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Watson-Marlow Pumps Group

WATSON-MARLOW BREDEL E-MANUALS

m-624u-gb-01

Watson-Marlow 624U pumps

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Declaration of conformity

CE When this pump unit is used as a stand-alone pump it complies with: Machinery Directive 98/37/EC EN60204-1, Low Voltage Directive 73/23/EEC EN61010-1, EMC Directive 89/336/EEC, EN50081-1/EN50082-1.

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 98/37/EC EN60204-1.

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

Two 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 two years 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.

This symbol, used on the pump and in this manual, means: Caution, risk of electric shock.

This symbol, used on the pump and in this manual, means: Caution, refer to accompanying documents.

This symbol, used on the pump and in this manual, means: Do not allow fingers to contact moving parts.

There are dangerous voltages (at mains potential) inside the pump. If access is required, isolate the pump from the mains before removing the cover.

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.

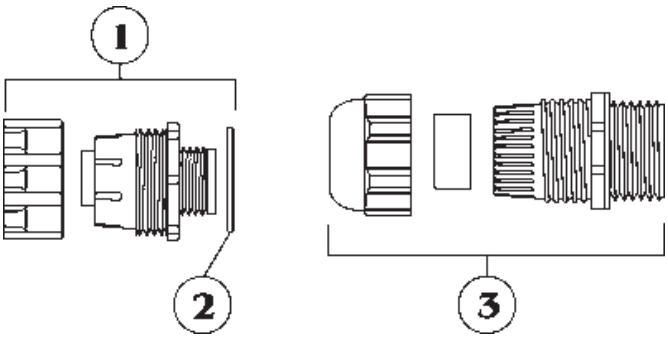
Installation

The 624U is suitable for single phase mains electricity supplies only.

To ensure correct lubrication of the gearbox the pump should only be run while its feet are on a horizontal surface. The pump should be positioned to allow a free flow of air around it.

- Remove the small transparent plate on the rear panel to gain access to the voltage selector and terminal block.

- Set the voltage selector to either 120V for 100-120V 50/60Hz single phase AC supplies or 240V for 220-240V 50/60Hz single phase AC supplies.
- Route the mains supply cable through the entry point to the right of the recess, and couple the cable to the terminal block as shown on the rear panel.
- There are two alternative connectors. One accepts 20mm rigid or flexible conduit, and the other accepts three core 0.75 square millimetre PVC sheathed mains cable (via the screwed adapter supplied) so that a mains lead can be used.
- Ensure that the mains lead is securely retained in the strain relief gland so that IP55 ingress protection is maintained.
- Securely replace the transparent plate and the gasket over the recess.



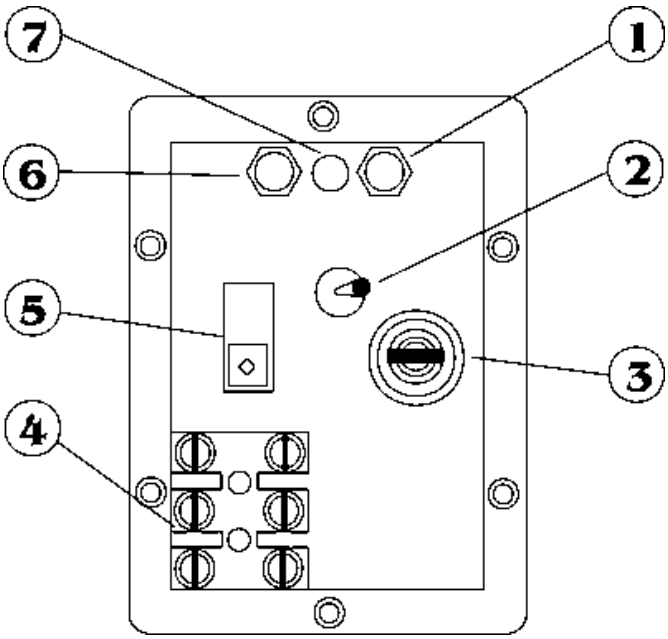
1. Armoured cable strain relief gland GR 0018
2. Washer GR 0019
3. Strain relief gland SL0020

Ingress protection standard will be compromised if the transparent plate is not replaced.

