

#	Description	Part number	Quantity
1	Cassette assembly	DEA0069A	1
2	Gearbox cover	DE 0293S	1
3	Roller 4 way	DE 0981T	1
3	Roller 8 way	DE 0982T	1
3	Roller 12 way	DE 0983T	1
3	Roller 16 way	DE 0984T	1
4	Roller bearing	BB 0034	16
5	Centre shaft bearing	BB 0038	2
6	Centre spacer bearing	BB 0014	2
7	Roller gear, 35 teeth	MN 0983M	6
8	Centre gear, 45 teeth	MN 0982M	1
9	Friction O ring	OS 0013	1
10	Head/drive adaptor 505BA	053.5021.000	1

Part 5 : 505L pumphead

Description

This design of peristaltic pumphead is Watson-Marlow's most accurate dosing and dispensing pumphead. To overcome the pulsatile effect many peristaltic pumps exhibit, Watson-Marlow have developed the principle of twin offset tracks. This puts the two tubes out of phase, merging a pulse from one channel with a trough from the other.

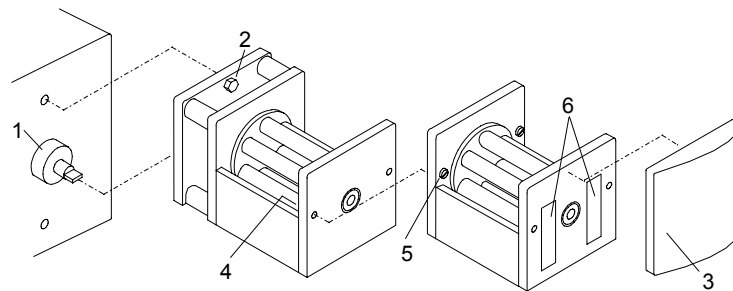
The 505L is fitted with six stainless steel rollers and uses either silicone or Marprene tubing up to 9.6mm bore, to further increase accuracy, 2.4mm wall thickness is used. With a 50% greater wall thickness than standard tubing, 505L tube elements are more stable under changing conditions of pressure, suction and viscosity. The increase of bore size compared to standard 500 series pumpheads gives increased flow rates to over 2.4 litres per minute at 220rpm.

Silicone tubing will give the highest accuracy, but Marprene or Bioprene may be a better choice where chemical compatibility is a problem, or extra long tube life is required. For most dispensing and low pulse applications, we would strongly advise the use of Watson-Marlow double-Y tubing elements, which are pre-formed to the correct length to ensure accurate merging of flows to give the smoothest flow possible. If you do not wish to use the special double-tube elements you will need to order a set of six tube clamps which will enable the pumphead to be used with either twin inlet (suction) tubes or as a two channel (totally separate) precision pumphead.

One 505LX extension pumphead can be fitted to 503P, 504S, 504U, 505Di, 505S, 505U and 505Du drives to increase flow rates still further or to provide another individual pumping channel.

Installation

Remove the drive-shaft cover from the 205/505LA and fit the pumphead over the drive "nose" (1), ensuring that the tongue on the drive shaft locates on the slot in the pumphead centre shaft. Tighten the two retaining screws (2) at the top and bottom of the mounting plate.



Fitting an extension pumphead

To remove the end cover plate (3) on the first pumphead, take one of the extension pumphead fixing bolts supplied and screw into the tapped holes (4), from the rear of the front plate, breaking the adhesion and pushing off the cover plate. Grease the shaft tongue on the extension pumphead with the grease supplied. Locate the tongue of the extension head drive shaft into the slot in the centre shaft of the first pumphead and tighten the two extension head fixing screws (5), at each side of the extension pumphead. The extension head is supplied with two strips of industrial adhesive tape (6). Peel off the cover strips and relocate the cover plate on the extension pumphead.

Flow rates

The flow rates given below were obtained using silicone tubing, with the pumphead rotating clockwise, pumping water at 20C with zero suction and delivery pressures (unless otherwise stated).

Where an application is critical, the flow rate should be determined under operating conditions. The important factors are suction and delivery pressures, temperature, and fluid viscosity.

Tube life will be reduced when pumping against pressure.

The flow rates shown are the combined flow using the Watson-Marlow Double-Y tubing elements. Flows for two separate channels are each approximately half that given.

