Watson-Marlow 620R, 620RE and 620RE4 pumpheads

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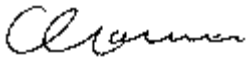
Declaration of incorporation

When this pump unit is to be installed into a machine or is to be assembled with other machines for installations, it must not be put into service until the relevant machinery has been declared in conformity with the Machinery Directive 2006/42/EC.

Responsible person: Christopher Gadsden, Managing Director, Watson-Marlow Limited, Falmouth, Cornwall TR11 4RU, England. Telephone +44 (0) 1326 370370 Fax +44 (0) 1326 376009.



One-year warranty

Watson-Marlow Limited warrants, subject to the conditions below, through either Watson-Marlow Limited, its subsidiaries, or its authorised distributors, to repair or replace free of charge, including labour, any part of this product which fails within one year of delivery of the product to the end user. Such failure must have occurred because of defect in material or workmanship and not as a result of operation of the product other than in accordance with the instructions given in this manual.

Conditions of and specific exceptions to the above warranty are

- Consumable items such as tubing and rollers are excluded.
- Products must be returned by pre-arrangement carriage paid to Watson-Marlow Limited, its subsidiaries, or its authorised distributor.
- All repairs or modifications must have been made by Watson-Marlow Limited, its subsidiaries, or its authorised distributors or with the express permission of Watson-Marlow Limited, its subsidiaries, or its authorised distributors.
- Products which have been abused, misused, or subjected to malicious or accidental damage or electrical surge are excluded.

Warranties purporting to be on behalf of Watson-Marlow Limited made by any person, including representatives of Watson-Marlow Limited, its subsidiaries, or its distributors, which do not accord with the terms of this warranty shall not be binding upon Watson-Marlow Limited unless expressly approved in writing by a Director or Manager of Watson-Marlow Limited.

Information for returning pumps

Equipment which has been contaminated with, or exposed to, body fluids, toxic chemicals or any other substance hazardous to health must be decontaminated before it is returned to Watson-Marlow or its distributor. A certificate included at the rear of these operating instructions, or signed statement, must be attached to the outside of the shipping carton. This certificate is required even if the pump is unused. If the pump has been used, the fluids that have been in contact with the pump and the cleaning procedure must be specified along with a statement that the equipment has been decontaminated.

Safety

In the interests of safety, this pump and the tubing selected should only be used by competent, suitably trained personnel after they have read and understood this manual, and considered any hazard involved.

Any person who is involved in the installation or maintenance of this equipment should be fully competent to carry out the work. In the UK this person should also be familiar with the Health and Safety at Work Act 1974.

Recommended operating procedures

DO keep delivery and suction lines as short as possible using a minimum number of swept bends.
DO use suction and delivery pipelines with a bore equal to or larger than the bore of the tube fitted in the pumphead. When pumping viscous fluids, the losses caused by increased friction can be overcome by using pipe runs with a cross sectional area several times greater than the pumping element.
DO fit an extra length of pump tube in the system to enable tube transfer. This will extend tube life and minimise the downtime of the pumping circuit.
DO keep the track and rollers clean.

The self-priming nature of peristaltic pumps means valves are not required. Any valves fitted must cause no restriction to flow in the pumping circuit.

When using Marprene tubing, after the first 30 minutes of running, re-tension the tube in the pumphead. Open the guard, hold the tubing at one port whilst pulling the tube tight through the second port. This is to counteract the normal stretching that occurs with Marprene which can go unnoticed and result in poor tube life.

Tube selection The chemical compatibility list published in the Watson-Marlow catalogue is only a guide. If in doubt about the compatibility of a tube material and the duty fluid, request a tube sample card for immersion trials.

620RE, 620RE4 and 620R Key safety information

Before opening the pumphead guard please ensure that the following safety directions are followed.

- For close-coupled drives, ensure that the pump is isolated from mains voltage.
- Ensure that there is no pressure in the pipeline.
- If a tube failure has occurred, ensure that any product in the pumphead has been allowed to drain through the controlled waste to a suitable drain.
- Ensure that protective clothing and eye protection are worn if hazardous products are being pumped.

620RE, 620RE4 and 620R Safe-guarding

- Primary safety on 620 series pumps is provided by the tool-lockable pumphead guard. On electrically-powered cased 600 series pumps, secondary (backup) protection is provided in the form of an electrical interlock which stops the pump if the pumphead guard is opened (and only for so long as the guard is opened). The electrical interlock on cased pumps should never be used as primary protection.

Always disconnect the mains power supply to the pump before opening the pumphead guard.

- Only primary protection through the tool-lockable guard is provided on pneumatically powered 620 series cased pumps. Only primary protection through the tool lockable pumphead guard is provided on 620 series pumps fitted with industrial AC motors, but an interface kit to allow mains power to be switched by the pumphead guard interlock is available as an extra-cost option.

