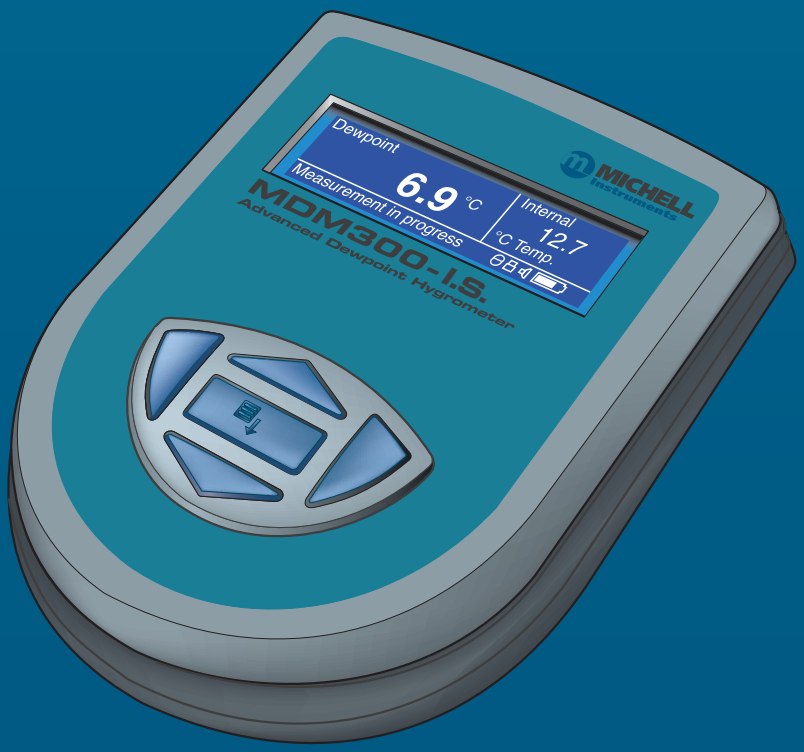
MDM300 I.S.

Advanced Dew-Point Hygrometer

Sensor & Battery Replacement Manual



97469 Issue 1
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Please fill out the form(s) below for each instrument that has been purchased.

Use this information when contacting Michell Instruments for service purposes.

Instrument	
Code	
Serial Number	
Invoice Date	
Location of Instrument	
Tag No	

Instrument	
Code	
Serial Number	
Invoice Date	
Location of Instrument	
Tag No	

Instrument	
Code	
Serial Number	
Invoice Date	
Location of Instrument	
Tag No	

MDM300 I.S.

For Michell Instruments' contact information please go to
www.michell.com

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Safety

The manufacturer has designed this equipment to be safe when operated using the procedures detailed in this manual. The user must not use this equipment for any other purpose than that stated. Do not apply values greater than the maximum value stated.

This manual contains operating and safety instructions, which must be followed to ensure the safe operation and to maintain the equipment in a safe condition. The safety instructions are either warnings or cautions issued to protect the user and the equipment from injury or damage. Use qualified personnel and good engineering practice for all procedures in this manual.

Electrical Safety

The instrument is designed to be completely safe when used with options and accessories supplied by the manufacturer for use with the instrument. The instrument is powered by an internally mounted rechargeable battery. The input power supply voltage limits for the battery charger supplied with the instrument are 100 to 240 V AC, 47/63Hz.

Caution: No other battery charger unit, other than that supplied with the instrument should be used.

Pressure Safety

High pressure gases can be extremely dangerous and only trained personnel should attempt to connect and use the MDM300 I.S. with such gases. DO NOT permit pressures greater than the safe working pressure to be applied to the instrument. The specified safe working pressure (SWP), for this instrument is 350 barg (5000 psig).

Toxic Materials

The use of hazardous materials in the construction of this instrument has been minimized. During normal operation it is not possible for the user to come into contact with any hazardous substance which might be employed in the construction of the instrument. Care should, however, be exercised during maintenance and the disposal of certain parts.