505L flow rates (ml/min)							
Tube #	119	16	25	17	18	122	
Tube bore	1.6mm	3.2mm	4.8mm	6.4mm	8.0mm	9.6mm*	
Drive	rpm	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"
504S/U 505Di	55	40	125	230	385	495	685
505S/U 505Du	220	155	500	925	1540	1980	2750
505Di	300*	245	800	1500	2450	3150	4375
ml/revolution		0.7	2.3	4.2	7.0	9.0	12.5

* 9.6mm bore through pumphead and to delivery; 12.7mm bore to source

Tubing range

Double-Y tubing elements for 505L		Product codes	
Tube bore mm	"	Silicone	Marprene
1.6	1/16	910.E016.024	902.E016.024
3.2	1/8	910.E032.024	902.E032.024
4.8	3/16	910.E048.024	902.E048.024
6.4	1/4	910.E064.024	902.E064.024
8.0	5/16	910.E080.024	902.E080.024
9.6*	3/8	910.E096.024	902.E096.024

* 9.6mm bore through pumphead and to delivery; 12.7mm bore to source. An MNA 0345A twin tube clamp assembly, available from Watson-Marlow or its distributors, must be purchased to enable the 9.6mm high-flow Double-Y tubing element to be used.

2.4mm wall transfer tubing			Product codes	
Tube Bore mm	"	Tube #	Silicone	Marprene
1.6	1/16	119	910.0016.024	902.0016.024
3.2	1/8	120	910.0032.024	902.0032.024
4.8	3/16	15	910.0048.024	902.0048.024
6.4	1/4	24	910.0064.024	902.0064.024
8.0	5/16	121	910.0080.024	902.0080.024
9.6	3/8	122	910.0096.024	902.0096.024

Y connectors		Product codes
For 1.6mm bore		999.3016.000
For 3.2mm bore		999.3032.000
For 4.8 and 6.4mm bore		999.3064.000
For 8.0mm bore		999.3080.000
For 9.6mm bore		999.3096.000

Tube loading

Tube loading instructions are given for the three possible methods of using a 505L pumphead.

For most dispensing, and any application where there must be minimal pulsing, the use of Watson-Marlow Double-Y silicone tubing elements is recommended.

These are pre-formed to the correct length and merge two out of phase flows into a single smooth output. These elements fit on the retaining pegs supplied with the pumphead.

Under certain circumstances it may be useful to run two separate inlet tubes from your source to the pumphead. It is advisable to do this if the fluid is particularly viscous and the single inlet tube is found to restrict the flow rate, or if the pump is situated a long distance from the source reservoir and is running at high speed.

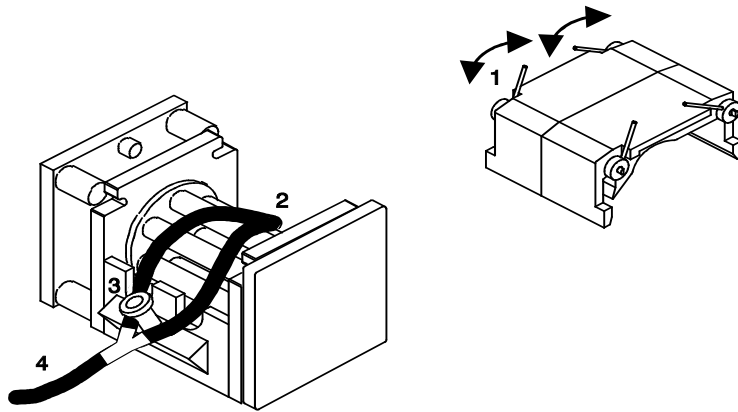
A tube clamp set is available from Watson-Marlow (refer to the spares section) to securely fix twin inlet tubes.

The 505L may also be used as a two channel, six roller, precision pumphead, with two entirely separate tubes. The tube clamp set contains two clamps for each size of tubing to enable both the inlet and the delivery side to be securely fixed.

It should be noted that, when used in this way, the flow does not benefit from the smoothing created by combining two out of phase flows, and slight channel-to-channel variation may be found in the flow rates. Keeping suction and discharge tubing lengths the same and will minimise this variation.

Lift the two levers (1) at either side of the pumphead and remove the track. Stretching the tubing element slightly (2), locate it over the "pegs" at either side of the pumphead (3).