620RE, 620RE4 and 620R Pumping conditions

Pressure and viscosity

- All pressure values in this operating instruction, from which performance and life figures have been calculated relate to peak pipeline pressures.
- Although rated to 4 bar working pressure, this pump will generate in excess of 4 bar working pressure if pipeline restrictions are in place. In instances where it is critical that a working pressure of 4 bar is not exceeded, pressure relief valves should be installed in the pipeline.
- For pumping duties of 2-4 bar pressure, only close coupled pumps should be used, fitted with 73 Shore hardness Marprene/Bioprene or standard STA-PURE tube elements. "M" in the tube element's product order code denotes suitability for high pressure use.
- When pumping duties of 0-2 bar pressure, use close coupled or cased pumps fitted with 64 Shore hardness elements or the standard range of continuous peristaltic pump tubing.
- Viscosity handling is maximised by using 73 Shore hardness Marprene/Bioprene or STA-PURE tube elements in the pumphead.
- Ensure that there is always a minimum of one metre of smooth bore flexible tubing connected to the discharge port of the pumphead. This will help minimise any impulse losses and pulsation in the pipeline. This is especially important with viscous fluids and rigid pipework.

620RE, 620RE4 and 620R Pump installation

A correctly engineered installation will promote the best possible tube life, so please ensure that the following guidelines are followed:

- Avoid tight pipeline bends, pipe reducers and excessive lengths of smaller bore tubing than that in the pumphead, particularly in pipelines on the suction side.
- Ensure that connecting pipe work and fittings are suitably rated to handle the predicted pipeline pressure.
- If rigid pipe work comes in close proximity to the pumphead, a drop out section of pipe work will simplify tube replacement.
- Ensure that the controlled waste blanking plug is in position if the controlled waste port is not in use. See below.



- It is advisable to use controlled waste pipe work if pumping hazardous, aggressive or abrasive fluids or products which will harden in contact with air.
- When connecting waste pipe work to the controlled waste port using the coupling adaptor supplied, ensure that there is adequate clearance underneath the pumphead. Waste pipe work should run to a suitable container or drain.
- The leak detector installation procedure is included in the leak detector kit.
- If unsure of an installation please contact your local Watson-Marlow Technical Support Office for further assistance.

620RE, 620RE4 and 620R General operation

Opening the pumphead guard

- Unlock the guard with a 5mm Allen key or a screw driver.

Open the guard to its full extent. This creates the maximum clearance between the tube ports and guard to remove the tubing.

Engaging / disengaging the rollers

- The extent of travel of the roller release levers is indicated below. Do not try and force the levers beyond their normal extent of travel as this will damage the rotor.
- To engage the rollers snap the roller release levers counter clockwise making sure that the rollers locked out against the tubing. To disengage the rollers, snap the release levers clockwise to their disengaged position. For high pressure tubing elements or four roller pumpheads, the 5mm Allen key can be used to aid leverage when engaging/disengaging the rollers with the release levers.

Make sure that fingers are clear of the front face of the rotor hub when using the roller release levers.

Pre-load checks

- Before loading tubing, ensure that all rollers rotate freely, that the tube ports and location grooves are clean and that if in use, the controlled waste pipe work is free of any obstructions.

Closing the pumphead guard and start-up

- Ensure that the guard seal is clean, replacing it if necessary.
- Ensure that the rollers are engaged and locked out against the tubing
- Close the guard and push it against the track until the latch engages.
- Connect suitable pipe work to the pumphead using the appropriate connectors for the tube element.

Continuous tubing clamp location in 620R pumpheads

- Select the appropriate tube clamp set for the tubing size to be used.
- Locate the two "U"-shaped track clamp halves into the pumphead ports (The "U"-shape ensures correct loading)
- Locate the corresponding guard clamp halves which have raised "T" locating sections, into the slots on the inner guard face above and below the guard hinge. Push and slide into their locked position.
- Closing the guard will align the two halves of the clamp around the tubing.

620RE and 620RE4 tube element loading

- 620RE element pumpheads are factory set to accept Watson-Marlow LoadSure tube elements. Pumping performance will be adversely affected if LoadSure elements are not used.
- Disengage rollers
- Locate one of the "D"-shaped flanges into the lower port. (The "D" flange ensures that the element can only be loaded correctly).
- Wrap the tube element around the disengaged rollers of the rotor.
- Locate the second "D"-shaped flange into the upper port.
- Ensure the flat face of each "D" flange sits flush to the flange sealing face of the track.
- Engage rollers
- Close the guard and push it against the track until the latch engages.

Tube element loading

620RE, 620RE4 and 620R Continuous tube loading

- 620R continuous tubing pumpheads are factory set to accept Watson-Marlow 600 series 3.2mm wall tubing. Pumping performance will be adversely affected if Watson-Marlow tubing is not used.
- Select the tube clamp set which is correct for the tubing size to be used.
- Disengage rollers
- Locate one end of the tubing into the lower port "U" clamp and hold firmly in position.
- Wrap the tubing tightly around the retracted rollers, making sure that there is no twisting through its length.
- Locate the other end of the tubing into the upper port "U" clamp.
- Hold both ends of the tubing in one hand maintaining tension around the retracted rollers.
- Engage rollers
- Close the guard and push it against the track until the latch engages
- Ensure that continuous tubing is not loosely clamped at the pumphead ports.
- Ensure that when the pump is re-started all of the rollers have re-engaged. A roller which has not re-engaged will "click" continuously. No damage will occur if this happens but the roller should be re-engaged manually using the 5mm Allen key. Please refer to the Troubleshooting section.

Continuous tube loading







620RE, 620RE4 and 620R Tube element or continuous tube removal

- Unlock the guard and disengage the rollers.
- Disconnect the tubing from the external pipeline.
- Remove the tubing from the pumphead.

