation of the device without connected grounding is inadmissible. Ungrounded operation might lead to occurrence of electrical shock and serious bodily harm with death included. The chamber is grounded with green-yellow wire with an eyelet, which is to be attached with M5 screw top end of chamber of the sterilizer.

#### **5. ULTRAVIOLET RADIATION.**

Direct exposure to UV radiation is harmful to human skin and sight, which can cause from reddening of skin to serious burns or ultimately loss of eyesight, depending on the time of exposure. In such cases one shall contact physician as soon as possible. Avoid any exposure to UV radiation.

## **Instalation and operation instructions**

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Thank you and congratulations on your purchase of TMA manufactured UV sterilization product. Sterilizers made by TMA are made from highest quality stainless steel. The thickness of the chamber wall guarantees high factor of safety in operation. All the raw materials and components are of best quality and were processes or manufactured in the countries of the EU. Plastics used in production of the lamp hoods withstand 110°C working temperatures. Devices completed successfully 30 Atm pressure trials. In the models series AM we introduced additional guides for the quartz sleeves easing the assembly and disassembly. This solution allows the same ease of assembly for device working horizontally, or vertically. This guide prevents the quartz sleeve from breaking during the routine maintenance. The turbulent flow induced by the guide increases the efficacy of disinfection. During the first 100 hours of operation the efficacy of disinfection is greater by 15% from the rated for the device. New features allow continuing disinfection even without flow of water through the chamber. The design of the chamber contributes to lower incidence of sediment from calcium and magnesium on the surface of the quartz sleeve. Models series AM are equipped with more durable amalgamate lamps– up to 12000 hours of service. The plastic lamp hood has a secondary function as a sight glass. This innovative solution of the use of transparent to visible light lamp hoods allows optical indication of the state of lamp. We hold high hopes that the implementations of these innovative solutions fulfill your expectations for new and more efficient products from TMA.

### **1. Introduction**

The device delivered to you is disassembled and shall be protected from sever shocks and drops, as the quartz sleeve and lamps are brittle and fragile. Do not touch lamp glass with bare hands! Fingerprints might cause the glass to break when it is under high operating temperatures. The sterilizer shall be exclusively transported in horizontal position. The manufacturer is not responsible for damage arising from the conditions of transport. Before installation and operation one shall read the instructions and implement the precautions listed.

Noncompliance with these precautions is grounds for releasing the manufacturer from warranty obligations

## 2. Applications

Disinfection with UV radiation is a reliable, simple and inexpensive method of sterilization. The use of this method is warranted every time when endangerment from microbes exists. Following applications might be listed among many others:

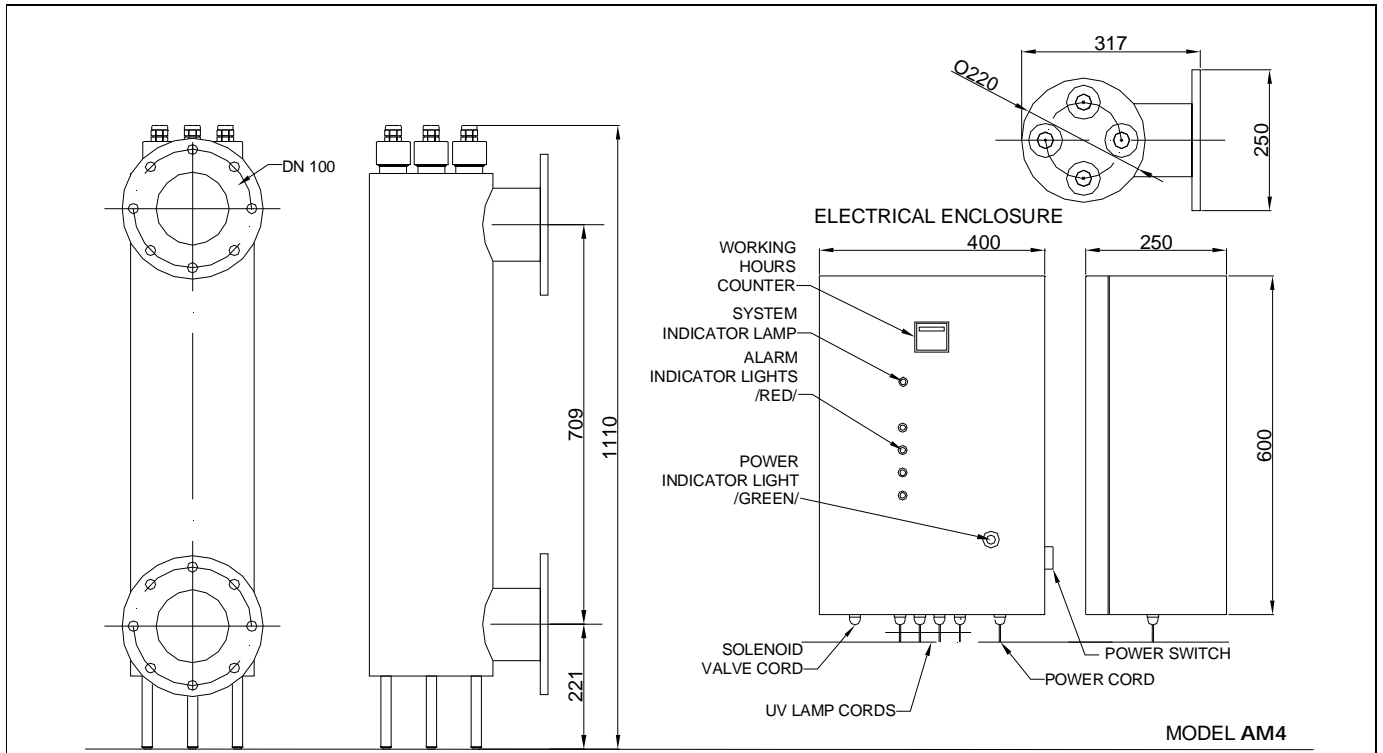
- Potable water in private and municipal installations
- Water potable and process in the restaurant and hotel business
- Process water in the production of medicines and cosmetics
- Water used in processing foodstuff
- Water in beverage production
- Water in swimming pools and fountains
- Control of green algae in ponds

**The primary advantages of UV sterilization are water without microbes and damaging chlorine so often used in sterilization of water.**

**Sterilizer uses special low pressure UV lamp to produce UV radiation of wavelength of 254 nm which causes photochemical reaction damaging DNA of microorganisms leading to death or sterility.**

The requirements for complete sterilization call for minimum dosage of 300J/ m<sup>2</sup> for potable water. Water flowing from the sterilizer is ready for immediate use. Sterilization UV does not change the chemical makeup of water. There is no danger of overdosing either.

