Topline Peristaltic Dosing Pump for PAC

Installation, Commissioning and O&M Manual

Introduction.

The Topline Peristaltic PolyAluminium Chloride (PAC) dosing pump offers low capacity precision output pump for the dosing of PAC directly from the carboy in which it is delivered, without further need for diluting or decanting.

PAC is applied to swimming pools, and all such filtered water systems, to improve filtration efficiency by increasing the size of small particles of suspended solids in the water, binding them together to produce larger masses. A typical pool sand filter can produce a filtrate of around 20 microns. Many small particles, including cryptosporidium, can pass straight through the filter bed at this size.

Correctly optimised PAC systems can increase the efficiency of the pool filter down to some 5 microns. Solids are backwashed away, following the filter manufacturer's instructions for correct backwashing rates, and results in crystal clear swimming pool.

Lowering the amount of suspended solids in the pool with PAC dosing can often lead to a marginal lowering of chemical consumption, as there is a lower demand for chlorine from these solids, a lowering of combined chlorine and can act as a phosphate remover, reducing algae growth.

Swimming pool PAC chemicals are normally designed only for sand filters up to a maximum filter rate of $35m^3/m^2/hr$.

PAC is not normally suitable for use with Diatomatious Earth filters, Cartridge filters or Zeolite filters.

PAC should only be installed pre-filter, in a full flow section of pipe work, as far from the filter as possible, but after any chemical sample draw-off point.

PAC can only coagulate solids in stable pH conditions. pH levels between 7.0 and 8.0 should be maintained at all times. Topline do not recommend that pre-filter chlorination (or pH correction) be applied with PAC installations as the pH will locally fluctuate during injection, leading to poor efficiency of 'floc' production.

Specification.