620RE, 620RE4 and 620R Maintenance

Scheduled maintenance

- The stainless steel pumping rollers run on sealed bearings and do not require lubrication.
- Remove the rotor and lubricate the follower rollers and roller engaging mechanisms with a lithium-based grease. This should be carried out every six months for intermittent duties and every three months for 24 hour duties.
- If fluid is spilled inside the pumphead, flush the pumphead out with water and mild detergent as soon as possible. If specific cleaning agents are required to clean the spillage, please consult Watson-Marlow Technical Support Office before proceeding, in order to confirm chemical compatibility.
- If the rotor needs to be removed, refer to the guidelines below.

Roller adjustment

620 pumpheads have provision for adjustment to reset the roller/track gap to compensate for wear after extended service in arduous applications.

Roller/track gaps can **only** be accurately judged without tubing in the pumphead. The gap should be **4.6mm** for 3.2mm wall tubing and **5.5mm** for LoadSure elements.

If the gap is more than 0.2mm greater than these dimensions, the following may be carried out:

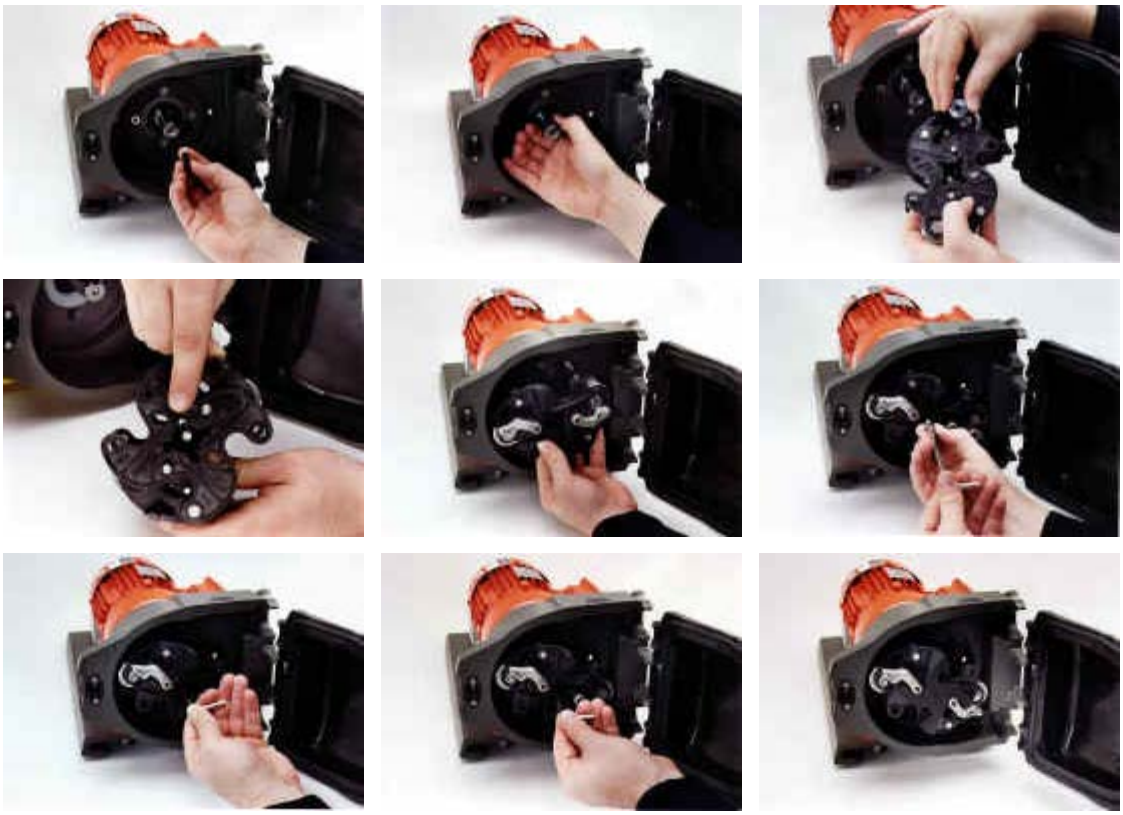
- Note the number on the roller arm to which the engraved line on the hexagon-headed main roller pin corresponds.
- Remove the circlip (snap-ring) and roller pin.
- Relocate the main roller pin, resetting the engraved line to one number lower. For example, if the engraved line was at "-1", reset it to "-2" to reduce the roller track gap.

Ensure the roller pin is correctly seated into the roller arm thrust washer. Replace the circlip.

Rotor removal and re-location

- Remove the rotor cover and central locating bolt using a 5mm Allen key. Pull the rotor off the keyed shaft, remove the key and clean thoroughly. Do not use tools to lever the rear face of the rotor away from the inner face of the track, it should come off by hand.
- To replace the rotor, locate the key into the keyway and apply a thin layer of grease over the shaft and key. Align the keyway of the rotor to the shaft key and slide the rotor into position, ensuring that a positive "stop" is achieved and ensure that the full length of the drive shaft is fitted into the rotor.
- Do not force the rotor into position. The rotor will slide into place easily if correctly aligned.
- Tighten the hexagonal locating bolt to a nominal torque of 10Nm using a 5mm Allen key.
- The rotor bolt, which is impregnated with "Loctite 218" thread lock, should be subjected to a maximum of three removals/relocations before renewal. To avoid rotor bolt renewal after three removals, apply "Loctite 222" thread lock to the rotor thread before relocation. This is critical to ensure prolonged, secure location of the rotor hub to the drive shaft. **Failure to complete this action will invalidate the terms and conditions of the pumphead warranty**.
- Replace the rotor cover.