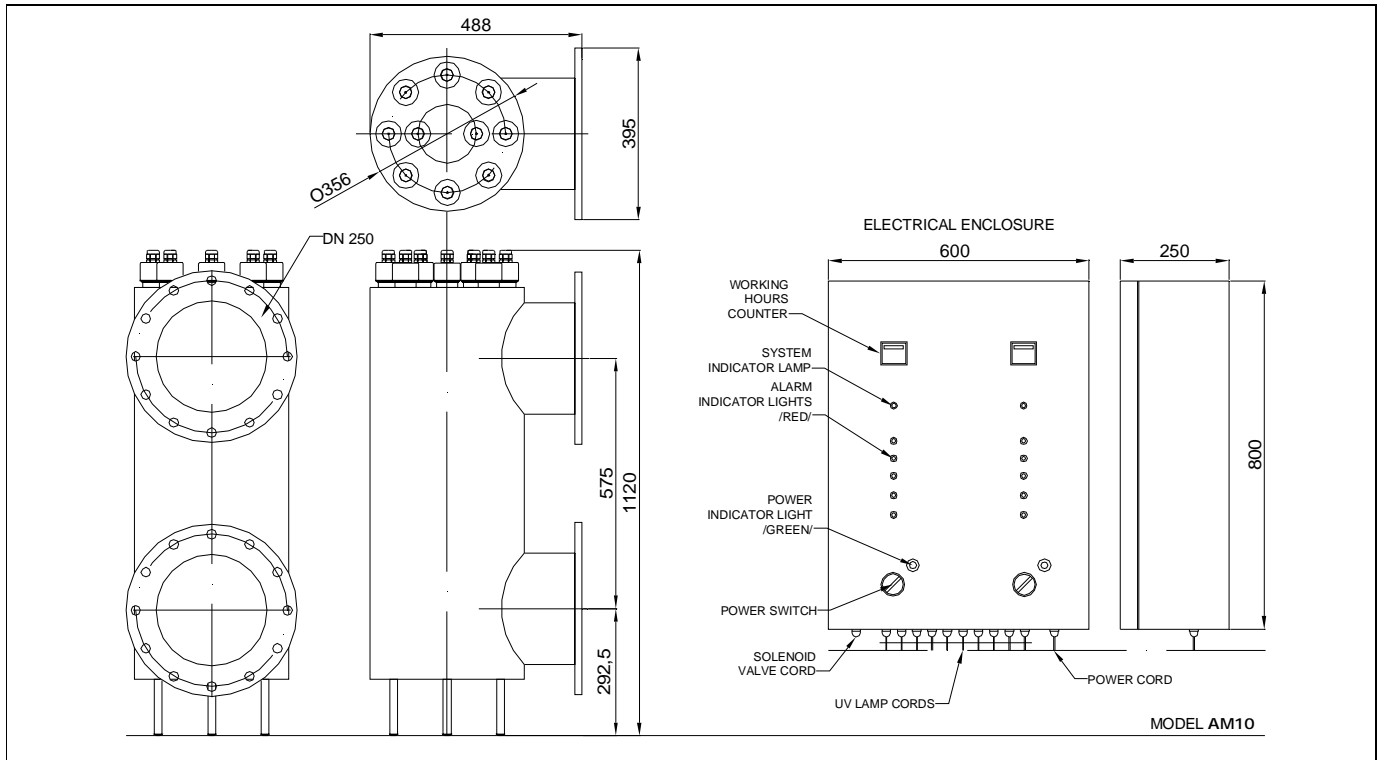
**3. Technical Specifications:**



### Technical Specifications:

Model	AM1	AM2	AM3	AM4	AM5
Power Supply	220V-230V				
Chamber Material	Stainless Steel				
Finish	Mirror Finish				
Dimensions /length. x width x height./mm	317x220x1110			317x250x1110	335x285x1110
Connection Size/Separation Dist..	DN80/ 735mm	DN100/ 735mm	DN100/ 735mm	DN125/ 709mm	DN150/ 683mm
UV Lamps /Number x Nominal Power/	1x130W	2 x130W	3 x130W	4 x130W	5 x130W
Life of UV Lamps	About 12 000 h				
Operating Temperature	0,5-50°C				
Operating Pressure	10bar(1MPa)				
Power UV @y 254nm	52 W	104 W	156 W	208 W	260 W
Nominal Power	160 W	320 W	480 W	640 W	800 W
Nominal Flow @ transmittance T <sub>10</sub> =95%, dose 300J/m <sup>2</sup>	28,0 m <sup>3</sup> /h	51,0 m <sup>3</sup> /h	88,0 m <sup>3</sup> /h	113,0 m <sup>3</sup> /h	163,0 m <sup>3</sup> /h
Nominal Flow @ transmittance T <sub>10</sub> =95%, dose 400J/m <sup>2</sup>	21,0 m <sup>3</sup> /h	38,0 m <sup>3</sup> /h	66,0 m <sup>3</sup> /h	84,0 m <sup>3</sup> /h	122,0 m <sup>3</sup> /h
Sight glass Muff	1	2	3	4	5
Drain Plug	Yes				
Working Orientation	Horizontal, Vertical				
<b>Electrical Enclosure and Controls</b>					
Material	Plastic	Steel			
Safety Class	IP 55	IP66		IP33	
Dimensions /mm	325x250x120	400x400x200	400x600x250		
Audible UV Lamp Fault Alarm	Yes				
Optical UV Lamp Fault Indicator	Yes				
Working Hours Counter	Yes				
Alarm System	Yes				
Solenoid Cut-Off Valve Terminals	Yes				
Terminals for Remote Alarm Indicator	Yes				
Remote ON/OFF Switch Terminals	Yes				
Weight with Enclosure	96,0kg	98,0kg	100,0kg	115,0kg	125,0kg
UV Intensity Measurement System	By Order /Optional/				





### Technical Specifications :

Model	AM6	AM8	AM10	AM12	AM15
Power Supply	220V-230V				
Chamber Material	Stainless Steel				
Finish	Mirror Finish				
Dimensions /length. x width x height./mm	463x340x1100		488x395x1120	544x445x1130	
Connection Size/Separation Dist	DN200/619mm		DN250/575mm	DN300/521mm	
UV Lamps /Number x Nominal Power/	6 x130W	8 x130W	10 x130W	12 x130W	16 x130W
Life of UV Lamps	About 12 000 h				
Operating Temperature	0,5-50 °C				
Operating Pressure	10bar(1MPa)				
Power UV @y 254nm	312W	416W	520 W	624 W	832W
Nominal Power	960 W	1280 W	1600 W	1920 W	2560 W
Nominal Flow @ transmittance $T_{10}=95\%$ , dose 300J/m <sup>2</sup>	226,0 m <sup>3</sup> /h	324,0 m <sup>3</sup> /h	484,0 m <sup>3</sup> /h	593,0 m <sup>3</sup> /h	832,0 m <sup>3</sup> /h
Nominal Flow @ transmittance $T_{10}=95\%$ , dose 400J/m <sup>2</sup>	170,0 m <sup>3</sup> /h	243,0 m <sup>3</sup> /h	363,0 m <sup>3</sup> /h	445,0 m <sup>3</sup> /h	624,0 m <sup>3</sup> /h
Sight glass Muff	6 szt.	8 szt.	10 szt.	12 szt.	16 szt.
Drain Plug	Yes				
Working Orientation	Horizontal, Vertical				
<b>Electrical Enclosure and Controls</b>					
Material	Steel				
Safety Class	IP 33				
Dimensions /mm	400x600x250	600x800x250		800x800x250	
Audible UV Lamp Fault Alarm	Yes				
Optical UV Lamp Fault Indicator	Yes				
Working Hours Counter	Yes				
Alarm System	Yes				
Solenoid Cut-Off Valve Terminals	Yes				
Terminals for Remote Alarm Indicator	Yes				
Remote ON/OFF Switch Terminals	Yes				
Weight with Enclosure	195,0kg	200,0kg	240,0kg	250,0kg	280,0kg
UV Intensity Measurement System	By Order /Optional/				

Increased flow through the sterilizer lowers the dosage delivered to microorganisms and

lowers effectiveness of disinfection without the need for bypass installation.

#### *Standard Features*

- electrical enclosure,
- lamp working hours counter,
- audible and optical alarm
- terminals for remote ON/OFF switch
- terminals for connecting electromagnetic valve shutting off flow in case of power or lamp failure

#### *Optional Accessories:*

- UV intensity sensor.

### **4. Description**

Sterilizer's chamber is made from stainless steel. Quartz sleeves with UV lamps are mounted in the chamber.