Fitting Watson-Marlow Double-Y tubing elements

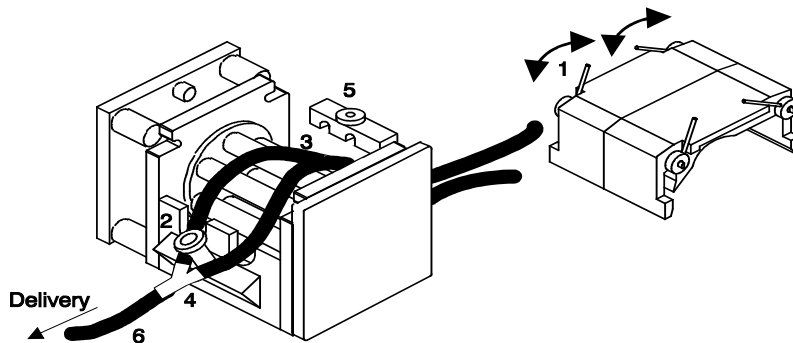


Replace the track and pull down the securing levers.

Transfer tubing (4) may now be attached to the connectors and is available from Watson-Marlow. It is advised to use 2.4mm wall tubing for transfer tubing (to match the double tube elements) as this will give the best performance under suction.

Lift the two levers (1) at each side of the pumphead and remove the track, as above. Remove the "peg" on the inlet side. Do not remove the delivery side peg (2).

Using twin inlet tubes

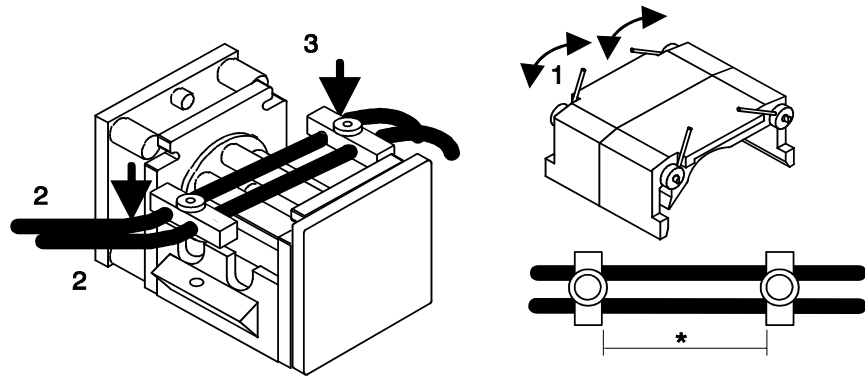


Take the two lengths (3) of tubing to be used and insert the appropriate "Y" connector (4). Lay this assembly across the rotor, with the "Y" connector over the end peg on the delivery side (2). Whilst pulling the tubing taut from the inlet side, take the correct tube clamp (5) (all tube clamps are marked with the nominal bore for their intended tubing) and firmly secure using the same fixing as the end peg. It is found to be easier to insert the two tubes into the "arches" of the clamp before securing the clamp itself.

Replace the track and pull down the securing levers and connect the delivery tube (6) to the output of the "Y" connector.

Using two independent tubes

Lift the two levers (1) at either side of the pumphead and remove the track, as above. Remove both locating "pegs". Take the two tube lengths (2) and insert into the "arches" of the tube clamps (3) ensuring that the nominal distance between the clamps * is 145mm for bore sizes up to 8.0mm and 150mm for 9.6mm bore. All tube clamps are marked with the nominal bore for their intended tubing and only the correct size should be used.



Take the tube assembly and secure one tube clamp. Whilst stretching the tubing slightly, fit the second tube clamp locking it down securely.

Replace the track and pull down the securing levers.

When fitting new lengths of Marprene tubing, run for about half an hour and then re-tension the tubing, making sure that the nominal lengths above are restored. If tubing lengths greater than those given are used, the tubing may move about within the pumphead and damage will occur.