When closing the guard, check it does not make contact with the rotor. If it does, then the rotor has been fitted incorrectly. Re-open the guard, remove and refit the rotor, and close the guard.



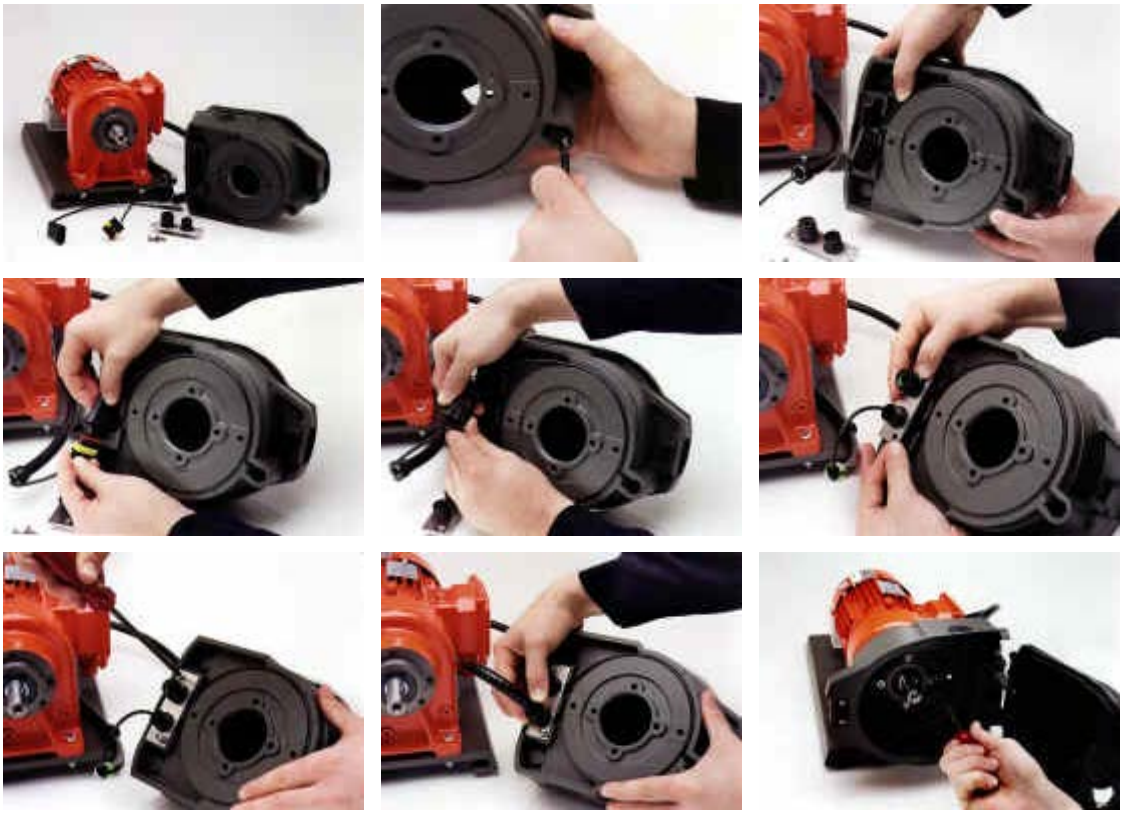
Track removal (close coupled AC motor gearboxes)

- Remove the rotor.
- Disconnect the controlled waste pipework if attached.
- Loosen the four track retaining screws using a Number 2 Pozi-Driv screwdriver.
- Disconnect the mains interlock if connected to a mains contactor
- Withdraw the track fully from the gearbox.

Track re-location (close coupled AC motor gearboxes)

- Ensure that the track is clean.

- Fit the track over the gearbox boss.
- Align the track horizontally so that the location holes are aligned with the threaded gearbox holes.
- Tighten the four track retaining screws using a Number 2 Pozi-Driv screwdriver.
- Re-connect the guard interlock controlled waste pipework if required.



620RE, 620RE4 and 620R CIP and SIP

General

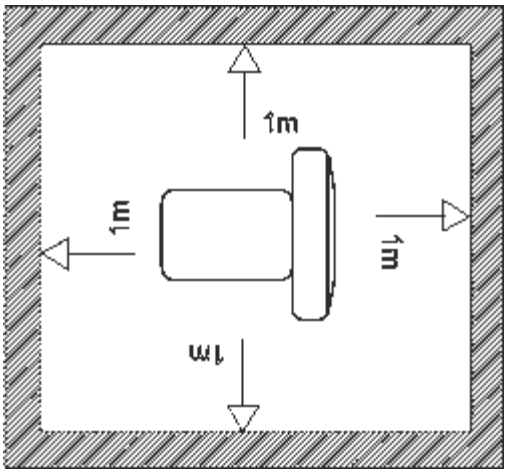
- Unlock the guard and disengage the rollers within the tube zone.
- Close the guard and squeeze against the track until the latch clicks.
- Observe a 1m safety area.

CIP

- LoadSure tube elements and continuous tubing can be cleaned using CIP processes.
- Ensure that the tubing material is chemically compatible with the cleaning agent that is to be used.
- If cleaning agents are spilled over the pumphead, wash down immediately.
- Ensure that controlled waste pipework is fitted to allow a safe release of cleaning agent in the event of a tube failure.