Repair and Maintenance

The instrument must be maintained either by the manufacturer or an accredited service agent. Refer to www.michell.com for details of Michell Instruments' worldwide offices contact information.

Calibration

The recommended calibration interval for this instrument is 12 months. The instrument should be returned to the manufacturer, Michell Instruments Ltd., or one of their accredited service agents for re-calibration. Alternatively a freshly calibrated exchange sensor can be purchased and easily fitted, see Section 1.2.3.

Safety Conformity

This product carries the CE mark and meets the requirements of all the relevant European and U.S. safety directives.

Abbreviations

The following abbreviations are used in this manual:

AC	alternating current
bar	pressure unit (=100 kP or 0.987 atm) (gauge)
Hz	Hertz
psig	pound(s) per square inch (gauge)
V	Volts

Warnings

The following general warnings listed below are applicable to this instrument. They are repeated in the text in the appropriate locations.

Where this hazard warning symbol appears in the following sections, it is used to indicate areas where potentially hazardous operations need to be carried out.

1 MAINTENANCE

The MDM300 I.S. requires very little maintenance. The only user-replaceable parts are the battery, the internal sensor and the top hat filter located behind the inlet orifice fitting. The following sections detail the routine and corrective maintenance procedures.

1.1 Routine Maintenance

The only routine maintenance required is to periodically clean the casing, display and keyboard of the instrument with a damp cloth and a mild detergent. The required frequency of cleaning will depend upon instrument usage and whether or not it is used in a carrying case.

Do not use acetone or any other type of solvent as this could damage the casing, display and keyboard.

1.2 Replacement of Sensor and Battery Pack

To gain access to the internal sensor and the battery housing, proceed as follows (refer to *Figure 1)*.

1.2.1 Open Casing

When the casing is open, the circuit board, which contains electrostatically sensitive devices, is exposed.

Take appropriate precautions i.e. wear an earthing wristband, in order to prevent possible damage.

To open the casing, proceed as follows:

1. Switch the instrument **OFF**.
2. Disconnect any connections to the gas ports.
3. Place a sheet of card onto a firm surface in order to protect the instrument's display and casing from possible scratching and place the instrument face down.
4. Using an Allen key, sequentially remove the five cap screws (1) and washers (2) (see *Figure 1)*.

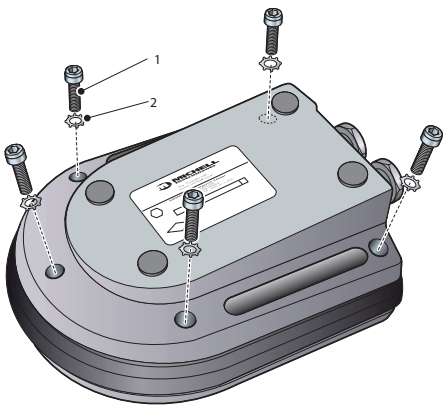

Figure 1 *Remove Case-Securing Bolts*

5. Open the two halves of the casing. **NOTE: There is a seal between the two halves so the top and bottom halves may need to be eased apart. There should also be an O-ring (see *Figure 2*, (5)) on each of the five pillars - keep these safe for later use.**