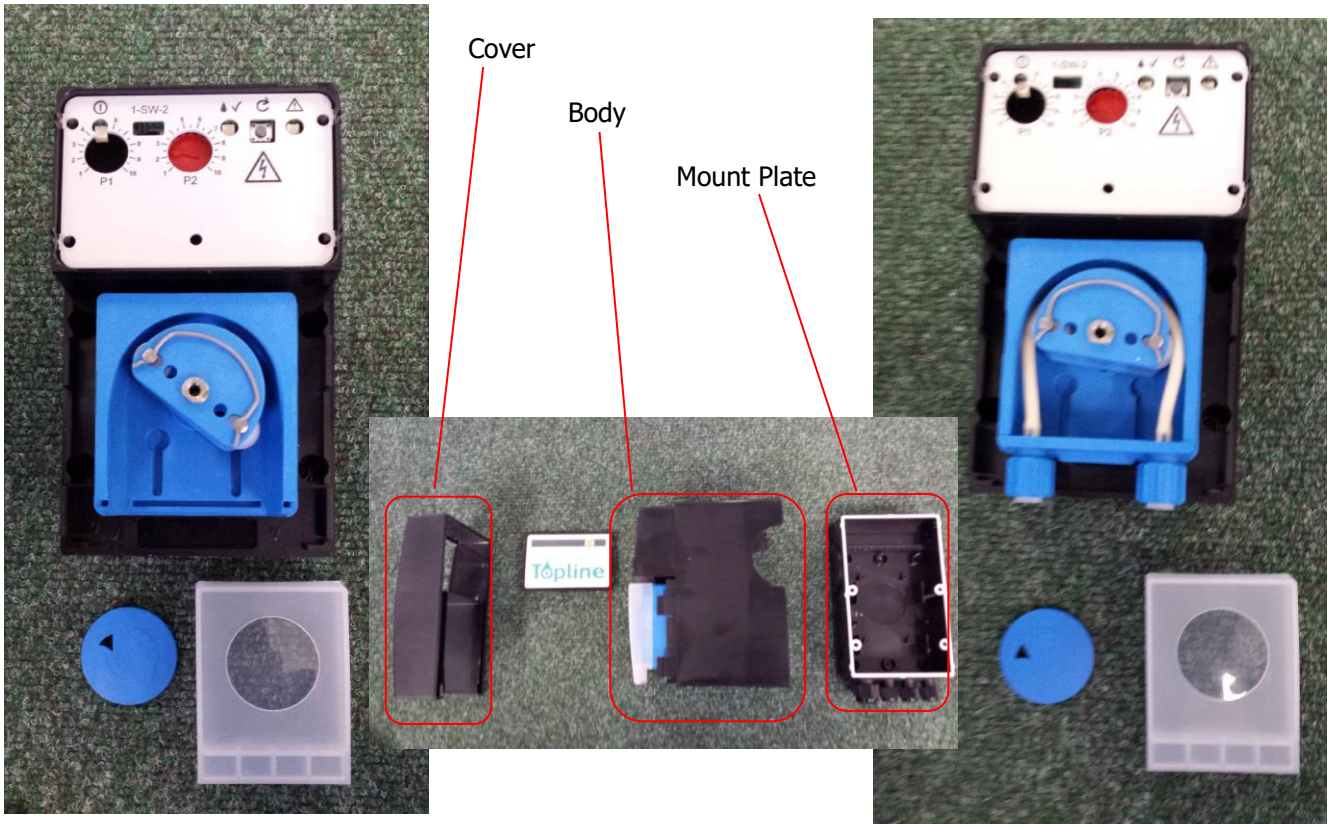
Topline Peristaltic Dosing Pump

Model	Topline Peristaltic Dosing Pump
Capacity	1.5 – 150 ml/hr
Suction Lift	Max 2 m
Back Pressure	1.5 bar max.
Hose Connections:	6 mm x 4mm ID OD Soft PVC
Initial Accuracy	±10%
Operating Temperature:	5 - 55°C
Running Time	100%
Protection Rating	IP65
Dimensions (W x H x D):	95 x 175 x 130 mm
Weight:	1.25 kg (approx.)
Power	AC 230 V ±10%, 50/60 Hz
Fuses	0.2 A MT (fitted)
Current consumption	5 VA max

Installation.
The pump should be mounted on a suitable wall, or mounting board, directly above the carboy/bund for the PAC and can be mounted using the four screws and wall plugs supplied.

The pump is disassembled to fix to the wall, by removing the front face plate, then unscrewing the pump body from the rear mount plate.

The pump cover is removed by carefully levering the notches on either side of the pump with a flat screwdriver and pulling the cover clear. The body is removed from the support plate by loosening the four retaining screws.



It is recommended that the dosing hose from the Topline peristaltic dosing pump to the injection point is as short as possible, with a maximum recommended hose length of 15m and vertical injection height of <10m.

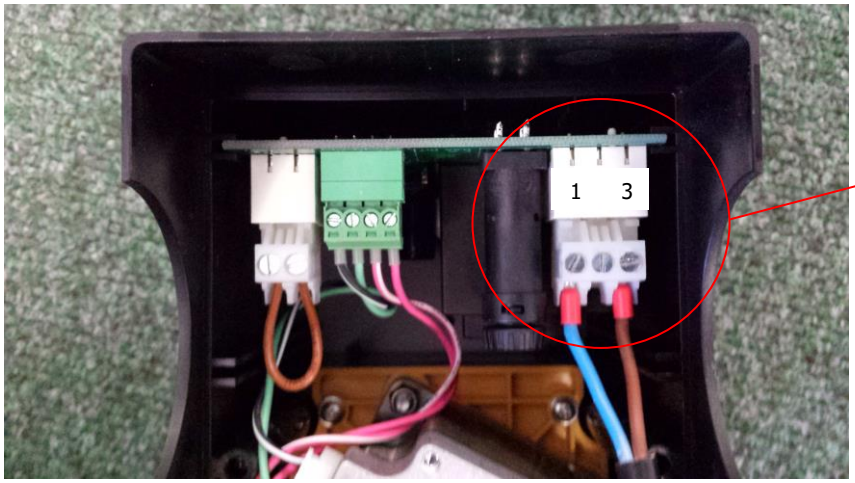
Power for the Topline peristaltic dosing pump maybe taken from any 1 amp fused supply, however since the pump should only dose into a full flow filter delivery pipe, whilst the circulation is operating, a source interlocked with the pool pumps would be preferred.

Some versions of the Topline TEC range of swimming pool controllers can be used to provide a power supply interlocked to shut down with the controller flow switch.

The dosing pump should be fitted with either a switched fused spur or suitably IP rated plug and socket. Topline do not typically recommend the use of IP rated standard UK 230v 13amp plug enclosures, this is to prevent accidental use of such sockets with power tools etc. which may cause damage of a chemical controller output power supply.

The Topline peristaltic dosing pump is supplied with 15m of dosing hose, which should be run in a protective/carrier conduit for the entire run. We would recommend 20mm or 25mm uPVC electrical conduit for this purpose. We do recommend that joints or swept bends are not solvent welded for hose replacement/inspection purposes. In common with all chemical dosing hoses we do not recommend that joints are positioned above walkways or doorways to prevent overhead chemical spillages in the event of a split hose.

The cap of the supplied drum of PAC should be removed and drilled out to allow the hose(s) to pass through. The cap will be reused with subsequent carboys.



Main Power Input

L 230v – Terminal 3
Neutral – Terminal 1

Electrical installation works may only be carried out by suitably qualified and experienced electrical engineers.

Application & Commissioning.
Not all PAC products are the same. Variations in PAC concentrations are common across the many different suppliers. The stated dose rates are noted for reference only. Please refer to your chemical supplier for specific dose rates.

Using the Topline peristaltic dosing pump, in keeping with the requirements of the Pool Water Treatment Advisory Group (PWTAG), PAC is dosed pre-filter 24 hours per day, all the time the filtration plant is operating.

The typical operational setting is for a PAC product is around 0.1ml/m^3/hr. This may need adjusting to suit the prevailing conditions of the pool water. For example; a heavily polluted pool, such as a children's pool, may need a setting of 0.3ml/m^3/hr, and an 'Olympic' size a pool, with a low use and large buffer of treated water, could possibly be lowered to 0.1ml/m^3/hr.