SIP

- Only STA-PURE tube elements can be used in a steam in place sterilisation processes.
- STA-PURE tubing elements can be sterilised to 3A Class two and FDA minimum recommended standard which is 121C (250F) at 1bar (14.5 psi) saturated steam for 20 minutes.
- Monitor the process continuously .
- If a tube failure occurs, shut down the process. Do not touch the pumphead until a 20 minute cooling period has been observed.
- Ensure a 20 minute acclimatisation period is observed before running the pump following SIP.
- Ensure that controlled waste pipework is fitted to allow a safe release of steam in the event of a tube failure.
- Ensure a 1m safety zone is maintained around the pumphead during SIP cycles.



Ensure that the pumphead door is closed and locked before SIP cleaning commences.

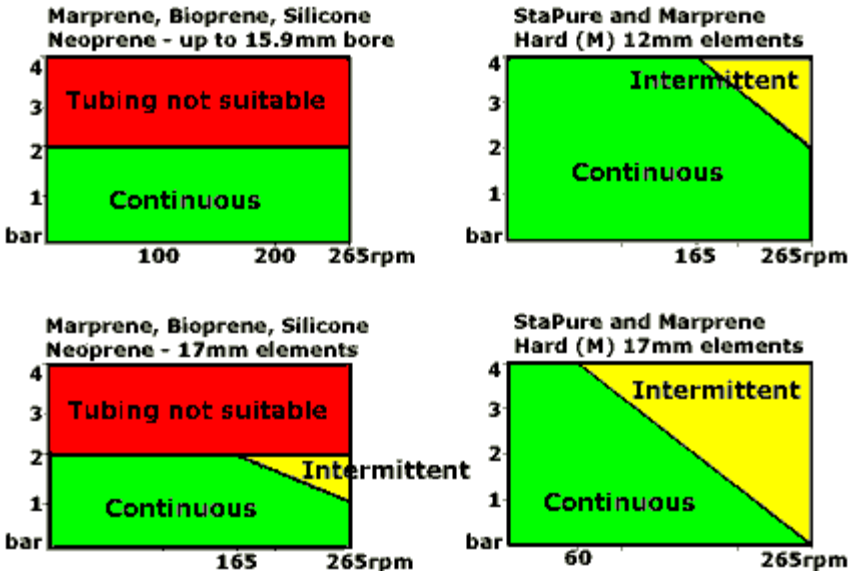
Pumphead spares

Number	Spare	Description
1	069.4101.000	620RTC: continuous tubing clamp set
2	MR2052C	Oddie fastener
2	MR2053B	Clip: Oddie retainer
2	MR2054T	Oddie washer
2	SG0021	Oddie spring
2	CX0150	Oddie circlip (snap ring)
3	MRA0251A	Track assembly (continuous pumphead)
3	MRA0297A	Track assembly (element pumphead)
3	MR2000C	Track
4	MRA0249A	Roller assembly element pumphead
4	MRA0250A	Roller assembly continuous pumphead

5	MR2027T	Controlled waste threaded fitting 620R
6	MR2028M	Controlled waste port blanking plug
7	MR2018T	Hinge pin
8	MR2055M	Rotor cover
9	MR2021B	Seal - guard
10	MR2002M	Guard without latch and seal
11	MR2015T	Follower roller spindle
12	CX0148	Roller assembly circlip (snap-ring) E type 6 dia
12	MR2014T	Stainless steel roller spindle
12	MR2010T	Thrust washer
13	MR2096T	Controlled waste threaded fitting locking nut
14	MRA0320A	Rotor assembly 2-roller element
14	MRA0321A	Rotor assembly 4-roller element
14	MRA0322A	Rotor assembly 2-roller continuous
15	MR2058B	Grommet - door switch
16	XX0220	Key - metal
17	MR2029T	Cased drive MG605 shaft/rotor hub spacer
18	MR2059T	Adaptor - Bodine (white polypropylene ring)
19	FN0488	Cased drive track locating screws M6x10
20	FN0523	Close-coupled track locating screws M6x20
21	FN0581	Rotor locating washer M6
22	FN0520	Rotor locating bolt M6 x 25
23	TT0006	5mm Allen key
24	MA0017	Magnet
	MRA0268A	Cased drive door switch assembly
	MRA0279A	Close-coupled door switch assembly
	CN0187	Plug blanking 10.72M

Technical data

Performance envelope of the 620R, 620RE and 620RE4 mark II rotor



Flow rates

Tube bore | Tube number - # | rpm | Pressure (+) | Suction (-)

Note: Flow rates quoted have been rounded for simplicity, but are accurate to within 5% - well within the normal tubing-tolerance variation of flow rate. They should therefore be taken as a guide. Real flow rates in any application must be determined empirically.