6. Place the two halves of the casing (3) and (4) side by side (refer to *Figure 2)*.

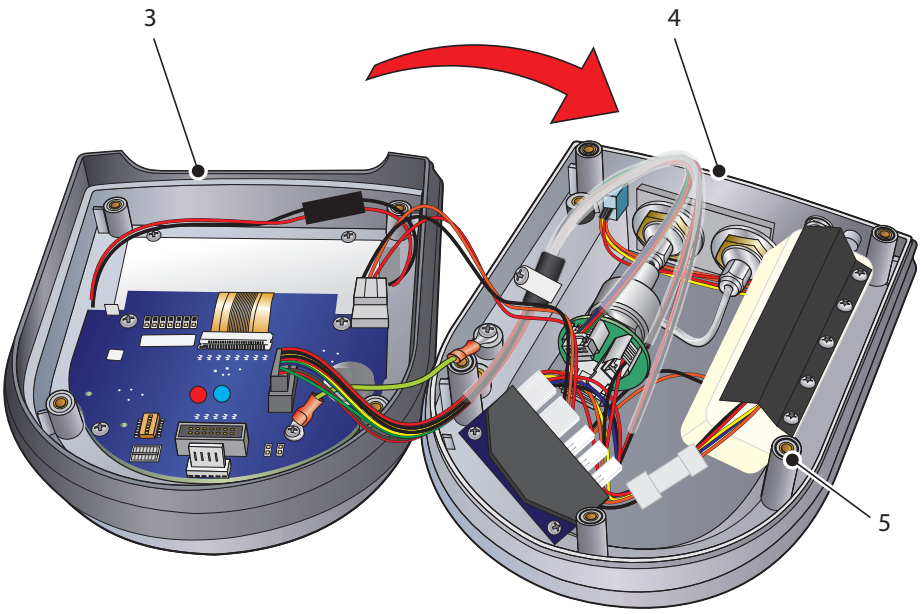

Figure 2 *Open Case*

1.2.2 Close Casing

To close the casing, proceed as follows:

1. Place the two halves of the casing together, checking that no cables are trapped between the two halves and that there is an O-ring on each of the five pillars.

2. Initially replace each of the cap screws and washers without fully tightening them.

3. Tighten-up each cap screw. **NOTE: Do not overtighten as this could cause the case to crack**.

1.2.3 Internal Sensor Removal and Replacement

Sensor removal

To remove the sensor proceed as follows:

1. Open the instrument case as described in Section 1.2.1.
2. Remove the connectors, (3), (4) and (5) from the back of the sensor (see *Figure 3)*. **NOTE: Each connector is locked in position by a clamp situated at the back of the connector. Before attempting to pull the connector out, push this clamp away from the connector in order to release it.**
3. Use a spanner to unscrew the locknuts (1) securing the sensor to the gas inlet and outlet ports.
4. Lift the sensor (2) clear.

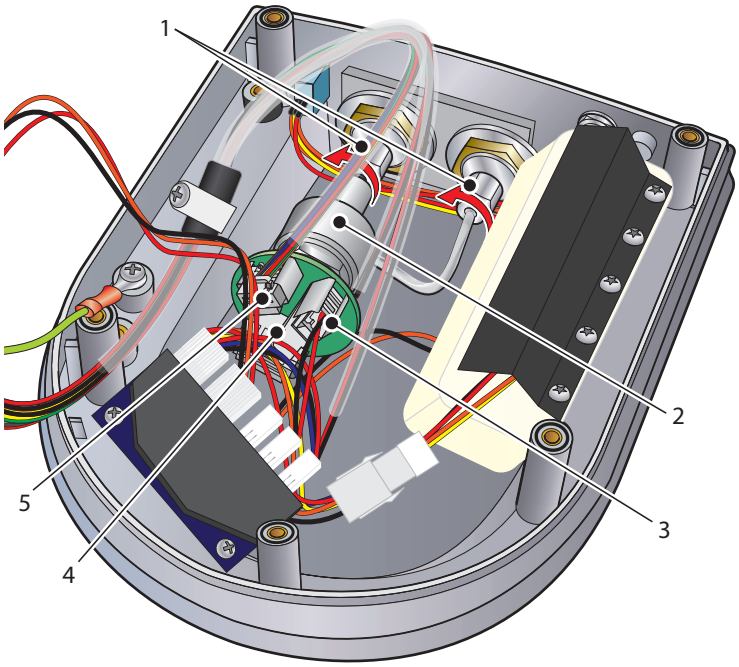

Figure 3 *Internal Sensor Removal*

Sensor replacement

To replace the sensor, proceed as follows:

1. Place the replacement sensor back into the gas connections, **ensuring that it is re-installed in the same orientation as previously**, and locate the olives in the gas ports.
2. Tighten each of the locknuts (1) finger tight.
3. Tighten each union an additional ¾ of a turn.
4. Re-fit the connectors (3), (4) and (5). The connectors are polarized and cannot be inserted incorrectly. Ensure that the connectors lock into position.
5. Close the casing as described in Section 1.2.2.
6. Switch on the instrument and check that it is operating satisfactorily.