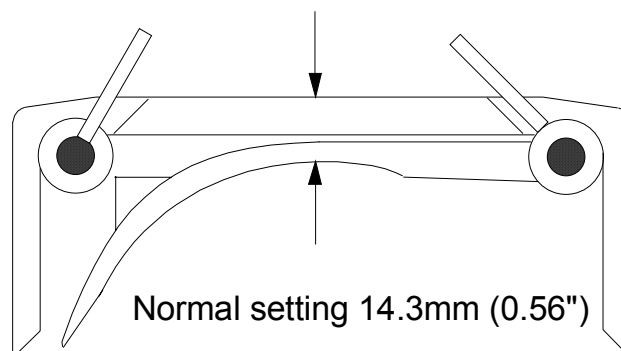
Care and maintenance

The 505L pumphead is "maintenance free" although you should check moving parts of the rotor from time to time for freedom of movement.

If aggressive liquids are spilled on to the pumphead, the head should be removed and cleaned. Do not use strong solvents.

Adjustment of the track

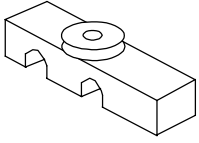
The track is set for use with 2.4mm wall tubing with bore sizes from 1.6mm to 9.6mm. If other tubing is used, it may require the adjustment of the track/rotor gap setting. This setting may also be used to "fine tune" each channel to achieve identical flow rates.



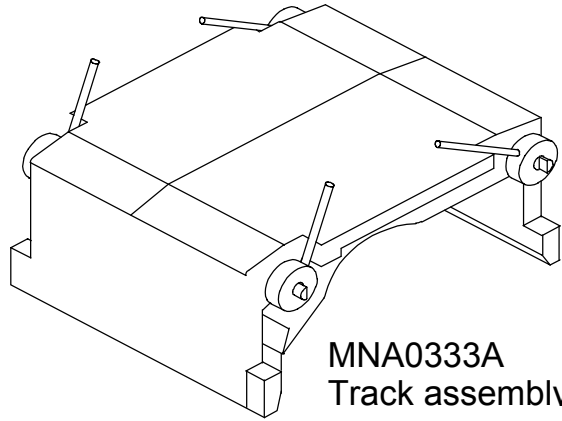
To restore the original setting, a dimension of 14.3mm (0.56") should be set from the track to the top from the pumphead. The adjustment screw is made with the screw between the two guide pins on the top of the track.

Spares and accessories

Accessories



505LTC Tube clamp set
059.4001.000
Comprises of 2 clamps for
each of the six tube sizes



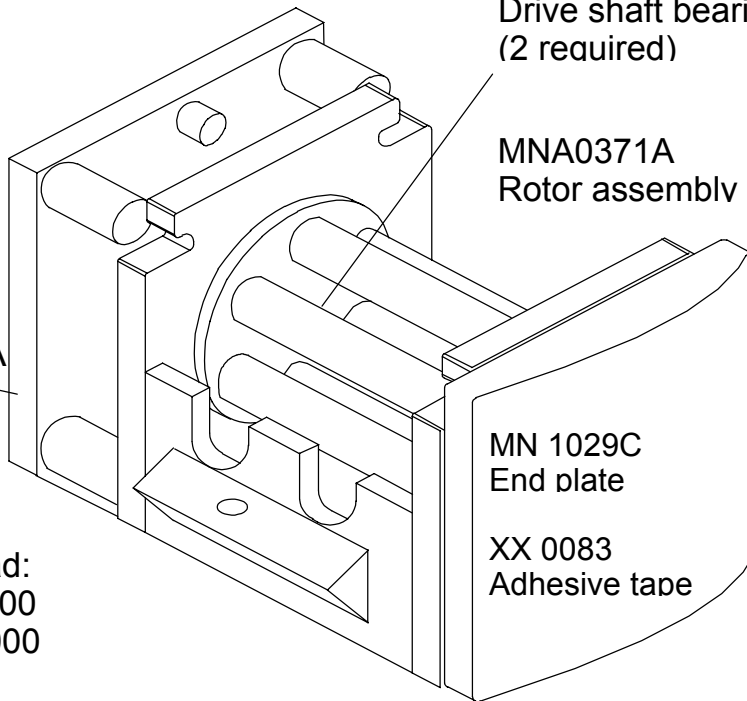
MNA0333A
Track assembly



MNA0339A
Tube locating peg
(2 required)

BB 0014
Drive shaft bearing
(2 required)

MNA0338A
Adaptor



MNA0371A
Rotor assembly

MN 1029C
End plate

XX 0083
Adhesive tape

Complete pumphead:
505L 053.4001.000
505LX 053.4011.000

Decontamination certificate