620R

Flow rates: Marprene, Bioprene (l/min)					
	mm	**6.4**	**9.6**	**12.7**	**15.9**
	inch	**1/4**	**3/8**	**1/2**	**5/8**
	#	**26**	**73**	**82**	**184**
	8-76	0.10-1.0	0.20-1.9	0.32-3.0	0.42-4.2
	8-77	0.10-1.0	0.20-1.9	0.32-3.1	0.42-4.2
	8-83	0.10-1.1	0.20-2.1	0.32-3.3	0.42-4.5
	17-83	0.22-1.1	0.43-2.1	0.68-3.3	0.90-4.5
	47-237	0.61-3.1	1.2-5.9	1.9-9.5	2.5-11
	50-251	0.65-3.3	1.3-6.3	2.0-10	2.7-11
	52-259	0.68-3.4	1.3-6.5	2.1-10	2.8-11

Flow rates: Marprene, Bioprene (USGPM)					
	mm	**6.4**	**9.6**	**12.7**	**15.9**
	inch	**1/4**	**3/8**	**1/2**	**5/8**
	#	**26**	**73**	**82**	**184**
	8-76	0.03-0.3	0.05-0.5	0.08-0.8	0.11-1.1
	8-77	0.03-0.3	0.05-0.5	0.08-0.8	0.11-1.1
	8-83	0.03-0.3	0.05-0.5	0.08-0.9	0.11-1.2
	17-83	0.06-0.3	0.11-0.5	0.18-0.9	0.24-1.2
	47-237	0.16-0.8	0.31-1.6	0.50-2.5	0.67-2.9
	50-251	0.17-0.9	0.33-1.7	0.53-2.7	0.72-3.0
	52-259	0.18-0.9	0.34-1.7	0.55-2.7	0.75-3.0

Flow rates: Silicone (l/min)					
	mm	**6.4**	**9.6**	**12.7**	**15.9**
	inch	**1/4**	**3/8**	**1/2**	**5/8**
	#	**26**	**73**	**82**	**184**
	8-76	0.10-0.9	0.22-2.1	0.34-3.2	0.44-4.7
	8-77	0.10-0.9	0.22-2.1	0.34-3.2	0.44-4.7
	8-83	0.10-1.0	0.22-2.2	0.34-3.5	0.44-5.1
	17-83	0.20-1.0	0.46-2.2	0.71-3.5	0.95-5.1
	47-237	0.56-2.8	1.3-6.4	2.0-10	2.8-14
	50-251	0.60-3.0	1.4-6.8	2.1-11	3.0-14

	52-259	0.62-3.1	1.4-7.0	2.2-11	3.1-15

Flow rates: Silicone (USGPM)					
	mm	**6.4**	**9.6**	**12.7**	**15.9**
	inch	**1/4**	**3/8**	**1/2**	**5/8**
	#	**26**	**73**	**82**	**184**
	8-76	0.03-0.2	0.06-0.5	0.09-0.8	0.12-1.2
	8-77	0.03-0.2	0.06-0.5	0.09-0.9	0.12-1.3
	8-83	0.03-0.3	0.06-0.6	0.09-0.9	0.12-1.4
	17-83	0.05-0.3	0.12-0.6	0.17-0.9	0.25-1.4
	47-237	0.15-0.8	0.34-1.7	0.46-2.6	0.73-3.7
	50-251	0.16-0.8	0.36-1.8	0.55-2.8	0.78-3.8
	52-259	0.16-0.8	0.37-1.8	0.58-2.9	0.82-3.9

Flow rates: Neoprene, STA-PURE (l/min)					
	mm	**6.4**	**9.6**	**12.7**	**15.9**
	inch	**1/4**	**3/8**	**1/2**	**5/8**
	#	**26**	**73**	**82**	**184**
	8-76	0.10-0.9	0.20-1.9	0.32-3.0	0.49-4.6
	8-77	0.10-0.9	0.20-1.9	0.32-3.1	0.49-4.7
	8-83	0.10-1.0	0.20-2.1	0.32-3.3	0.49-5.1
	17-83	0.20-1.0	0.43-2.1	0.68-3.3	1.0-5.1
	47-237	0.56-2.8	1.2-5.9	1.9-9.51	2.9-14
	50-251	0.60-3.0	1.3-6.3	2.01-10	3.1-15
	52-259	0.62-3.1	1.3-6.5	2.1-10	3.2-16

Flow rates: Neoprene, STA-PURE (USGPM)					
	mm	**6.4**	**9.6**	**12.7**	**15.9**
	inch	**1/4**	**3/8**	**1/2**	**5/8**
	#	**26**	**73**	**82**	**184**
	8-76	0.03-0.2	0.05-0.5	0.08-0.8	0.13-1.2
	8-77	0.03-0.2	0.05-0.5	0.08-0.8	0.13-1.2
	8-83	0.03-0.3	0.05-0.5	0.08-0.9	0.13-1.3
	17-83	0.05-0.3	0.11-0.5	0.18-0.9	0.27-1.3
	47-237	0.15-0.8	0.31-1.6	0.50-2.5	0.76-3.8
	50-251	0.16-0.8	0.33-1.7	0.53-2.7	0.81-4.0
	52-259	0.16-0.8	0.34-1.7	0.55-2.7	0.84-4.2

620RE

Flow rates: Marprene TM, Bioprene TM (l/min)			
	mm	**12**	**17**
		LoadSure	**LoadSure**
	8-76	0.30-2.8	0.47-4.5
	8-77	0.30.2.8	0.47-4.5

	8-83	0.30-3.1	0.47-4.9
	17-83	0.63-3.1	1.0-4.9
	47-237	1.7-8.8	2.8-14
	50-251	1.9-9.3	2.9-15
	52-259	1.9-9.6	3.1-15

Flow rates: Marprene TM, Bioprene TM (USGPM)			
	mm	**12**	**17**
		LoadSure	**LoadSure**
	8-76	0.08-0.7	0.12-1.2
	8-77	0.08-0.8	0.12-1.2
	8-83	0.08-0.8	0.12-1.3
	17-83	0.17-0.8	0.26-1.3
	47-237	0.46-2.3	0.73-3.7
	50-251	0.49-2.5	0.78-3.9
	52-259	0.51-2.5	0.81-4.0