**The inlet is located in the bottom part of the chamber. The outlet is located at the top of the chamber.**

The drain plug is located at the bottom. It is used in emptying the chamber from fluid in the case the sterilizer is left idle for long period of time. The lamps are mounted inside the chamber in quartz sleeve and connected with the enclosure by hi-potential wire. The enclosure houses besides the power supply, the lamp working hours counter, the audible alarm and indicating lights with the terminals for electromagnetic shutoff valve in case of lamp or power failure

To the terminals number 1 and 2 /neutral/ inside the enclosure connect solenoid valve type NZ (open on power on) max.2A.

To the terminals 3 and 4 /life 230V/ inside the enclosure, after removing the jumper cable, connect remote switching on/off of the sterilizer:

1. Closed circuit – sterilizer on
2. Open circuit – sterilizer off.

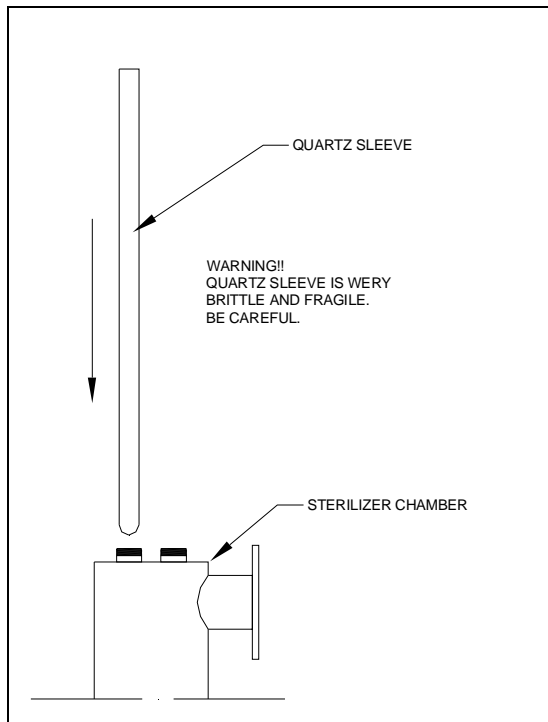
Power supply specifications 220-230V + 8%, -10%, 50-60 Hz.

Electric shock protection by earth terminal.

Transparent lamp hood allows for indication of working condition of the lamp.

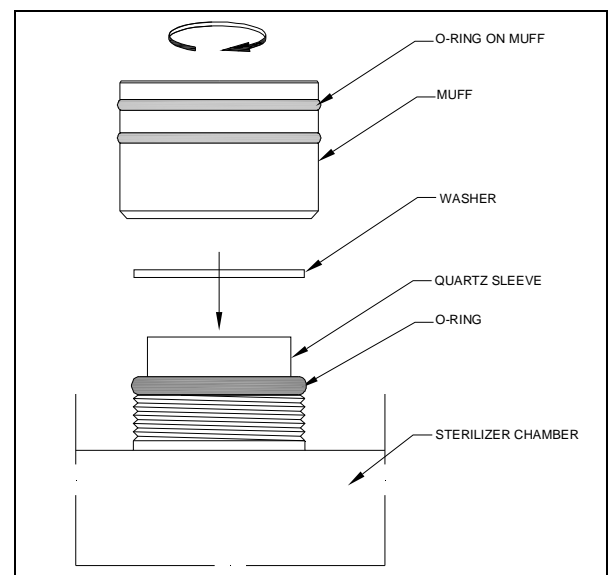
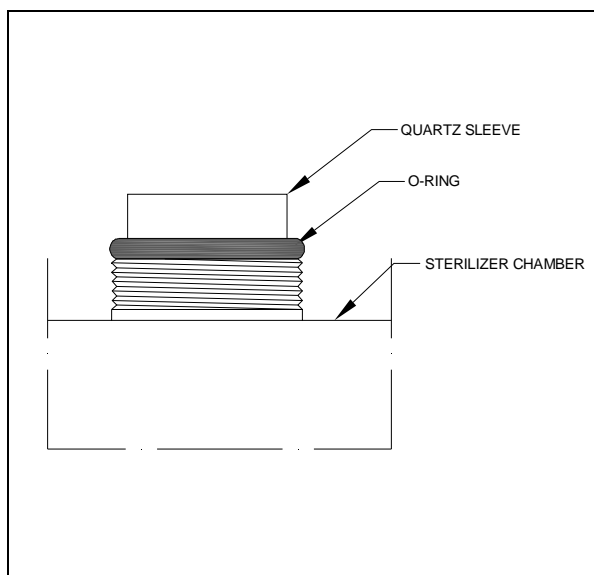
### **5. Instruction for installation and operation**

- a) Device assembles in either vertical or horizontal position. Temperature range for installation is from 0.5 to 50°C.
- b) Upstream of the intake install potable water filter. Minimum rating 0.1 mm recommended 0.05 mm. Water shall not contain more than 0.3mg Fe and 0.1 Mn.
- c) Install manual cut-off valves, upstream of intake and downstream of outlet.
- d) Electrical enclosure mounts on wall at least 60 cm from the floor.

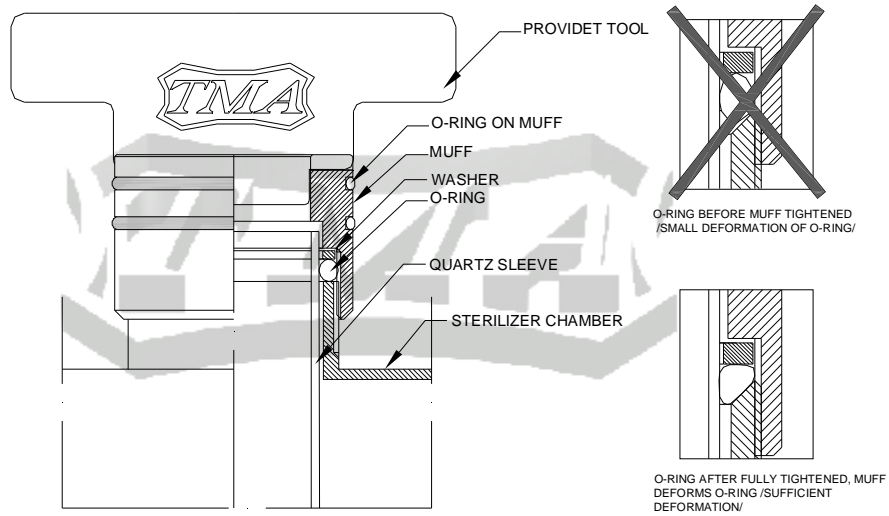


e) Slide in through the nipple the quartz sleeves; continue through sleeve guides onto nests at the bottom. Exercise caution as the quartz sleeves are brittle and fragile.