Rear panel recess

The pump rear panel recess houses the following:

1. Signal range potentiometer
2. Tachometer switch
3. Fuse holder
4. Terminal block
5. Voltage selection switch
6. Signal offset potentiometer
7. Signal overload LED



Troubleshooting

Should the pump fail to operate, make the following checks to determine whether or not servicing is required.

- Check that the power switch is on.
- Check the mains supply is available at the pump.

- Check the voltage selector switch is in the correct position.
- Check the fuse in the mains socket.
- Check that the pump is not stalled by incorrect fitting of tubing.

Manual operation

Set the *Auto/Manual/Max* switch to *Manual*.

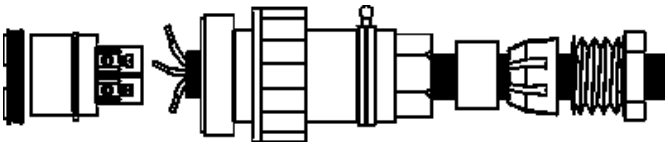
- **Start up Direction** Start the pump by turning the Forward/Off/Reverse switch to the required direction of rotation. The preferred direction of rotation is clockwise (with fluid entering at the bottom of the pumphead), which will ensure the longest possible tube life. To operate against higher pressures use anticlockwise rotation.
- **Prime** To prime the pump at maximum speed press the Max button.
- **Speed control** Set speed is indicated on the digital display.
- **Stop** Stop the pump by turning the Forward/Off/Reverse switch to its central Off position. To change the direction of flow, turn the Forward/Off/Reverse switch to its central Off position until the pumphead rotor stops, and then turn it to the required direction of rotation.

If returning from auto control to manual control, it is not necessary to disconnect the process signal from the pump or adjust the calibration potentiometers.

Automatic operation

- Set the Auto/Manual/Max switch to Auto.

For all auto and remote control operations, the drive is supplied with a 6-pin waterproof connector.



Watson-Marlow part number UP0035

Correct assembly of the connector plug is essential or the ingress protection standard will be compromised. Never apply mains voltage across any pins on the 6-pin socket. Up to 30V may be applied across pins 2 and 3 but not across other pins. Permanent damage not covered by warranty may result in both instances.

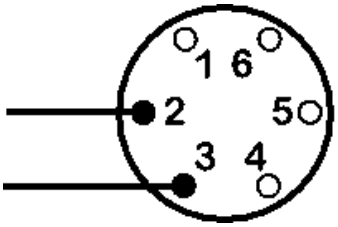
The pump is controllable by an analogue process signal of up to 30V or 32mA. The pump will provide an increasing flow rate for rising control signal (non-inverted response) or an increasing flow rate for falling control signal (inverted response).

- **Signal offset** is the process signal level which has to be reached in order for the pump rotor to start rotating.
- **Signal range** is the change in process signal level necessary to produce the required change in pump rotor speed.

For example, when using a 4mA to 20mA process signal:

Pump response	Signal offset	Signal range
Non-inverted	4mA	16mA
Inverted	20mA	16mA

For voltage modes, a stable variable DC voltage source can be used in conjunction with a DC voltmeter, (maximum 30V DC). Polarity set for a non-inverted response. Reverse polarity for an inverted response.



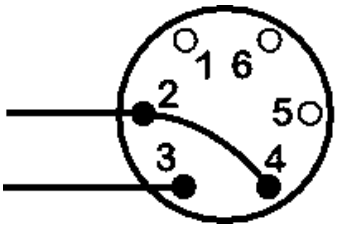
Voltage signal

Input impedance 220 kOhms

Response	Range V	Offset V	Pin 2	Pin 3
Non-inverted	5 to 30	0 to 30	-	+
Inverted	5 to 24	0 to 24	+	-

For current modes, the same DC source can be used in conjunction with a DC milliampere meter, (maximum 32mA). Polarity set for a non-inverted response. Reverse polarity for an

inverted response.