Flow rates: Marprene TL, Bioprene TL (l/min)			
	mm	**12**	**17**
		LoadSure	**LoadSure**
	8-76	0.30-2.8	0.54-5.1
	8-77	0.30-2.8	0.54-5.2
	8-83	0.30-3.1	0.54-5.6
	17-83	0.63-3.1	1.1-5.6
	47-237	1.7-8.8	3.2-16
	50-251	1.9-9.3	3.4-17
	52-259	1.9-9.6	3.5-17

Flow rates: Marprene TL, Bioprene TL (USGPM)			
	mm	**12**	**17**
		LoadSure	**LoadSure**
	8-76	0.08-0.7	0.14-1.4
	8-77	0.08-0.8	0.14-1.4
	8-83	0.08-0.8	0.14-1.5
	17-83	0.17-0.8	0.30-1.5
	47-237	0.46-2.3	0.84-4.2
	50-251	0.49-2.5	0.89-4.5
	52-259	0.51-2.5	0.92-4.6

Flow rates: Silicone (l/min)			
	mm	**12**	**17**
		LoadSure	**LoadSure**

	8-76	0.31-2.9	0.49-4.6
	8-77	0.31-3.0	0.49-4.7
	8-83	0.31-3.2	0.49-5.16
	17-83	0.66-3.2	1.0-5.1
	47-237	1.8-9.2	2.9-14
	50-251	1.9-9.7	3.0-15
	52-259	2.0-10	3.2-16

Flow rates: Silicone (USGPM)			
	mm	**12**	**17**
		LoadSure	**LoadSure**
	8-76	0.08-0.8	0.13-1.2
	8-77	0.08-0.8	0.13-1.2
	8-83	0.08-0.8	0.13-1.3
	17-83	0.17-0.8	0.27-1.3
	47-237	0.48-2.4	0.76-3.8
	50-251	0.51-2.6	0.80-4.0
	52-259	0.53-2.6	0.84-4.2

Flow rates: Neoprene, STA-PURE (l/min)			
	mm	**12**	**17**
		LoadSure	**LoadSure**
	8-76	0.32-3.0	0.58-5.5
	8-77	0.32-3.1	0.58-5.6
	8-83	0.32-3.3	0.58-6.0
	17-83	0.68-3.3	1.2-6.0
	47-237	1.9-9.4	3.4-17
	50-251	2.0-10	3.6-18
	52-259	2.1-10	3.8-19

Flow rates: Neoprene, STA-PURE (USGPM)			
	mm	**12**	**17**
		LoadSure	**LoadSure**
	8-76	0.08-0.8	0.15-1.4
	8-77	0.08-0.8	0.15-1.5
	8-83	0.08-0.9	0.15-1.6
	17-83	0.18-0.9	0.32-1.6
	47-237	0.49-2.5	0.90-4.5
	50-251	0.53-2.6	0.95-4.8
	52-259	0.55-2.7	0.99-4.9

620RE4

Flow rates: Marprene TM, Bioprene TM (l/min)

	mm	12	17
		LoadSure	LoadSure
	8-76	0.25-2.4	0.33-3.1
	8-77	0.25-2.4	0.33-3.2
	8-83	0.25-2.6	0.33-3.4
	17-83	0.54-2.6	0.70-3.4
	47-237	1.5-7.5	1.9-9.8
	50-251	1.6-7.9	2.1-10
	52-259	1.6-8.2	2.1-11

Flow rates: Marprene TM, Bioprene TM (USGPM)

	mm	12	17
		LoadSure	LoadSure
	8-76	0.07-0.6	0.09-0.8
	8-77	0.07-0.6	0.09-0.8
	8-83	0.07-0.7	0.09-0.9
	17-83	0.14-0.7	0.19-0.9
	47-237	0.39-2.0	0.51-2.6
	50-251	0.42-2.1	0.54-2.7
	52-259	0.43-2.2	0.57-2.8

Flow rates: Marprene TL, Bioprene TL (l/min)

	mm	12	17
		LoadSure	LoadSure
	8-76	0.25-2.4	0.38-3.6
	8-77	0.25-2.4	0.38-3.6
	8-83	0.25-2.6	0.38-3.9
	17-83	0.54-2.6	0.80-3.9
	47-237	1.5-7.5	2.2-11
	50-251	1.6-7.9	2.4-12
	52-259	1.6-8.2	2.4-12

Flow rates: Marprene TL, Bioprene TL (USGPM)

	mm	12	17
		LoadSure	LoadSure
	8-76	0.07-0.6	0.10-0.9
	8-77	0.07-0.6	0.10-1.0
	8-83	0.07-0.7	0.10-1.0
	17-83	0.14-0.7	0.21-1.0
	47-237	0.39-2.0	0.58-2.9
	50-251	0.42-2.1	0.62-3.1
	52-259	0.43-2.2	0.65-3.2

Flow rates: Silicone (l/min)			
	mm	12	17
		LoadSure	LoadSure
	8-76	0.26-2.5	0.34-3.2
	8-77	0.26-2.5	0.34-3.3
	8-83	0.26-2.7	0.34-3.5
	17-83	0.56-2.7	0.72-3.5
	47-237	1.5-7.8	2.0-10
	50-251	1.6-8.3	2.1-11
	52-259	1.7-8.5	2.2-11

