Servicing Instructions

Therapy Equipment Medireg Range

Revision 2 : October 2005
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**Record of Permanent Revisions**

Retain this record at the front of the Manual. On receipt of Revision, revise as detailed in the Letter of Transmittal and record the incorporation of the revision on this sheet.

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<th>Rev. No.</th>
<th>Issue Date</th>
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Product Information – Medireg Range

Function

The function of the Medical Regulator (Medireg) is to supply a fixed outlet supply of 4 Bar (approximately 60psi) from an Oxygen or Medical Air Gas Cylinder. This outlet pressure can vary up to 6 Bar (90psi) from an “Entonox” Gas Cylinder.

The unit should be operated and stored in a dry clean environment within the temperature range of -10°C to +40°C.

Types

<table>
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<th>Gas</th>
<th>Oxygen</th>
<th>Medical Air</th>
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<tr>
<td></td>
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<td>O2/N2O (“Entonox”)</td>
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<tr>
<th>Fittings</th>
<th>Bullnose</th>
<th>Pin Index</th>
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| Regulator Types | Medireg | -       | Standard Regulator, supplying a fixed outlet pressure of 4 Bar (approx. 60psi), or up to 6 Bar (approx. 90psi), via a 3/8”BSP Outlet thread or Schrader Connection. |
|-----------------|---------|---------|
| Dialreg         | -       |         | Standard Regulator, however with a ‘Dial’ type flow device fitted to the top of the unit as an integral part. |
| Flowreg         | -       |         | Standard Regulator, however with a ‘Ball/Tube’ flow device fitted to the top of the unit as an integral part. |
Technical Specification

Inlet Connection  - Bullnose or Pin Index
Inlet Pressure  - Up to 2000psi
Outlet Pressure  - 4 Bar (Approx 60psi) – Oxygen or Air
                  Up to 6 Bar (Approx 90psi) – “Entonox”

Constitutional
Materials  - Brass Jet and Diaphragm Shaft
          PTFE Seating
          Nitrile and Viton O Rings
          Brass Main Body
          Polycarbonate Casing
          Plated Brass Bullnose Nipple/Handwheel
          GlassFiled Nylon Top Cover
          Plated Brass 3/8”BSP Outlet
          Stainless Steel Springs

Approval/Warranties

The Therapy Equipment Pipeline Suction range fully complies to the requirements of BS EN 738-1: 1997 (Pressure Regulators for use with Medical Gases) and is CE Marked in accordance with current European legislation.

The Therapy Equipment Medireg range is supplied with a 4 Year Function Warranty.

Reconditioning/Servicing Recommendations

The Therapy Equipment Medireg range requires reconditioning every four years. During this process, all internal and external seals, and Seatings are replaced.

Maintaining the Medireg range within these recommendations, will ensure compliance to SAB No44, and the recent MHRA Safety Notice (MDA/2003/016).

KEEP ALL OIL AND GREASE, AND NON-RECOMMENDED LUBRICANTS AWAY FROM THIS PRODUCT, AS PRESSURISED OXYGEN AND OIL MAY IGNITE
Annual Function Test Requirements

Frequency

Annually or in accordance with the Hospital Policy

Objective

To replace all external seals and ensure that the unit is in an accurate working condition and leak free

Precaution

It is strongly advised that protective gloves be worn before any servicing is carried out on Medical Devices

Procedure

Static/Dynamic Pressure Test Procedure

1. Change Bullnose O Ring (6304) on Bullnose Nipple, or Bodok Seal (6159) on Pin Index Yoke.

2. Connect the Regulator to the Cylinder, and hand tighten either the Plastic Handwheel for the Bullnose fitting or Yoke Screw for the Pin Index fitting.

3. In the case of units supplied with 3/8" BSP outlets, connect a Fine Adjustment Valve and 10 Bar Pressure Gauge, making sure that the Fine Adjustment Valve is in the open position.

4. Turn the cylinder on slowly, and check the Dynamic Pressure (Flowing Pressure) i.e. with Fine Adjustment Valve is in the open position, and Static Pressure i.e. with Fine Adjustment Valve in the closed position.

   Dynamic Pressure - 60psi +/- 5psi
   Static Pressure - 61psi +/- 5psi

5. Once settled, the needle should give a fixed reading – any movement in the needle either up or down, over a period of time signifies malfunction. Please remove the Regulator from use, if any malfunction noted.
Units without 3/8" BSP Outlets

1. Follow above instructions up to Number 2.

2. Turn the cylinder on slowly and connect a Tube with attached Calibrated Flowtube to the Tubing Nipple.

3. Check the output readings are within tolerance (+/- 10% of indicated flow, up to a maximum of 0.5LPM, whichever is the greater)

Leak Test Procedure

1. In the case of units supplied with 3/8"BSP Outlets, ensure that the Outlet is occluded by fitting a blanking plug. In the case of units supplied without an outlet, ensure that the unit is in the OFF position.