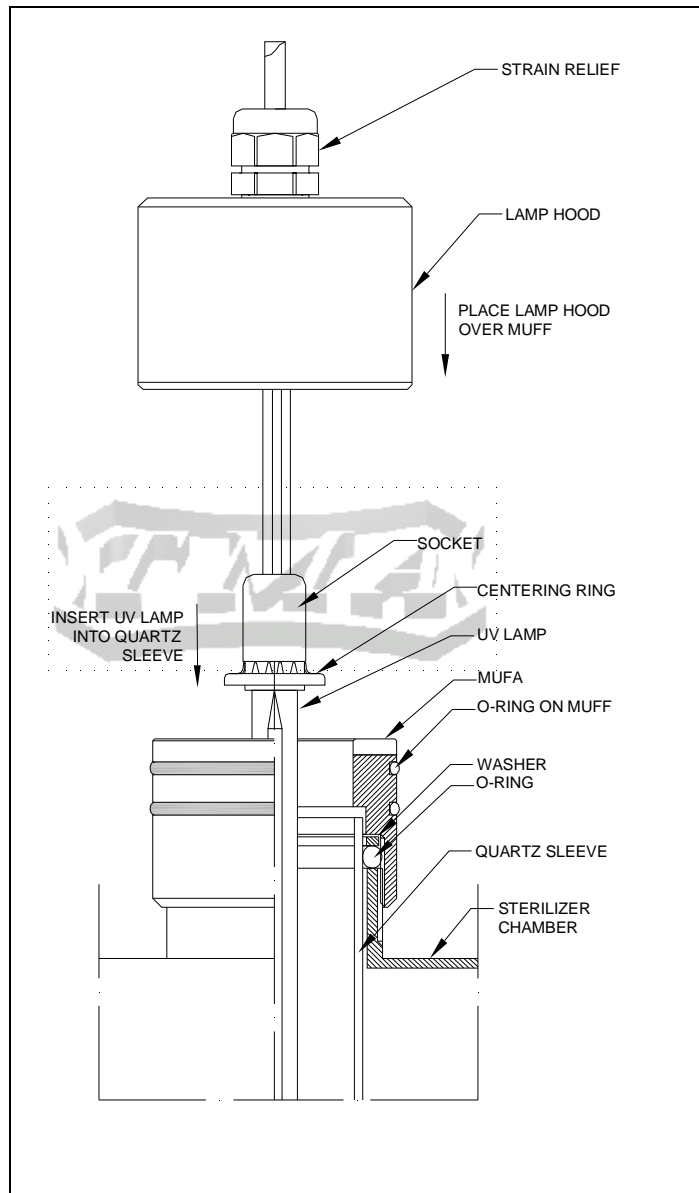
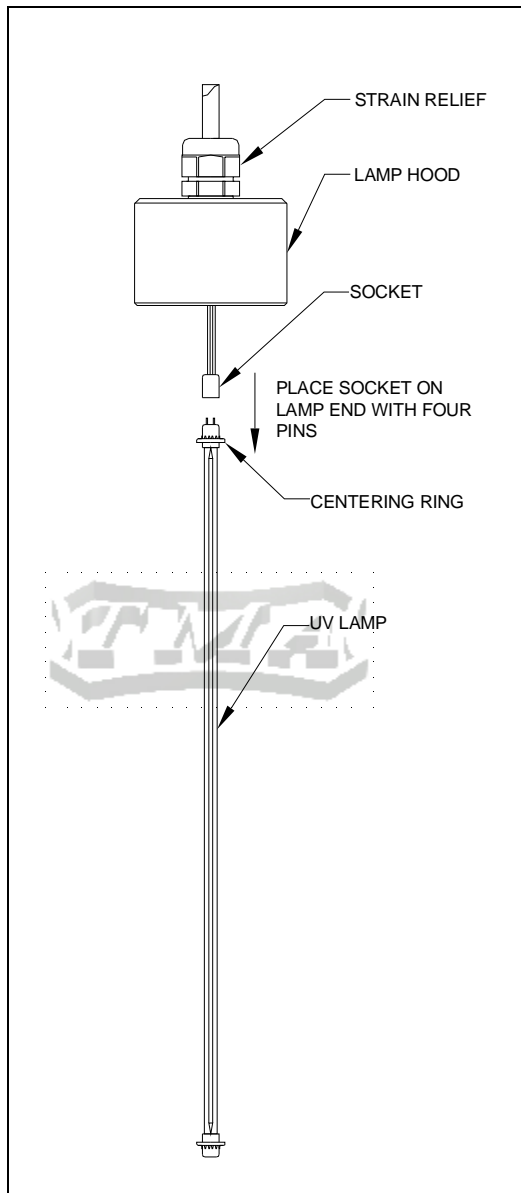
- f) Place the o-ring over quartz sleeve and against the lip of the nipple. Next place the washer over the o-ring, screw the muff onto this assembly with the provided tool. Turn the muff to considerable resistance in order to tighten the seal. Tightening the muff shall not break the sleeve.



TIGHTEST SEAL AROUND THE QUARTZ SLEEVE SHALL BE CREATED WITH LARGE DEFORMATION OF O-RING. O-RING IS VISIBLE THROUGH THE SLEEVE. TIGHTEN MUFF WITH THE PROVIDED TOOL, AS SEEN.



- g) Fill the chamber under full pressure and check the seal tightness.
- h) Place the socket on the end for UV lamps with four pins. Slide in the fully connected lamps into the quartz sleeves.



- i) Place lamp hood over muff.
- j) Plug in to mains 230V, 50 Hz.
- k) Turn device on by using switch on the side or front of electrical enclosure. Green indicator light goes on when device is connected to power and powered up. The system electronics tests the alarm circuits, and the red indicator lights go on for a brief moment.
- l) Replace UV lamps after 12000 hours of work.

#### Attention!

1. Any fault with UV lamp, including burn out, is signaled by lighting up of red indicator lamp and tripping of audible alarm.
2. Incidental powering on the electrical enclosure without connected UV lamps may cause damage to electronic ballast driving UV lamps.

#### Attention!

In the case of installing upstream /or downstream/ of sterilizer solenoid shut-off valve ( terminals 1 & 2) tripping alarm or power interruption causes immediate shutting off fluid flow to the chamber of sterilizer. Terminals 1 & 2 have internal connection broken in case of alarm tripping and as such are neutral. Power to solenoid shut-off valve shall be connected through terminals 1 & 2. Solenoid shut-off valve serves the purpose of preventing unsterilized fluid entering the installation downstream of the sterilizer in the case of power interruption or lamp failure.

## 6. Maintenance

- a) If any sediment is noticed on the surface of quartz sleeve it is recommended to immediately clean the sleeve. Negligence of this recommendation can cause drop in efficacy of sterilization.
- b) Any time the sleeve is cleaned or replaced it is recommended to **unconditionally replace the o-ring creating the seal around the sleeve.**
- c) When replacing the UV lamp it is recommended to clean the sleeve if it is necessary due to occurrence of sediment.
- d) Cut-off valves placed upstream and downstream of the sterilizer chamber shall be open gradually in order to avoid the rush of fluid hitting the quartz sleeve.
- e) It is not required to have constant or any flow through the chamber. Sterilizers are so designed that there may be no flow through the chamber with no damage issuing to the sterilizer.
- f) Ultraviolet radiation is damaging to skin and eyesight.
- g) The UV disinfection does not affect the water quality. Contact your dealer if you need other equipment to soften, deiron and filter water.
- h) In case of high turbidity and waste water effluent the efficacy of disinfections are lowered. Contact your dealer or manufacturer for advice.
- i) Avoid frequent turning on and off the equipment. One on-off cycle lowers The UV lamp life by about 10-20 hours.
- j) Flow rate through the device can be increased. This lowers the delivered dosage and lowers the efficacy of disinfection.
- k) **Bioassay samples shall be collected into sterile opaque containers as not to expose the sample to the light to avoid photo reactivation of microorganisms, which can rebuild their damaged DNA in presence of light.**
- l) In the case the red indicator light is on replacement of the UV lamp is necessary. The part number can be found on transparent plastic lamp hood placed over the muff.
- m) Even short lived surge, to above 254V, can damage the electronic ballast driving the UV lamps.
- n) **Using faulty or post end of life UV lamps / end of life set about 12,000 working hours/ can lead to damage to electronic ballast located In the electrical enclosure. The responsibility of timely lamp replacement is with the user.**
- o) Excessive humidity and water inside the quartz sleeve can cause damage to the electronic ballast driving the UV lamp.
- p) The leakage current going into grounding is 1,5 ma for each UV lamp.

## 7. Instruction for replacement of UV lamp.

In order to replace the UV lamp one shall:

- a) Allow lamps to cool down. No flow through the sterilizer necessary.
- b) Disconnect from power supply /neutral and life/,
- c) Take off plastic hood,
- d) Slide out the UV lamp from the quartz sleeve,
- e) Take off socket from the ends of UV lamp, do not touch lamp with bare hands,
- f) Place socket on the end of a new UV lamp and slide it into the sleeve

- g) Reverse steps c and b.