Current signal

Input impedance 250 Ohms

Response	Range mA	Offset mA	Pin 2	Pin 3
Non-inverted	12 to 30	0 to 30	-	+
Inverted	12 to 30	0 to 24	+	-

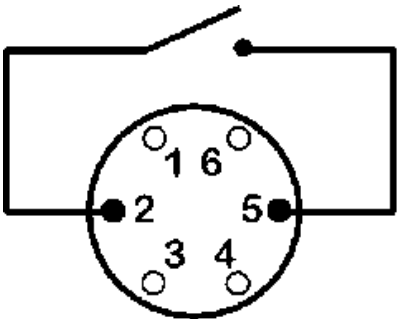
Calibration procedure

Ensure the correct wiring of the 6 pin plug and insert the plug into the socket at the rear of the pump.

- Remove the rear panel window.
- Turn the signal offset potentiometer clockwise until the slider traverse limit is reached and is signified by a clicking noise. Now turn the potentiometer ten turns anticlockwise. Repeat for the signal range potentiometer. This ensures correct potentiometer set-up for calibration.
- Set the process signal offset.
- Turn the signal offset potentiometer clockwise to set the drive shaft speed to the desired minimum.
- Set the process signal at its upper range limit (not exceeding 30V or 32mA).
- Turn the signal range potentiometer clockwise to set the drive shaft speed to the desired maximum.
- Repeat the procedure until pump response coincides exactly with the process signal.
- If the signal rises above its designated maximum, the action of the signal conditioner will be to hold the motor to maximum speed at the MAX setting indicated by the LED indicator flashing. If the signal rises above 30V, permanent damage, not covered by warranty, may result.

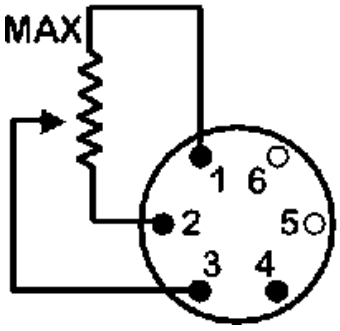
Securely replace the rear panel recess cover on the back of the pump ensuring the gasket is in the correct position. This will avoid the ingress protection standard of the pump being compromised.

Remote control



Stop / start

Connect remote switch between pins 2 and 5 of the 6 pin socket. Close contact to stop the pump, open to run.

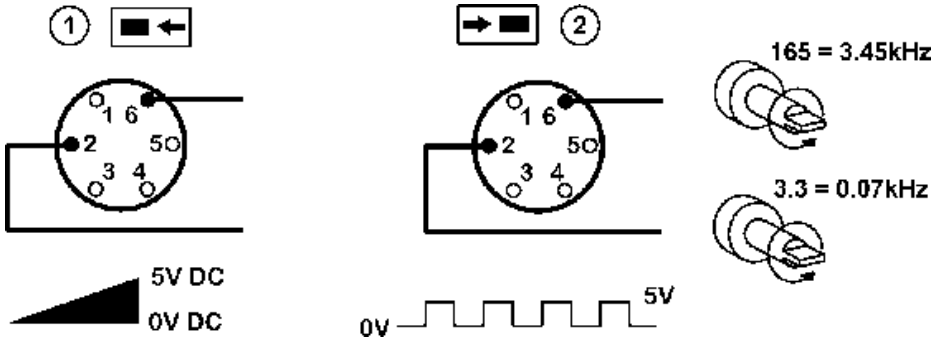


Speed

A remote potentiometer with a nominal value of between 4.7kohm and 5kohm should be wired as shown, When using a remote potentiometer do not connect a voltage/current control signal at the same time. The speed control signal will require calibration relative to the minimum and maximum settings of the potentiometer. Use the offset and range potentiometers as described under calibration.

Tachometer output

This facility can be used to indicate motor speed or total the number of motor revolutions. Select either 1) 0-5V DC or 2) 5V pulse train output using the tachometer output switch.



Care and maintenance

The only scheduled maintenance required for the 624U/R is inspection of the motor brushes and their replacement before their length is less than 6mm. The life of the brushes will depend on the duty of the pump, but is expected to be a minimum of 4,000 hours at maximum speed.

If the pump requires cleaning, use a mild solution of detergent in water after removing the pumphead. Do not use strong solvents.