2. Connect the Regulator to the Cylinder, and hand tighten either the Plastic Handwheel for the Bullnose fitting or Yoke Screw for the Pin Index fitting.

3. Turn the cylinder on slowly.

4. Ensure that the gauge on the Regulator is registering the approximate contents of the cylinder.

5. Turn the cylinder OFF, with the pressure retained within the Regulator, and leave for approximately 15-20 minutes.

6. Ensure that all possible outlets for the gas are turned off (or blocked), and that the Gauge needle does not drop. A drop on the needle indicates a leak. If a leak is detected, then the unit should be removed from use, and reconditioned (or returned to Therapy Equipment under warranty if within 4 years old)
Instructions for Reconditioning

Frequency

The Medireg Range should be fully reconditioned or replaced every 4 Years. It is therefore recommended that each Hospital monitors/audits the Regulators in use within the Hospital, and ensures that there is a programme for removal of all units reaching their 4 year anniversary for either reconditioning or replacement using our New for Old Scheme.

The above recommendations are in line with the requirements of Safety Action Bulletin No. 44 (Issued Jan 1989) and also the recent MHRA Safety Notice (MDA/2003/016).

The Medireg Range is supplied with a 4 Year Function Warranty, and strip down maintenance on the product should not be required during this initial period. Any functional fault found within the first 4 Years of Purchase is covered under the Warranty, and the product should therefore be returned to the manufacturer for a warranty repair.

The warranty does not however cover accidental damage.

Objective

To replace the High Pressure Valve Seat and all Internal and External Seals. Once competed, to retest the unit to ensure the unit is functioning correctly and leak free.

Precaution

It is strongly advised that protective gloves be worn before any servicing is carried out on Medical Devices

UNDER NO CIRCUMSTANCES SHOULD ANY OIL, GREASE OR NON-RECOMMENDED LUBRICANT BE USED IN THE RECONDITIONING OF REGULATORS.
Procedure

Bullnose Medireg

1. Remove the Serial Number Label (5099-23) on the rear of the Outer Casing, and unscrew the two screws (5099-08) to release the front and rear case.

2. Remove the Top Cover (5000-03) by pulling upwards.

3. Place the Regulator under a bench-press and carefully remove the four screws (5000-05). When taking the final screw out make sure that the pressure of the internal regulator spring is being supported by the bench-press.

4. Remove the Inner Cap (5000-04)

5. Remove the Diaphragm Assembly (5099-05-01) and Spring (5099-26) from the regulator body.

6. Place the regulator body into a vice, and remove the Bullnose Nipple (5000-01) which will also release the bottom cover plate (5099-22)

7. Renew the Bullnose O Ring (6304) on the coned end of the Bullnose Nipple, and the O Ring (5099-14) which is in the groove, in the face of the threaded end of the Bullnose Nipple.

8. Remove the coloured label from the bottom of the regulator body, and replace it with a coloured label indicating the current year.

9. The removal of the Diaphragm and the spring will expose the Main Jet (5099-13) at the bottom of the regulator body. Using a clean soft implement push the top of the Jet downwards and remove from the Bullnose inlet hole.

10. Replace the two O Rings (Small – 5099-11; Large 5099-12), and re-seat the Jet (5099-13) by pushing it back into the Bullnose Inlet hole. An audible ‘click’ should be heard.

11. Fit the new Diaphragm Assembly, which includes the High Pressure Valve Seat. The new Diaphragm stem will have a smear of Fomblin lubricant, which can safely be used with high pressure Oxygen. No further action is required other than replacement. Ensure that the existing spring (5099-26) is replaced under the new diaphragm.

12. Replace the O Ring (5050-03-01) between the Main Regulator Body and the Cap.
13. Place the regulator body into a vice, and insert the Bullnose Nipple, using a Torque Wrench (setting 75N-m), making sure to fit the plastic bottom cover (5099-22) with the lip away from the body.

14. Place the regulator body in the bench-press and compress the Diaphragm Assembly against the spring (5099-26) to the point where the special pin can be inserted through the regulator body, holding the Diaphragm and Spring under compression.

15. When the pin has been inserted replace the O Ring (5050-03-01) in the Top Cap (5000-04) and replace the Top Cap into the regulator using the four screws.

16. Take the pin out of the regulator body using a pair of pliers.

17. Remove the Allen Head Grub Screw (5099-16) which holds the Relief Valve in place, from the side of the regulator body.