**Attention:** Series AM sterilizers UV lamps must have special centering ring at both ends. When the UV lamps are shipped from the manufacturer the centering rings are provided with every lamp.

## 8. Replacement and clearing quartz sleeve (Warning: Very brittle).

In order to replace quartz sleeve one shall:

- a) Remove UV lamp as of point 7. Instruction for replacement UV lamp,
- b) Unscrew muff,
- c) Remove washer and o-ring from the quartz sleeve,
- d) Slide the sleeve out of guides and nipple of the sterilizer,
- e) Clean thoroughly the sleeve using generally available glass cleaners, dry the interior of the sleeve,
- f) Slide carefully the quartz sleeve into the chamber of the sterilizer,
- g) Place **new o-ring** over the sleeve, then place the washer,
- h) Tighten the muff over the o-ring and washer with the provided tool. Check the proper placement of the o-ring , it should be lodged into the **conical groove in the nipple of the sterilizer**,
- i) Open gradually the cut-off valves, flood the chamber, and check the seal around the sleeve. If it springs a leak tighten the muff till tight seal is obtained,
- j) Place the UV lamp per point 7 of this instruction.

**Warning! At the time of replacement or clearing of the quartz sleeve the o-ring must be replaced.**

## 9. Transport

Ship sterilizer only in horizontal position. It should be disassembled for shipping. The quartz sleeve and lamp should be packed separately as they are brittle. They should be sufficiently well packed to withstand rough handling.

## 10. Warrantee

Manufacturer grants warrantee for the period of 60 months from the date of sale on the chamber made from stainless steel.

Power supply and control circuitry is on 24 months warrantee.

No repair of the power supply and control circuitry shall be done by user.

Warranty does not cover the UV Lamps and quartz sleeve.

The manufacturer can not held be liable for any damages arising from use or failure of the equipment.

The warranty covers only replacement or repair of faulty parts or equipment

### A. LEGENG FOR INDICATOR LIGHT ON ENCLOSURE

Lighted color indicator lights inform operator of status of sterilizer. Certain conditions can be identified from the configuration of lights. For these corrective action are listed below:

<b>Alarm Red Light</b>	<b>System Light Green Light</b>	<b>Power Green Light</b>	<b>Problem</b>	<b>Action</b>
OFF	ON	ON	No fault	-
OFF	OFF	OFF	No Power	Check power source
ON	OFF	ON	1. Burn out or faulty UV lamp 2. Faulty ballast	1. New UV lamp 2. New ballast
OFF	OFF	ON	Alarm System Fault	Contact Dealer

### B. TROUBLESHOOTING

<b>Problem</b>	<b>Cause</b>	<b>Action</b>
Burn out UV Lamp Water inside quartz sleeve - . short circuit – open circuit on circuit breaker	<b>Muff not tightened sufficiently.</b> Worn out o-ring	Take quartz sleeve out, dry interior, change o-ring, and assemble back. Tighten muff. If UV lamp does not work – electronic ballast damaged – replace – contact dealer
UV lamp goes off	End of life of lamp caused by number of working hours and number on-off cycles.	Replace UV lamp.



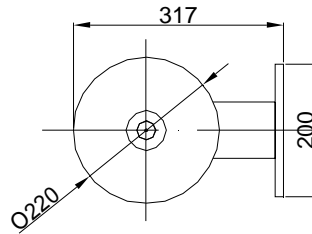
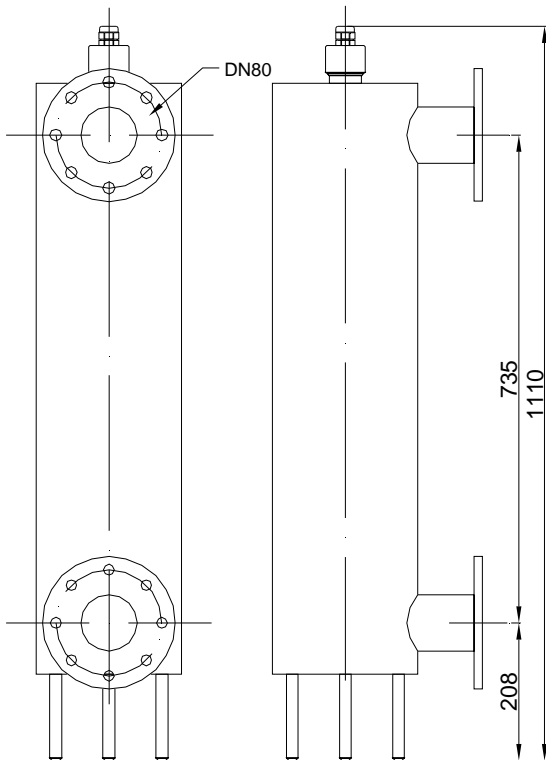
ULTRAVIOLET WATER STERILIZER AM1-AM15

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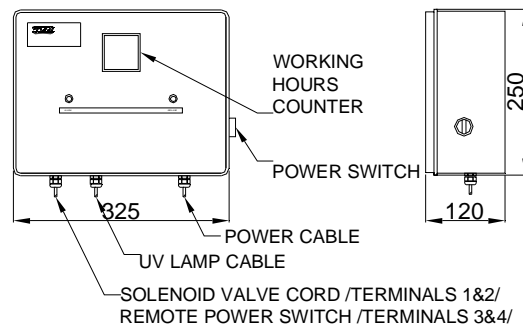
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AM1, AM2 - GENERAL ARRANGEMENT

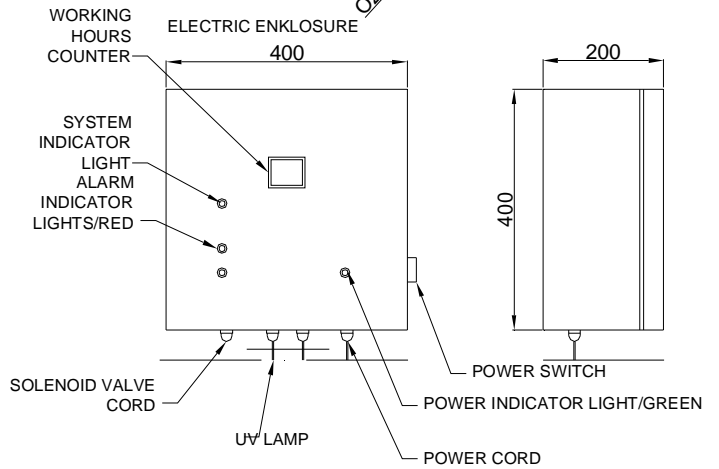
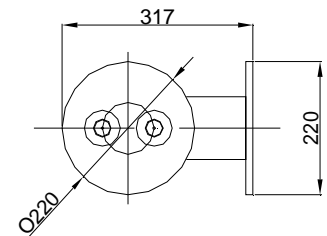
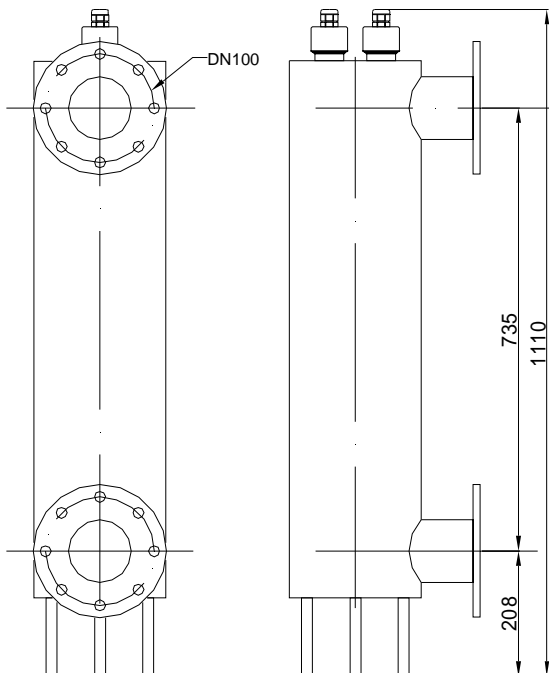
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ELECTRICAL ENCLOSURE