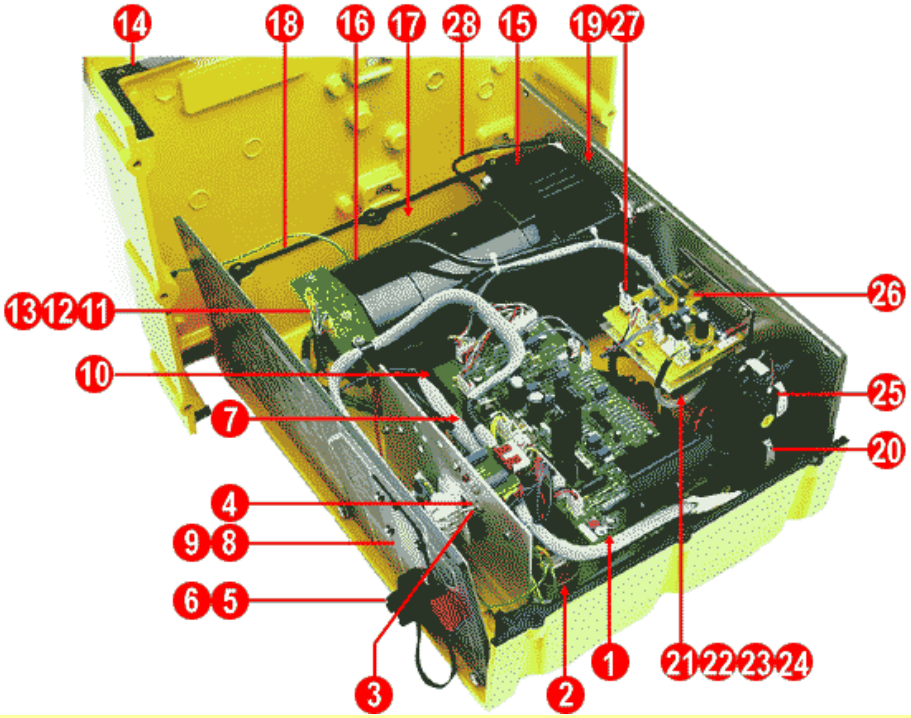
For gearbox rebuilds, use Lubriplate GR-132 (Bodine reference LG-23) only. This is a lithium combination type thickener, NL GI No.1 grade, non-corrosive extreme pressure lubricant. This product is water resistant and resistant to a large degree to most other contaminants.

Specification

Maximum rotor speed	165 rpm
Power supply	100-120/220-240V /1/ 50/60Hz
Control range	50:1
Power consumption	250 VA
Fuse rating	Type T (anti-surge) 5A
Operating temperature range	5C to 40C
Storage temperature range	-40C to 70C
Weight	21kg (46lbs)
Noise	<70dBA at 1m
Standards	EN60529 (IP55)
	Machinery directive 98/37/EC EN60204-1
	Low voltage directive 73/23/EEC EN61010-1
	EMC directive 89/336/EEC EN50081-1/EN50082-1

Specific drive performance details such as loaded drive speed variation against mains supply voltage fluctuation and drive stability from a cold start to normal operating temperature are available on request. For further information please contact Watson-Marlow Technical Support Department.

Drive spares



Number	Spare	Description
1	MRA0176A	Pcb control
2	FA0002	Mains filter
3	SW0060	Tacho switch
4	SW0086	Voltage switch
5	UP0035	Six-pin plug
6	US0035	Six-pin socket
7	FA0010	Earth filter
8	MR0669S	Cover plate
9	MR0771S	Gasket
10	MRA0328A	Capacitor 250V, pcb-mounted
11	MR0959H	Tacho harness
12	MN0787M	Tacho disc
13	MR0525S	Tacho bracket
14	MR0690S	Gasket
15	MG0600	Motor/gearbox 165rpm
16	BM0015	Motor brush
17	TM0020	Terminal block
18	MR0691S	Gasket
19	OS0042	O ring seal
20	SW0146	Auto/man/max
21	MR0769B	Potentiometer
22	MR0716S6	Knob
23	MR0715M	Locking knob
24	MD0925T	Locking knob (machined)
25	SW0141	Direction switch
26	MRA0261A	Interlock/display pcb
27	MR2087H	Interlock cable
28	MRA0268A	Interlock reed switch
	OG0024	Gearbox lubricant

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.