18. Replace the O Ring (5099-18) on the Safety Valve Body (5099-17).

19. Re-fit the Safety Valve components, ensuring that the body is inserted in the hold, in front of the spring.

20. Replace the Allen Head Grub Screw (5099-16). The Grub Screw should be fitted so that the top of the screw is flush with the regulator body. **DO NOT SCREW THE GRUB SCREW BELOW THE LEVEL OF THE BODY.** This should ensure that the Pressure Relief Valve is set to blow off at approximately 100psi (7 Bar).

21. Visually inspect the gauge (5099-27) for signs of damage, and replace if necessary.

22. Re-fit the casing and fit new Serial Number label (existing Serial Number should be written on panel).

**Testing**

Connect the Regulator to a cylinder, and repeat procedure as per *Annual Function Test Procedure*. 

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Section 4  
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October 2005
**Pin Index Medireg**

1. Remove the Serial Number Label (5099-23) on the rear of the Outer Casing, and unscrew the two screws (5099-08) to release the front and rear case.

2. Remove the Top Cover (5000-03) by pulling upwards.

3. Place the Regulator under a benchpress and carefully remove the four screws (5000-05). When taking the final screw out make sure that the pressure of the internal regulator spring is being supported by the bench-press.

4. Remove the Inner Cap (5000-04)

5. Remove the Diaphragm Assembly (5099-05-01) and Spring (5099-26) from the regulator body.

6. Remove the two screws (5005-16) securing the Pin Index Yoke to the Regulator Body

7. Replace the Bodok Seal (6159) on the Pin Index Yoke

8. Remove the Yoke Insert (5005-21) that connects the Pin Index to the Regulator, and change the O Ring (5005-22)

9. Remove the Inlet Blanking Plug (5005-17) from the bottom of the Regulator body and change the O Ring (5005-22)

10. Change the Year Indicator Disc (5005-05-01) on the bottom of the plastic cap.

11. The removal of the Diaphragm and the spring will expose the Main Jet (5099-13) at the bottom of the regulator body. Using a clean soft implement push the top of the Jet downwards and remove from the Bullnose inlet hole.

12. Replace the two O Rings (Small – 5099-11; Large 5099-12), and re-seat the Jet (5099-13) by pushing it back into the Bullnose Inlet hole. An audible ‘click’ should be heard.

13. Fit the new Diaphragm Assembly, which includes the High Pressure Valve Seat. The new Diaphragm stem will have a smear of Fomblin lubricant, which can safely be used with high pressure Oxygen. No further action is required other than replacement. Ensure that the existing spring (5099-26) is replaced under the new diaphragm.

14. Replace the O Ring (5050-03-01) between the Main Regulator Body and the Cap.
15. Re-fit the Inlet Banking Plug (5005-17) to the bottom of the Regulator Body

16. Place the regulator body in the bench-press and compress the Diaphragm Assembly against the spring (5099-26) to the point where the special pin can be inserted through the regulator body, holding the Diaphragm and Spring under compression.

17. When the pin has been inserted replace the O Ring (5050-03-01) in the Top Cap (5000-04) and replace the Top Cap into the regulator using the four screws.

18. Take the pin out of the regulator body using a pair of pliers

19. Remove the Allen Head Grub Screw (5099-16) which holds the Relief Valve in place, from the side of the regulator body.

20. Replace the O Ring (5099-18) on the Safety Valve Body (5099-17)

21. Re-fit the Safety Valve components, ensuring that the body is inserted in the hold, in front of the spring.

22. Replace the Allen Head Grub Screw (5099-16). The Grub Screw should be fitted so that the top of the screw is flush with the regulator body. **DO NOT SCREW THE GRUB SCREW BELOW THE LEVEL OF THE BODY.** This should ensure that the Pressure Relief Valve is set to blow off at approximately 100psi (7 Bar).

23. Visually inspect the gauge (5099-27) for signs of damage, and replace if necessary

24. Re-fit the casing and fit new Serial Number label (existing Serial Number should be written on panel).

**Testing**

Connect the Regulator to a cylinder, and repeat procedure as per *Annual Function Test Procedure*. 
Dialregs

For the specifics of Bullnose and Pin Index Dialreg servicing, please see the instructions under Bullnose and Pin Index Medireg servicing.

The reconditioning requirements for the replacement of the Internal Valves and Seals are the same as described in the Bullnose and Pin Index Servicing.

1. Remove the Control Knob label (5050-10-02) and Cap (5050-12-01)
2. Unscrew the Holding Screw (6501-15), taking care to hold the plate (5050-13-01) in place to prevent the contained springs from being released too quickly.
3. Remove the Plate (5050-13-01) slowly. Release the two springs (5050-14-01) and remove the two Balls (5050-01-01)
4. Remove the Control Knob (5050-10-01) by pulling sharply upwards.
5. Remove the Plastic Top Plate (5050-09-01)
6. Unscrew the four screws (5005-05) **MAKING SURE** that sufficient pressure has been applied to the top of the regulator to stop the Main Body from being released too quickly.