1.2.4 Battery Replacement

Battery Replacement

To replace the battery, proceed as follows:

1. Open the instrument case as described in Section 1.2.1.
2. Loosen the 3 battery clamp retaining screws (2).
3. Release the battery (1) at connector (3) and remove.
4. Re-connect new battery to connector (3).
5. Replace and tighten battery clamp retaining screws (2).
6. Close the casing as described in Section 1.2.2.
7. Switch on the instrument and check that it is operating satisfactorily.
8. Charge the battery, when necessary, as described in the User's Manual.

NOTE: No other parts of the MDM300 I.S. are user-servicable - please contact your Michell representative if further help is needed.

Refer to www.michell.com for details of Michell Instruments' worldwide offices contact information.

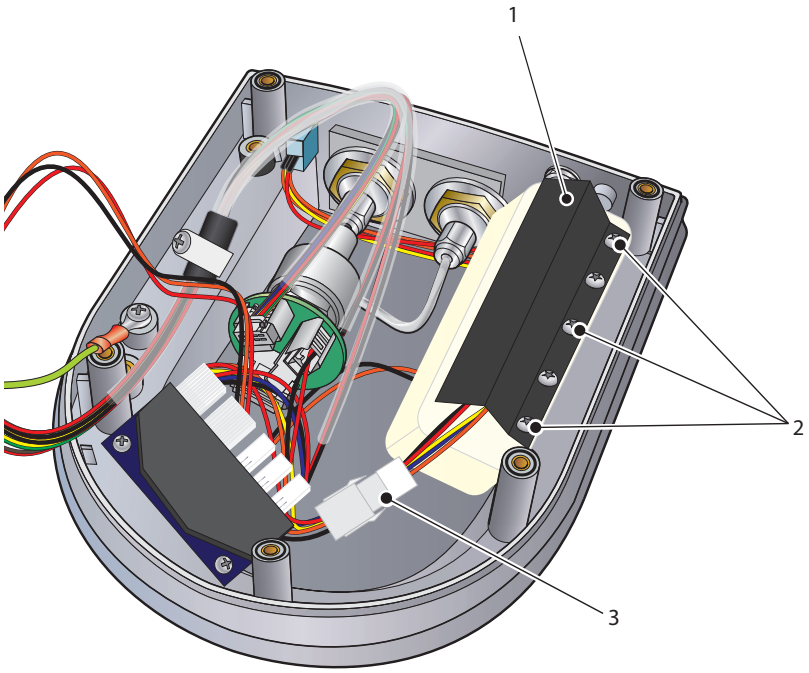

Figure 4 *Battery Replacement*

Appendix A

Quality, Recycling & Warranty Information

Appendix A Quality, Recycling & Warranty Information

A.1 Pressure Equipment Directive (PED) 97/23/EC

The above Directive has been implemented in United Kingdom Law by the Pressure Equipment Regulations 1999.

The Regulations require that all pressure equipment and assemblies within the scope of the Pressure Equipment Directive must be safe when placed on the market or put into service.

Michell Instruments' products have been assessed and, as referenced against the Classification Charts detailed in Annex II of the Directive, do not fall into the requirements for CE marking compliance with the Pressure Equipment Directive.

Article 3, paragraph 3 states that any product containing a pressurized fluid that does not qualify for compliance should, nevertheless, be constructed with Sound Engineering Practice (SEP).

Michell Instruments attests here that its products have been designed, manufactured & tested to assure safe operation, and in accordance with Sound Engineering Practices.

A.2 Recycling Policy

Michell Instruments is concerned with the protection of the environment. It is our commitment to reduce and eliminate from our operations, wherever possible, the use of substances which may be harmful to the environment. Similarly, we are increasingly using recyclable and/or recycled material in our business and products wherever it is practical to do so.