MODEL AM1



MODEL AM2



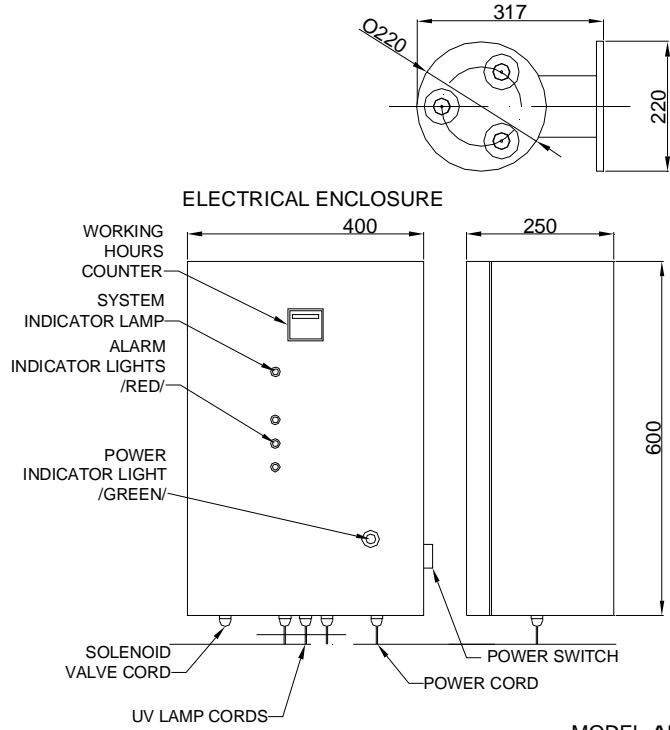
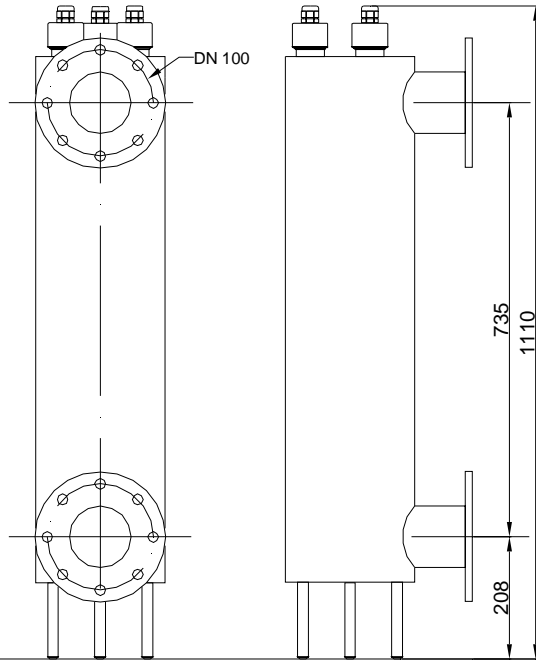
ULTRAVIOLET WATER STERILIZER AM1-AM15

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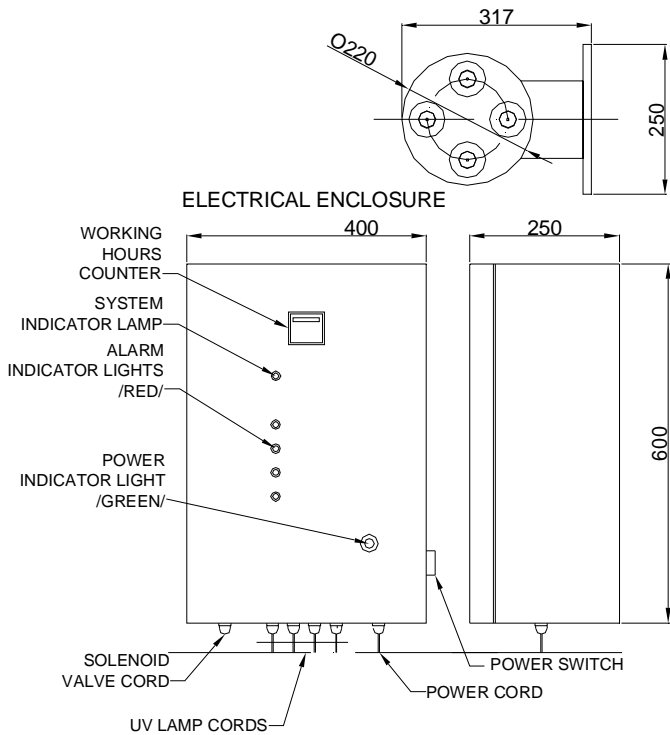
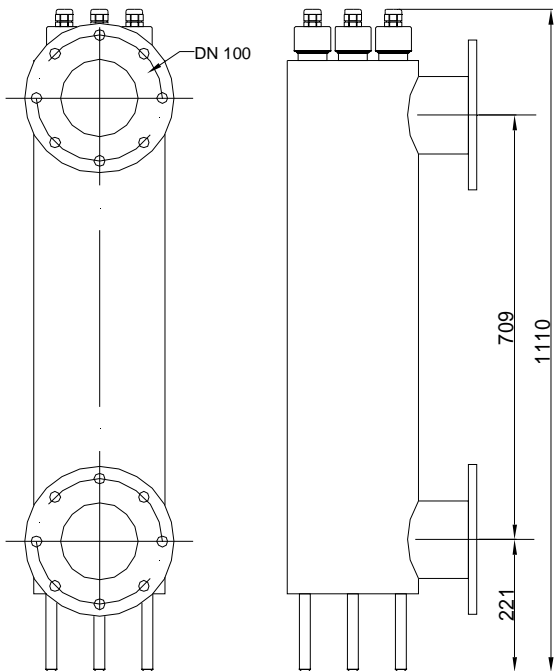
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AM3, AM4 - GENERAL ARRANGEMENT

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MODEL AM3



MODEL AM4



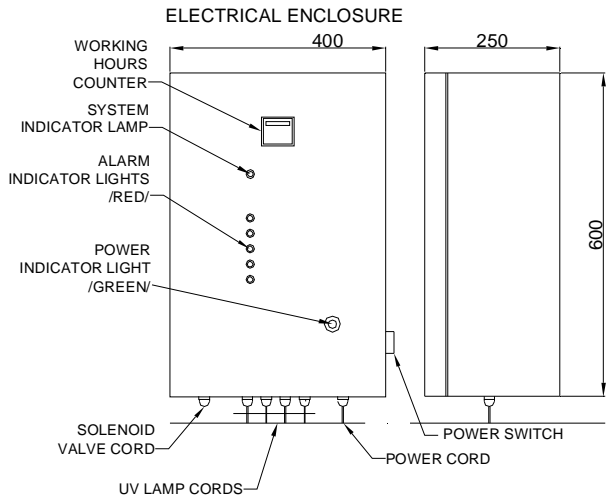
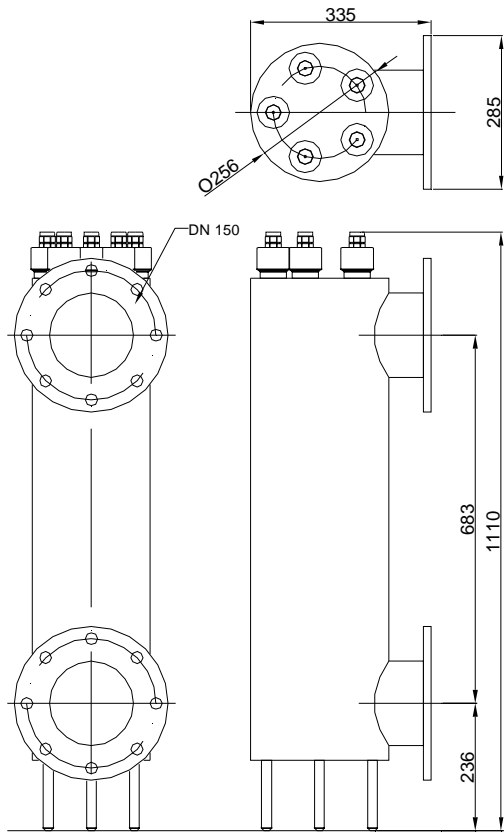
ULTRAVIOLET WATER STERILIZER AM1-AM15