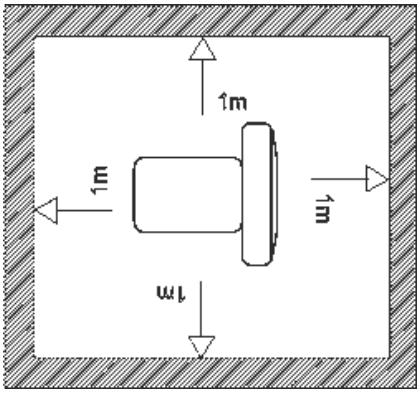
CIP

- LoadSure tube elements and continuous tubing can be cleaned using CIP processes.
- Ensure that the tubuing 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.

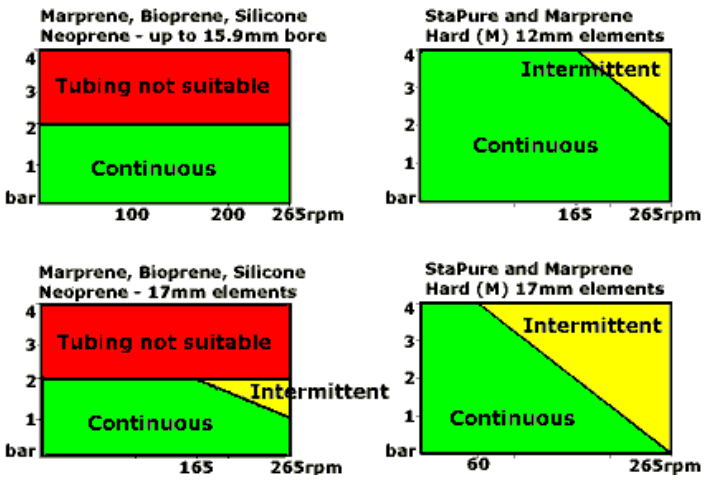
Pumphead spares

Number	Spare	Description
1		Tube clamp pack: p/n 069.4101.000
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) - includes guard
3	MRA0297A	Track assembly (element pumphead) - includes guard
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 screw M6x10 locating bolt
20	FN0523	Close-coupled track locating screw M6x20 locating bolt
21	FN0581	Rotor locating washer M6
22	FN0520	Rotor locating bolt M6 x 25
23	TT0006	5mm Allen key
24	MA0017	Guard magnet
	CN0187	Plug blanking 10.72M
	MRA0268A	Cased drive door switch assembly
	MRA0279A	Close-coupled door switch assembly

Technical data

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



Flow rates

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					
	**mm**	**6.4**	**9.6**	**12.7**	**15.9**
	inch	**1/4**	**3/8**	**1/2**	**5/8**
	**#**	**26**	**73**	**82**	**184**
	3-165 (l/min)	0.04 - 2.1	0.08 - 4.1	0.12 - 6.6	0.16 - 8.6
	3-165 (USGPM)	0.01 - 0.6	0.02 - 1.1	0.03 - 1.7	0.04 - 2.3

Flow rates: Silicone					
	**mm**	**6.4**	**9.6**	**12.7**	**15.9**
	inch	**1/4**	**3/8**	**1/2**	**5/8**
	**#**	**26**	**73**	**82**	**184**
	3-165 (l/min)	0.04 - 2.0	0.08 - 4.5	0.13 - 6.9	0.16 - 11
	3-165 (USGPM)	0.01 - 0.5	0.02 - 1.2	0.03 - 1.8	0.04 - 3.0

Flow rates: Neoprene, STA-PURE					
	**mm**	**6.4**	**9.6**	**12.7**	**15.9**
	inch	**1/4**	**3/8**	**1/2**	**5/8**
	**#**	**26**	**73**	**82**	**184**
	3-165 (l/min)	0.04 - 2.0	0.08 - 4.1	0.12 - 6.6	0.18 - 10
	3-165 (USGPM)	0.01 - 0.5	0.02 - 1.1	0.03 - 1.7	0.05 - 2.7

620RE

Flow rates: Marprene TM, Bioprene TM			
	**mm**	**12**	**17**
		**LoadSure**	**LoadSure**
	3-165 (l/min)	0.11 - 6.1	0.18 - 9.7
	3-165 (USGPM)	0.03 - 1.6	0.05 - 2.6

Flow rates: Marprene TL, Bioprene TL			
	**mm**	**12**	**17**
		**LoadSure**	**LoadSure**
	3-165 (l/min)	0.11 - 6.1	0.20 - 11
	3-165 (USGPM)	0.03 - 1.6	0.05 - 2.9