Flow rates: Silicone (USGPM)			
	mm	12	17
		LoadSure	LoadSure
	8-76	0.07-0.7	0.09-0.9
	8-77	0.07-0.7	0.09-0.9
	8-83	0.07-0.7	0.09-0.9
	17-83	0.15-0.7	0.19-0.9
	47-237	0.41-2.1	0.53-2.7
	50-251	0.43-2.2	0.56-2.8
	52-259	0.45-2.3	0.59-2.9

Flow rates: Neoprene, STA-PURE (l/min)			
	mm	12	17
		LoadSure	LoadSure
	8-76	0.27-2.6	0.40-3.8
	8-77	0.27-2.6	0.40-3.9
	8-83	0.27-2.8	0.40-4.2
	17-83	0.57-2.8	0.86-4.2
	47-237	1.6-8.0	2.4-12
	50-251	1.7-8.5	2.5-13
	52-259	1.8-8.8	2.6-13

Flow rates: Neoprene, STA-PURE (USGPM)			
	mm	12	17
		LoadSure	LoadSure
	8-76	0.07-0.7	0.11-1.0
	8-77	0.07-0.7	0.11-1.0
	8-83	0.07-0.7	0.11-1.1
	17-83	0.15-0.7	0.23-1.1
	47-237	0.42-2.1	0.63-3.2
	50-251	0.45-2.2	0.67-3.3

52-259	0.46-2.3	0.69-3.5

620R product codes

mm	inch	#	Marprene	Bioprene	Peroxide silicone	Platinum silicone
6.4	**1/4**	**26**	902.0064.032	903.0064.032	910.0064.032	913.0064.032
9.6	**3/8**	**73**	902.0096.032	903.0096.032	910.0096.032	913.0096.032
12.7	**1/2**	**82**	902.0127.032	903.0127.032	910.0127.032	913.0127.032
15.9	**5/8**	**184**	902.0159.032	903.0159.032	910.0159.032	913.0159.032

mm	inch	#	STA-PURE	Neoprene	Butyl	Tygon
6.4	**1/4**	**26**	960.0064.032	920.0064.032	930.0064.032	950.0064.032
9.6	**3/8**	**73**	960.0096.032	920.0096.032	930.0096.032	950.0096.032
12.7	**1/2**	**82**	960.0127.032	920.0127.032	930.0127.032	950.0127.032
15.9	**5/8**	**184**	960.0159.032	920.0159.032	930.0159.032	950.0159.032

mm	inch	#	Fluorel	Gore fluoroelastomer /PTFE
6.4	**1/4**	**26**	970.0064.032	965.0064.032
9.6	**3/8**	**73**	970.0096.032	965.0096.032
12.7	**1/2**	**82**	970.0127.032	965.0127.032
15.9	**5/8**	**184**	970.0159.032	965.0159.032

620RE and 620RE4 LoadSure product codes

	12mm DIN 15	12mm Tri-clamp 3/4in	17mm DIN 15	17mm Tri-clamp 3/4in
STA-PURE	960.0120.PFD	960.0120.PFT	960.0170.PFD	960.0170.PFT
Gore fluoroelastomer /PTFE	965.0120.PFD	965.0120.PFT	965.0170.PFD	965.0170.PFT
Bioprene TM	903.M120.PFD	903.M120.PFT	903.M170.PFD	903.M170.PFT
Bioprene	903.0120.PFD	903.0120.PFT	903.0170.PFD	903.0170.PFT
Platinum silicone	913.0120.PFD	913.0120.PFT	913.0170.PFD	913.0170.PFT

	12mm Cam and Groove 3/4in	17mm Cam and Groove 3/4in
Marprene TM	902.M120.PPC	902.M170.PPC
Marprene	902.0120.PPC	902.0170.PPC
Peroxide silicone	910.0120.PPC	910.0170.PPC
Neoprene	920.0120.PPC	920.0170.PPC

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STA-PURE is a trademark of W L Gore & Associates.

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Patient-connected use: warning

Warning: These products are not designed for use in, and should not be used for patient connected applications.

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Decontamination certificate

In compliance with the *UK Health and Safety at Work Act* and the *Control of Substances Hazardous to Health Regulations*, you are required to declare the substances which have been in contact with product(s) you return to Watson-Marlow or its subsidiaries or distributors. Failure to do so will cause delays. Please ensure that you fax us this form and receive an RGA (Returned Goods Authorisation) before you despatch the product(s). A copy of this form must be attached to the outside of the packaging containing the product(s). Please complete a separate decontamination certificate for each product.

You are responsible for cleaning and decontaminating the product(s) before return.

Your name		**Company**	
Address			
Postcode / zip		**Country**	
Telephone		**Fax**	
Product type		**Serial number**	
To speed the repair, please describe all known faults			

The product has ... ○ Been used ○ Not been used

If the product has been used, please complete all the following sections. If the product has not been used, please just sign this form.

Names of chemicals handled with product(s)	
Precautions to be taken in handling these chemicals	
Action to be taken in the event of human contact	

I understand that the personal data collected will be kept confidentially in accordance with the UK Data Protection Act 1998.

Signature		**RGA number**	
		Your position	
		Date	

Please print out, sign and fax to Watson-Marlow Pumps at +44 1326 376009.