To protect natural resources and to promote material reuse, please separate batteries from other types of waste and recycle responsibly. If batteries are not properly disposed of, these substances can cause harm to human health and the environment

The product that you have purchased may contain recyclable and/or recycled parts and we will be happy to provide you with information on these components if required. For further information please see the following sections.

A.3 WEEE Compliance

Directive 2012/19/EU 4 July 2012 on Waste Electronic and Electrical Equipment (WEEE)

The Waste Electronic and Electrical Equipment (WEEE) Directive places rules upon European manufacturers of electrical and electronic equipment. The directives' aim is to reduce the impact that electronic devices have on the environment.

Michell Instruments is in full compliance with the WEEE Directive and is registered with an approved recycler (Registration No. WEE/JB0235YW) and treats the requirement of the directive and the protection of the environment with the utmost importance. All Michell Instruments' products are appropriately marked indicating their requirement for recycling.

It may be required to return certain instruments for treatment at the end of their working life.

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A.4 RoHS2 Compliance

Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011

The Restriction of Hazardous Substances (RoHS) Directive places rules upon European manufacturers of electrical and electronic equipment. The directives' aim is to reduce the impact that electronic devices have on the environment.

According to the EC Directive 2002/95/EC, Michell Instruments' products qualify as Category 9, Control and Monitoring Equipment. Under the 2002/95/EC Directive, Category 9 products are exempt from compliance with the Directive.

However, the careful design of all Michell Instruments' products takes into consideration the requirements of the Directive and, wherever possible, compliance is achieved. All future products will be developed entirely using compliant materials. Furthermore, Michell Instruments is taking active steps to remove non-compliant materials and components from existing products wherever these may occur. Presently, none of the non-compliant materials are known to occur in Michell Instruments' products.

The new Directive 2011/65/EU (RoHS2) entered into force on 21 July 2011 and required all Member States to transpose the provisions into their respective national laws by 2 January 2013.

Under the provisions of the RoHS2 EU Directive 2011/65/EU (Article 3, [24]) defines 'Control and Monitoring Equipment' specifically as 'monitoring and control instruments designed exclusively for industrial or professional use'.

RoHS2 EU Directive 2011/65/EU states the closing date for compliance of any Control and Monitoring Equipment product sold into the EU market place as 22nd July 2017.

However, the careful design policy of all Michell Instruments' products continues to attain compliance in the shortest practical timescales and strives to ensure that less than 0.1% of total mass per product, of all non-compliant materials, appear within them. Michell Instruments continues to monitor suppliers and material sources to ensure that compliance of goods provided is maintained.

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A.5 Warranty

Unless otherwise agreed, the Supplier warrants that, as from the date of delivery for a period of 12 months, the goods and all their component parts, where applicable, are free from any defects in design, workmanship, construction or materials.

The Supplier warrants that the services undertaken shall be performed using reasonable skill and care, and be of a quality conforming to generally accepted industry standards and practices.

Except as expressly stated, all warranties whether express or implied, by operation of law or otherwise, are hereby excluded in relation to the goods and services to be provided by the Supplier.

All warranty services are provided on a return to base basis. Any transportation costs for the return of a warranty claim shall reside with the Customer.

A.6 REACH Compliance

Regulation (EC) No. 1907/2006
Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Michell Instruments is a manufacturer of moisture measurement and gas analysis instrumentation and is a 'downstream' user of chemicals, as described by the EU Council Directive 76/769/EEC. The products we supply are not raw chemical products (goods).

Under normal and reasonably foreseeable circumstances of application, the goods supplied to you shall not contain or release any prohibited chemicals. No listed SVHC (Substances of Very High Concern) appear within products manufactured by Michell Instruments. Therefore the 0.1% mass per product, or total usage of 1 tonne/year, will never be exceeded. For these reasons we are neither required by obligation for registration nor for the creation of material safety data sheets (MSDS) for our products.

Our continued review of the SVHC Candidate List and latest additions is to ensure we remain compliant.