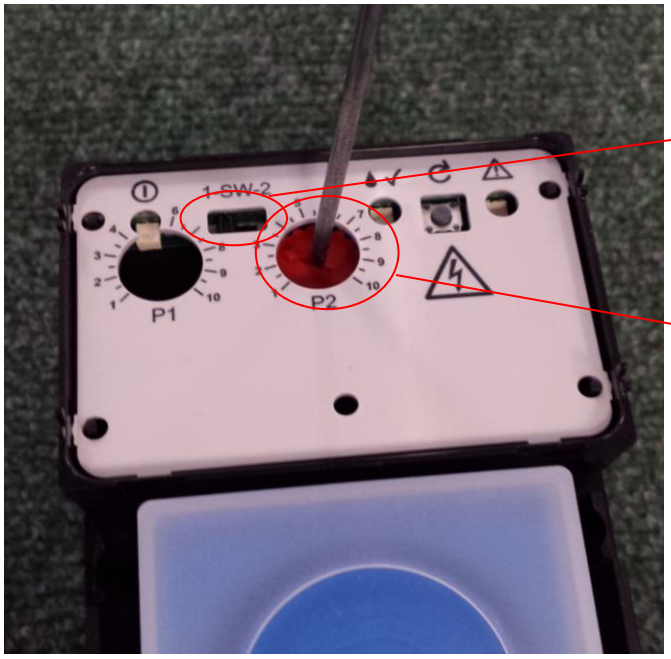
The Topline peristaltic dosing pump has a maximum output pressure of 1.5 Bar. The output of the dosing pump should be checked against the dose rate chart to ensure that either a higher or lower back pressure is not overrunning or impairing pump output.

The pump cover is removed by carefully levering the notches on either side of the pump with a flat screwdriver.

The settings on the table below should be used to set up the pump for the desired output, for example a pool of 100m^3/hr with an applied dose rate of 0.1ml/m^3/hr would require a dose rate of 10ml/hr. And so the selector switch would be set to Position 1 and the dial set to dial would be set to 5.5. Similarly 60m^3/hr would require a dose of 6m/hr and so selector switch Position 1 would be set and the dial set to 3.5. To check that this setting is correct the suction hose should be put into a calibration tube (or tube of a known capacity) and the pump run for 10 minutes. The amount drawn from the tube is multiplied by 6 to give the capacity in ml/hr. The pump should be adjusted accordingly, until the correct setting is achieved.

The design of the motor is provides a step-less increase from 0.5 to 194ml/hr through the potentiometer scale. This will vary however, depending upon the back pressure at the injector, the length of suction lift and the length of delivery hose (max 15m) and its elevation to the injection point.

The pump output is set by choosing the higher or lower dosing range, with the selector switch, and then carefully rotating the potentiometer from 1 –10 clockwise to increase the pump output from 1.5 to 150ml/hr



Dose Rates (at 0.1ml/m³/hr PAC)

Pump Setting	Switch Position 1		Switch Position 2	
	Output ml/hr	Pool Flow m³/hr	Output ml/hr	Pool Flow m³/hr
1	0.5	5	19.4	194
1.5	1.2	12	29.1	291
2	2.4	24	38.8	388
2.5	3.6	36	48.5	485
3	4.8	48	58.2	582
3.5	6	60	67.9	679
4	7.2	72	77.6	776
4.5	8.4	84	87.3	873
5	9.6	96	97	970
5.5	10.8	108	106.7	1067
6	12	120	116.4	1164
6.5	13.2	132	126.1	1261
7	14.4	144	135.8	1358
7.5	15.6	156	145.5	1455
8	16.8	168	155.2	1552
8.5	18	180	164.9	1649
9	19.2	192	174.6	1746
9.5	20.4	204	184.3	1843
10	21.6	216	194	1940

Operation

There is no operational procedure to follow. The Topline Peristaltic Dosing Pump is set to run 24 hours per day, all the time the circulation is in operation. The general usage of PAC should be noted over a period of days/weeks to identify when the pump is losing efficiency.

The PAC is dosed from the carboy in which it is delivered.

The carboy in use and any carboy in stock must be bunded. PAC is generally an acid, and therefore must not be stored with hypochlorites.

Suitable lifting and handling precautions should be made for the carboy drum, which in addition to the dead weight carries some inertia when carried, due to the movement of the liquid within.

Suitable COSHH and RAMS will need to be produced for any such tasks.

The Topline Peristaltic Dosing Pump will not drain the carboy completely. Wearing suitable personal protective equipment (PPE), the residue maybe decanted into a clean container and carefully poured into the new carboy (provided suitable volume is available).

Service Intervals

Over a period of time the Topline peristaltic dosing pump injection point may become fouled with a residue of PAC, we recommend that the injection point is checked and cleaned every six months minimum.

The capillary hose will lose its elasticity over time. We recommend that the peristaltic dosing pump capillary hose be replaced every 12 months.

We recommend that the injection hose be replaced every two years.

Spares

Capillary Hose Kit – (Blue)

6mm OD x 4mm ID Hose Connection

Part Number T6098

Injector – ½" BSP

6mm OD x 4mm ID Hose Connection

Part Number T6097

Non-Return Foot Valve-

6mm OD x 4mm ID Hose Connection

Part Number T6096

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