After Number 6, replace all Internal Seals and Diaphragm as per *Instructions for Reconditioning* starting from Number 5.

In addition, however the following requires reconditioning on a Dialreg:

1. Push out the Metering Drum (5050-15-02) from the Plastic Dialreg Body (5050-07-01)
2. Replace the O Ring (5099-11) on the stem of the Metering Drum (5050-15-02)
3. Replace the two O Rings (5050-04-01) on either side of the Internal Face of the plastic body.

**THE METERING DRUM IS PRE-SET AND THEREFORE SHOULD NOT NEED REPLACING**

4. Replace the O Ring (5050-03-01) between the plastic Dialreg Body and the Main Regulator Body
5. Push the Metering Drum back into the Main Body, taking care not to trap any of the internal O Rings
6. Fit new O Ring (5050-03-01) to underside of Stop Plate (5050-18)

7. When the reconditioning of the Main Regulator has been completed, and the Main Spring compressed by means of the special pin, re-fit the Dialreg Plastic Body, with the four screws, ensuring that the Stop Plate (5050-18) is in place between the Metering Drum and the Body with the O Ring facing towards the body.

8. Push fit the Plastic Cap (5050-09-01) over the plastic Dialreg Body

9. Re-fit the Control Knob (5050-10-01) onto the brass shaft of the Metering Drum

10. Insert the two Balls (5050-01-01) then the two Springs (5050-14-01) and hold them captive with the metal plate (5050-13-01) using the screw (6501-15)

11. Press fit the plug (5050-12-01) back into the top of the Control Knob and fit a Label (5050-10-02)

Testing

Connect the Regulator to a cylinder, and repeat procedure as per Annual Function Test Procedure.

Flowregs

For the specifics of Bullnose and Pin Index Flowreg servicing, please see the instructions under Bullnose and Pin Index Medireg servicing.

The reconditioning requirements for the replacement of the Internal Valves and Seals are the same as described in the Bullnose and Pin Index Servicing

1. Remove the plastic Flowreg Body Cover (5150-01-03)

2. Unscrew the four screws (5005-05) **MAKING SURE** that sufficient pressure has been applied to the top of the regulator to stop the Main Tip from being released too quickly

After Number 2 replace all Internal Seals and Diaphragms as per Instructions for reconditioning starting at Number 5.
In addition, however the following requires reconditioning on a Flowreg:

1. Unscrew the Tube Retainer (5150-01-02) using the special tool, and remove the Outer Tube (6501-01-01) and Inner Tube (6501-02)

2. Replace the Gauze Filter (6501-20) if necessary, the Outer Tube O Ring (6501-16) and the Inner Tube O Ring (6501-26)

3. Inspect the Inner and Outer Tubes for general condition and replace if necessary

4. Remove the Control Knob Label (6501-04) and unscrew the screw (6501-15) to remove the Control Knob (6461).

5. Remove the Circlip (6501-13) using C-Clip pliers and unscrew the spindle assembly.

6. Replace the two Spindle O Rings (6501-07). When the Spindle Assembly is replaced, care should be taken to ensure that the components are replaced in the correct order:
   Brass Washer / O Ring / O Ring / Brass Washer / Stainless Steel Washer / C-Clip

7. When servicing of the Main Regulator has been completed, and the Main Springs compressed by means of the special pin, re-fit the Main Top with the four screws.

8. Re-fit the plastic Flowreg Body Cover (5150-01-03)

**Testing**

Connect the Regulator to a cylinder, and repeat procedure as per *Annual Function Test Procedure*. 
Reconditioning/Servicing/Replacement Arrangements

Reconditioning

Whilst Therapy Equipment provide free of charge training in the reconditioning and servicing of Medireg range, we also provide a reconditioning service.

The units will be fully reconditioned using our recommended procedure, and returned to the customer with a renewed four year function warranty.

The current costs for this service are as follows:

- **Medireg**: £29.50 + VAT (inclusive of parts)
- **Dialreg**: £30.50 + VAT (inclusive of parts)
- **Flowreg**: £31.50 + VAT (inclusive of parts)

Replacement

We offer a discounted scheme whereby we exchange your old units for brand new units.

Please see the catalogue for full details/pricing

Servicing Kits

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Exploded Drawing – Internal Parts
Exploded Drawing – Medireg Top

5000-09
5000-03
5000-04
5050-03-01
5000-10
5000-05

5099-15  B/N Top Outlet
5099-15-01  B/N Side Outlet
5099-15-04  P/I Side Outlet
5099-15-05  P/I Top Outlet
Exploded Drawing – Casing Parts
Exploded Drawing – Dialreg Parts

The PVC Washer (5050-16) was superceded by the Dialreg Stop Plate (5050-18) with effect from 1st January 2003.
Exploded Drawing – Flowreg Parts