INFORMATION

N° INF08/018 Issue 1 Product 8240 Series Colorimetric Monitors Manual IM/8241

General Fault Finding

1 Introduction

The 8240 series of colorimeters is fitted with extensive diagnostics, which provide information on routine servicing and problems that have developed. Any one of these problems illuminate the 'Out of Service' L.E.D and de-energise the normally energised 'Out of Service' alarm relay. In addition to this, timed calibrations are inhibited and the cause of the alarm is displayed on Programming Page 1.0.

2 Malfunction of the Monitor

A Calibration Fail for any reason could be caused by almost any part of the liquid handling section of the monitor including the solutions. Mechanical components, which are involved with the liquid handling, e.g. pumps; tubing; valves and tubing connections, should be systematically checked for correct operation and for leaks or blockages, which change the chemical conditions within the monitor.

In the majority of cases any problems experienced are generally found to be associated with the chemistry and liquid handling section.

Noise maybe due to air bubbles sticking in the pipework and to the walls of the cuvette. Degassing of the sample is normal due to pre-heating of the sample on entry into the liquid handling section. However, the monitor is designed so this does not normally affect its performance. If the problem is excessive a system chemical rinse should be carried out to clean and re-wet the liquid handling system and cuvette. Reducing the control temperature also helps.

The most common problems are associated with the reagent or standard solution. Any unpredictable problems may be due to the standard or reagent solutions, or their flow through the monitor. If any doubts exist regarding the integrity of these solutions, they should be replaced with freshly prepared solutions in the early stages of the fault finding investigations.

If the monitor fails to produce results as expected, the most likely cause is the standards, either contaminated when handled or (and most likely) made up with poor quality water, possibly containing high background levels of silica and/or phosphate. Incorrectly prepared reagents may give a poor calibration factor. If the solutions are purchased from a proprietary chemical supplier, care should be taken in storing the containers; they should be date stamped, used in strict rotation, and not used after their expiry date. When measuring trace levels of silica, contamination can only be avoided by preparing and handling solutions with great care. Laboratory glassware is not to be used for low concentration solutions; use plastic instead.

3 Simple Checks

Unstable or Erratic Readings

1. Check the flow of each reagent through the pump.
2. Check the flow of sample into the cuvette.
3. Check that the pinch tube is fitted correctly into the pinch valve and sample is not passing to drain.
4. Ensure that the drain/fill cycle is taking place normally. Illumination can be seen via the plastic prism on the top of the lamp housing.
5. Ensure that the cuvette overflows through the bottom left hand outlet tube before the lamp lights during each drain/fill cycle.
6. Rinse the pipework for 30 minutes with cleaning solution (detailed in the manual) to remove any build-up of molybdate precipitation.
7. Carry out a monitor response test detailed below.

Low/High Calibration Factor Value

1. Check and, if necessary, replace the standard solution.
2. Check and, if necessary, replace the reagent solution.
3. Switch ‘Energise AUTO ZERO valve’ to YES on Programming Page 2.2.
4. Disconnect the tube on the AUTO ZERO valve furthest away from the reaction block. Ensure that solution emerges from the valve nipple.
5. Switch ‘Energise AUTO ZERO valve’ to NO and set ‘Energise SECONDARY CAL valve’ to YES.
6. Lift the secondary calibration solution tube out of the container for a few seconds and ensure that air is being drawn into the tube.
7. Carry out a monitor response test as detailed below.

Monitor Stability/Response Test

1. Check that the temperature on both heaters is under control and stable.
2. Switch ‘Default Calibration Parameter’ to YES on Programming Page 2.1.
3. Switch ‘Energise AUTO ZERO valve’ to YES on Programming Page 2.2.
4. Run monitor for 30 minutes.
5. Use the up and down buttons to generate a sensible reading of the sample on the display on Programming Page 0. Note the reading over a 30 minute period to ensure a stable reading.
6. Switch ‘Energise AUTO ZERO valve’ to NO and ‘Energise SECONDARY CAL valve’ to YES.
7. Run the monitor for 30 minutes. Note that the reading on Programming Page 0 has changed by approximately the value of the secondary solution and is stable over a 30 minute period.

8. If successful, set the monitor to normal operation, i.e., de-energise the SECONDARY CAL valve and carry out a baseline calibration.

Simple Electronic Response Test

1. Remove the optical system cover.
2. Switch 'Default Calibration Parameter' to YES on Programming Page 2.1.
3. Select YES to parameter entitled 'Switch lamp to continuous' on Programming Page 2.2. This stops the drain/fill sequence.
4. Place a thin card between the lamp housing and the measuring cuvette to stop the light reaching the measuring photocell.
5. Wait six seconds and note that the reading on the display on Programming Page 0 goes off scale.
6. Remove the card and place it between the lamp housing and the reference photocell housing to stop the light reaching the measuring photocell.
7. Wait six seconds and note that the reading goes to zero. Note also that the intensity of the light, seen through the plastic prism on top of the lamp housing, increases.
8. Remove the card and set the monitor to normal mode via Programming Pages 2.1 and 2.2.

The Exciter Lamp

This lamp is pre-set at the factory and needs no further adjustment. Consult the separate Technical Guide for information regarding replacement and setting up.

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