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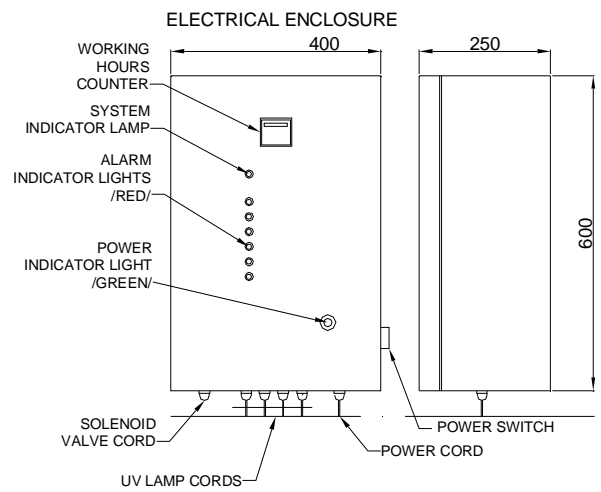
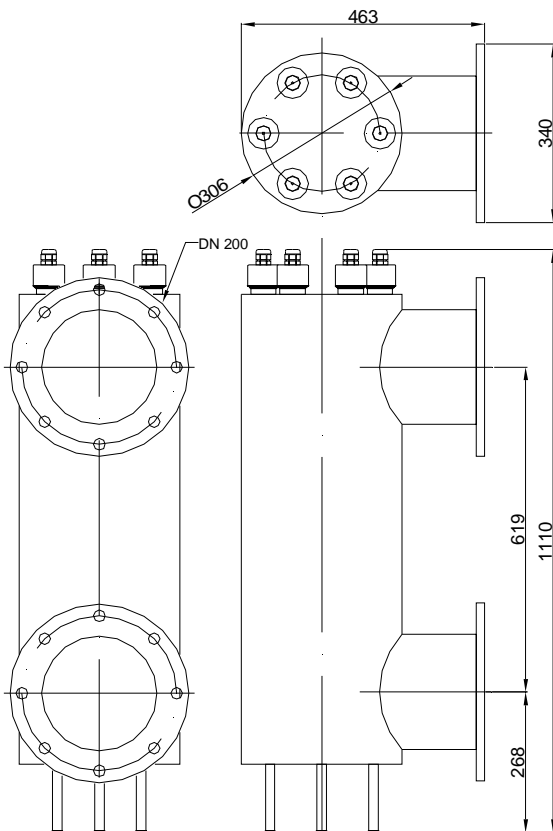
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AM5, AM6 - GENERAL ARRANGEMENT

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MODEL AM5



MODEL AM6



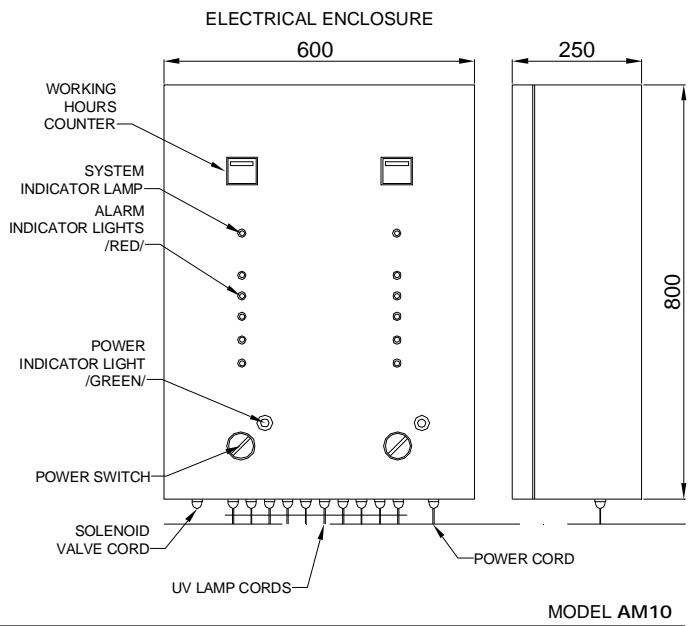
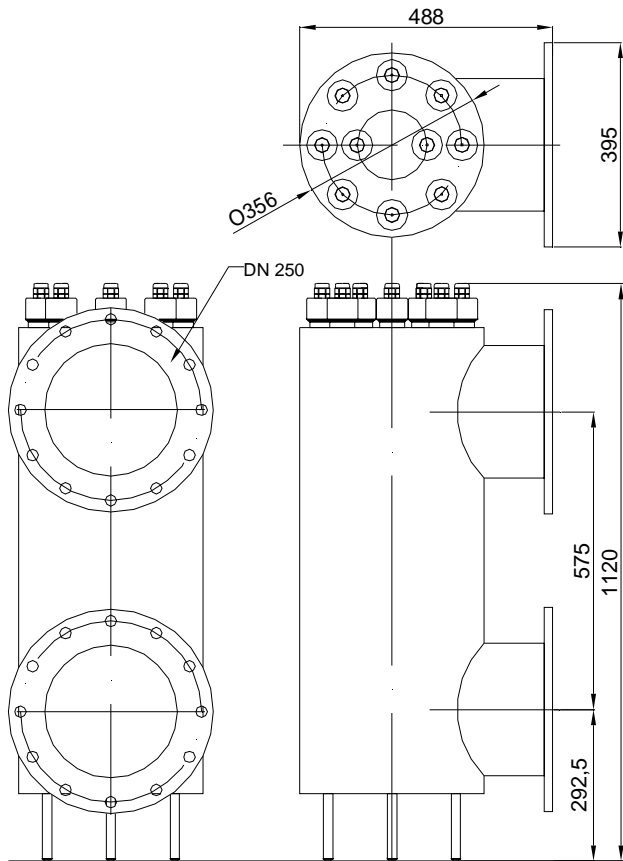
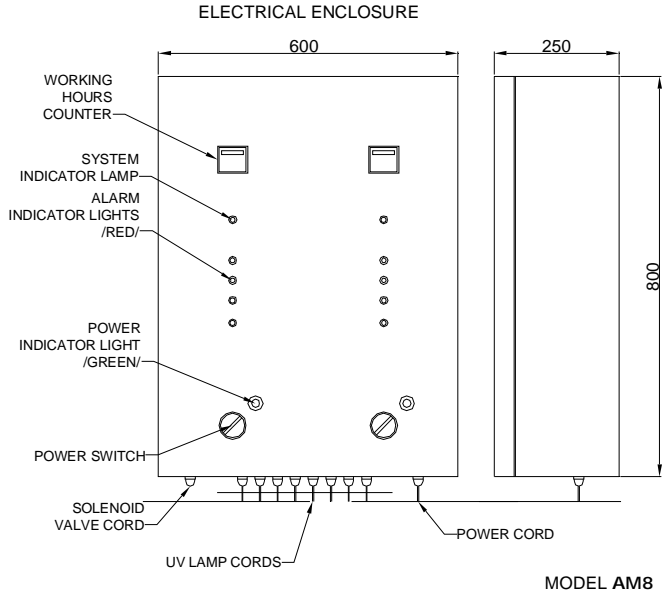
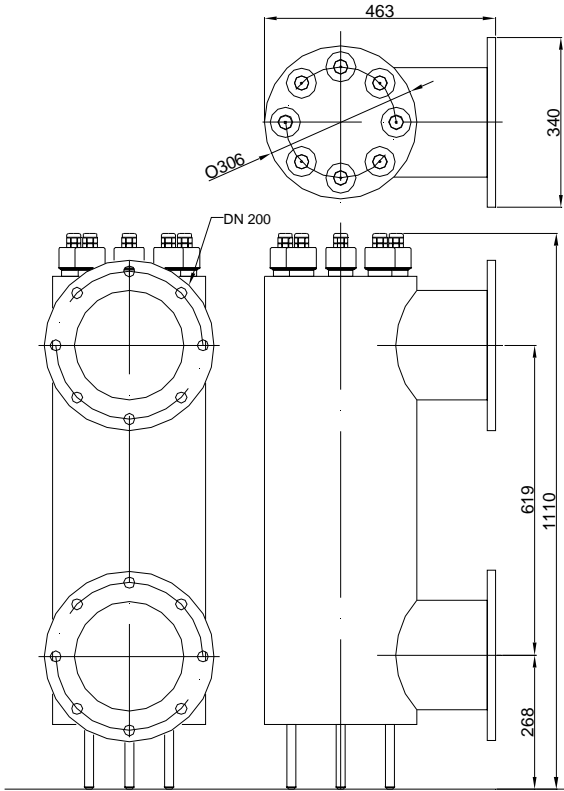
ULTRAVIOLET WATER STERILIZER AM1-AM15