Flow rates: Silicone			
	**mm**	**12**	**17**
		**LoadSure**	**LoadSure**
	3-165 (l/min)	0.12 - 6.4	0.18 - 10
	3-165 (USGPM)	0.03 - 1.7	0.05 - 2.7

Flow rates: Neoprene, STA-PURE			
	**mm**	**12**	**17**
		**LoadSure**	**LoadSure**
	3-165 (l/min)	0.12 - 6.6	0.22 - 12
	3-165 (USGPM)	0.03 - 1.7	0.06 - 3.1

620RE4

Flow rates: Marprene TM, Bioprene TM			
	**mm**	**12**	**17**

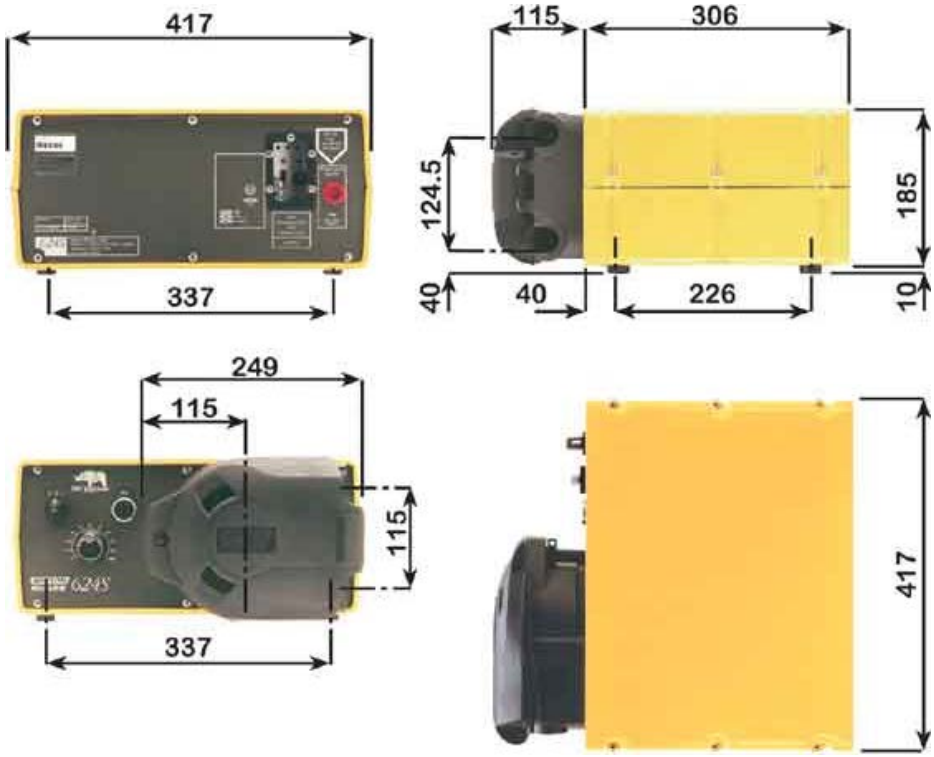
		LoadSure	**LoadSure**
	3-165 (l/min)	0.09 - 5.2	0.12 - 6.8
	3-165 (USGPM)	0.02 - 1.4	0.03 - 1.8

Flow rates: Marprene TL, Bioprene TL			
	mm	**12**	**17**
		LoadSure	**LoadSure**
	3-165 (l/min)	0.09 - 5.2	0.14 - 7.8
	3-165 (USGPM)	0.02 - 1.4	0.04 - 2.1

Flow rates: Silicone			
	mm	**12**	**17**
		LoadSure	**LoadSure**
	3-165 (l/min)	0.10 - 5.4	0.13 - 7.0
	3-165 (USGPM)	0.03 - 1.4	0.03 - 1.9

Flow rates: Neoprene, STA-PURE			
	mm	**12**	**17**
		LoadSure	**LoadSure**
	3-165 (l/min)	0.10 - 5.6	0.15 - 8.3
	3-165 (USGPM)	0.03 - 1.5	0.04 - 2.2

Dimensions in mm



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		

Trademarks and disclaimer

Patient-connected use: warning

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

Publication history

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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.