Michell Instruments maintains a hazardous material register in which MSDS data sheets are collated, and we will check that our suppliers will comply to REACH requirements for all materials and substances we use in the processes of our manufacturing.

In the unlikely event that any chemicals of concern appear in our products in quantities greater than 0.1% of total mass per product we will immediately inform you by correspondence according to the REACH Article 33 requirements. Our current appraisal is, however, that we do not expect or foresee such an incidence.

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A.7 Calibration Facilities

Michell Instruments' calibration facilities are among the most sophisticated in the world and have been recognized for their excellence.

Traceability to the National Physical Laboratory (NPL) UK is achieved through our UKAS Accreditation (Number 0179). This covers dew point over the range -90 to +90°C (-130 to +194°F) and also Relative Humidity.

Dew-point calibrations are also traceable to the National Institute for Standards & Technology (NIST) USA over the range -75 to +20°C (-103 to +68°F).

NOTE: Standard traceable calibration certificates for instruments and sensors are not issued under our UKAS accreditation. UKAS certificates are usually to special order and are clearly identified.

A.8 Return Policy

If a Michell Instruments' product malfunctions within the warranty period, the following procedure must be completed:

1. Notify a Michell Instruments' distributor, giving full details of the problem, the model variant and the serial number of the product.
2. If the nature of the problem indicates the need for factory service then the instrument should be returned to Michell Instruments, carriage prepaid, preferably in the original packaging, with a full description of the fault and the customer contact information.
3. Upon receipt, Michell Instruments will evaluate the product to determine the cause of the malfunction. Then, one of the following courses of action will be taken:
    - If the fault is covered under the terms of the warranty, the instrument will be repaired at no cost to the owner and returned.
    - If Michell Instruments determines that the fault is not covered under the terms of the warranty, or if the warranty has expired, an estimate for the cost of the repairs, at standard rates, will be provided. Upon receipt of the owner's approval to proceed, the product will be repaired and returned.

A.9 Manufacturing Quality

Michell Instruments is registered with the British Standards Institute for Quality Assurance to:

BS EN ISO 9001: 2008

Rigorous procedures are performed at every stage of production to ensure that the materials of construction, manufacturing, calibration and final test procedures meet the requirements laid down by our BSI approved Quality System.

Please contact Michell Instruments (www.michell.com) if the product does not arrive in perfect working order.

Appendix B

Return Document & Decontamination Declaration

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Decontamination Certificate

IMPORTANT NOTE: Please complete this form prior to this instrument, or any components, leaving your site and being returned to us, or, where applicable, prior to any work being carried out by a Michell engineer at your site.

Instrument			Serial Number	
Warranty Repair?	YES	NO	Original PO #	
Company Name			Contact Name	
Address				
Telephone #			E-mail address	
Reason for Return /Description of Fault:				
Has this equipment been exposed (internally or externally) to any of the following? Please circle (YES/NO) as applicable and provide details below				
Biohazards		YES	NO	
Biological agents		YES	NO	
Hazardous chemicals		YES	NO	
Radioactive substances		YES	NO	
Other hazards		YES	NO	
Please provide details of any hazardous materials used with this equipment as indicated above (use continuation sheet if necessary)				
Your method of cleaning/decontamination				
Has the equipment been cleaned and decontaminated?		YES	NOT NECESSARY	

Michell Instruments will not accept instruments that have been exposed to toxins, radio-activity or bio-hazardous materials. For most applications involving solvents, acidic, basic, flammable or toxic gases a simple purge with dry gas (dew point <-30°C) over 24 hours should be sufficient to decontaminate the unit prior to return.
Work will not be carried out on any unit that does not have a completed decontamination declaration.

Decontamination Declaration

I declare that the information above is true and complete to the best of my knowledge, and it is safe for Michell personnel to service or repair the returned instrument.

Name (Print)		Position	
Signature		Date	

MICHELL Instruments

F0121, Issue 2, December 2011

NOTES:

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http://www.michell.com