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AM8, AM10 - GENERAL ARRANGEMENT

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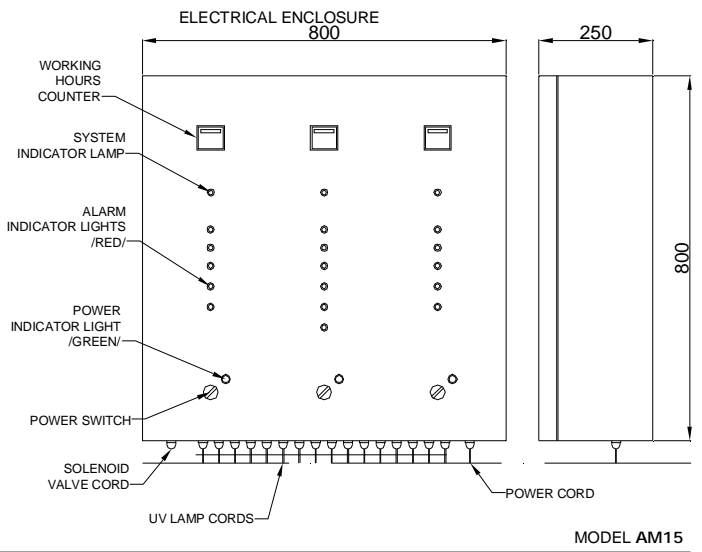
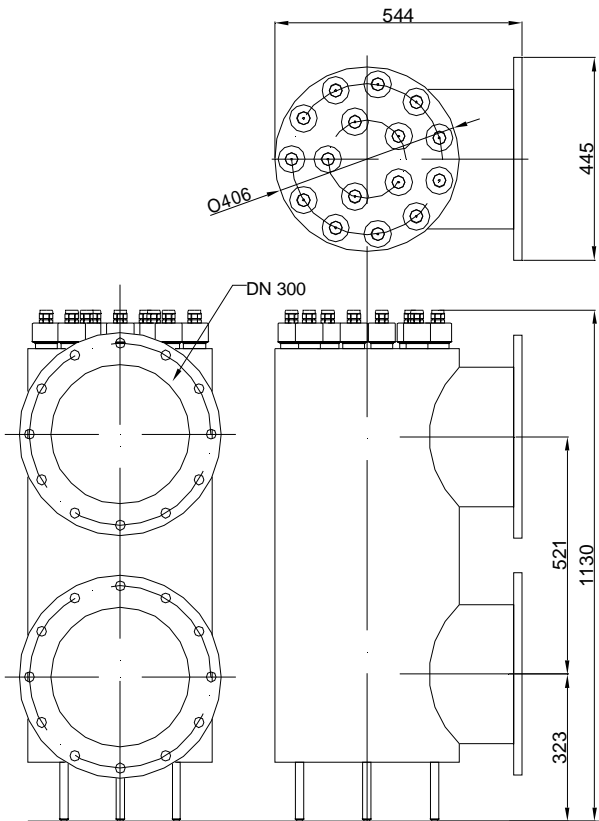
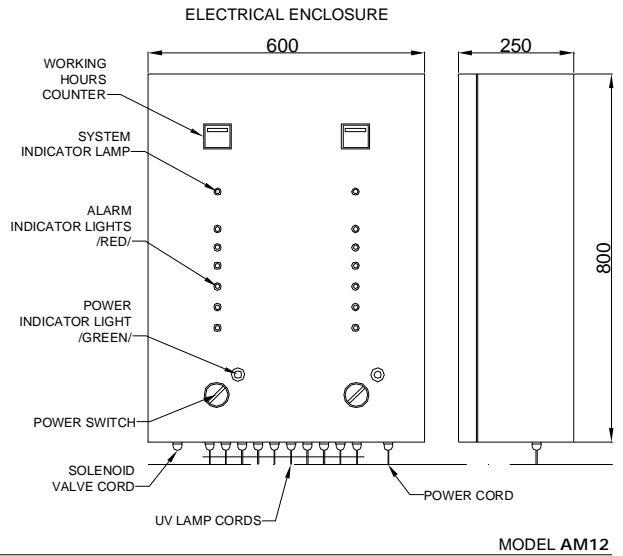
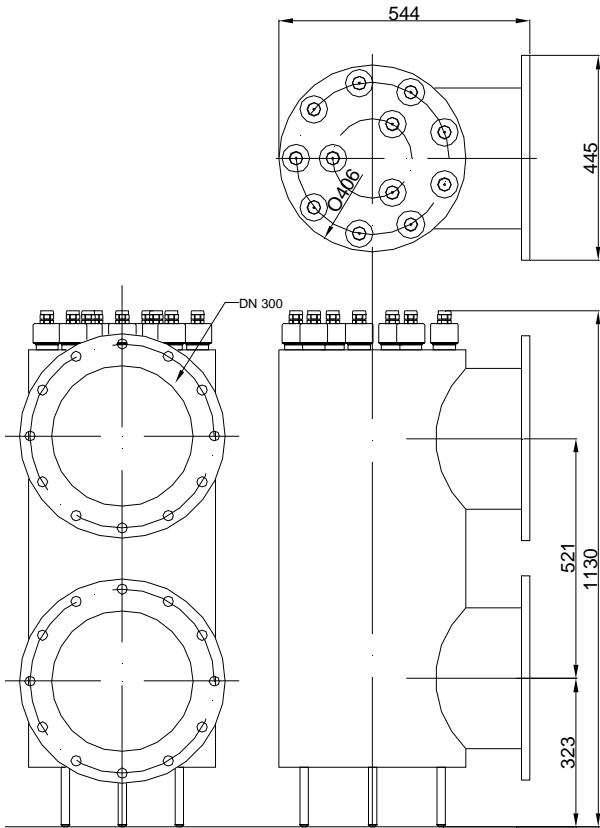
ULTRAVIOLET WATER STERILIZER AM1-AM15


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AM12, AM15 - GENERAL ARRANGEMENT

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	ULTRAVIOLET WATER STERILIZER AM1-AM15		DWG#
	TITLE	CONNECTION FOR SOLENOID VALVE	<b>6</b>

