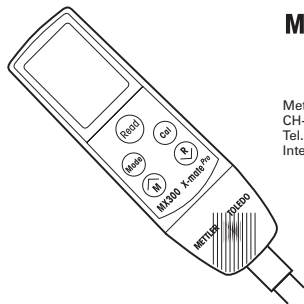


MX300 X-mate^{Pro}



METTLER TOLEDO

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51709841 Rev. A, 3/00

MX300 Meter Specifications

Memory

199 per type of sensor module

Display

Custom LCD

Outputs

Serial (RS232)

Auto Off

10 minutes from last keypress

Operating Conditions

Temperature -5 to 40°C
Humidity 90% at 35°C
(non condensing)

Size / Weight

5.5 x 4.1 x 14.5 cm / 176 g

Batteries

2 x AA/LR6 alkaline 1.5V d.c.

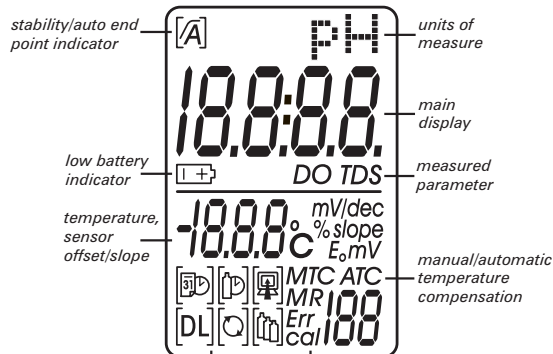
Sensor Modules

Sensor module specifications and information are set out in each sensor module manual

Regulatory Compliance

Complies with Part 15 of FCC Rules (Class A computing device) and European EMC Directives EN50081-1: 1992 and EN50082-1: 1992
Waterproof to IP67.

Display and Controls



Read

Press and release

Turns MX300 meter on.
Starts measurement.
Stops measurement by manually endpointing.
Confirms stable endpoint in manual mode.
Press and hold for 2 seconds
Turns Auto End Point on/off. [A]

Mode

Press and release

Selects mode and turns MX300 meter off.
Clears memories.
Press and hold for 2 seconds
Enters Program Menu. [DL]

Cal

Press and release

Starts calibration.
Press and hold for 2 seconds
Recalls last cal data relevant to the module connected.



Press and release

Stores result in memory (by pressing once) and then deletes memory stored (by pressing again immediately).
Scrolls upwards to locate a result in memory and display memory cancel.
Increases value in Program Menu.
Press and hold for 2 seconds
Turns continuous measurement on/off. [Q]



Press and release

Recalls result from memory.
Scrolls downwards to locate a result in memory and display memory cancel.
Decreases value in Program Menu.
Sends results to printer or computer.
Press and hold for 2 seconds
Turns continuous datalogging on/off. [DL]
Transfers stored data when connected to printer.
Turns fast data transfer mode on when connected to computer. [R]

On: press **Read**.

Off: from sample measurement press **Mode** through to 'off'.

Wake up from auto off: press **Read**.

Maintenance

General

The MX300 meter requires very little maintenance. Occasionally wipe the MX300 meter with a damp cloth. The casework is made of ABS which is known to be affected by some organic solvents, including toluene, xylene and methyl-ethyl-ketone. It is good practice to wipe away any spillages as soon as they occur.

Every six months inspect the connector 'O' ring and battery 'O' rings, and replace if damaged. Before refitting the battery cover, lightly grease the battery 'O' ring seals to facilitate future easy removal of the cover.

CAUTION: If the MX300 meter, without a sensor module connected, is dropped into water and the connector housing becomes wet, this must be dried before reconnection. The MX300 meter should be shaken until the water is removed. To ensure full IP67 sealing the MX300 meter/sensor module must be assembled correctly with the 'O' rings in place and lightly greased.

Replacing the Batteries



Replace batteries as soon as the low battery indicator appears. To prevent data loss always turn the MX300 meter off using the **Mode** key before replacing the batteries. Loosen the battery cover screws with a screwdriver and remove the cover by pulling on the button. See the Assembly section for details on installing batteries. Do not mix old and new batteries.

CAUTION: To prevent permanent damage care should be taken to prevent liquid entering the MX300 meter when replacing batteries. If it does, remove the batteries and allow the MX300 meter to dry before using.

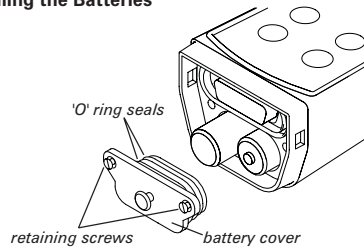
NOTE: Check the Program Menu settings after changing the batteries.

Sensor Module Maintenance

Refer to the appropriate sensor module manual for full details on maintaining your sensor module.

Assembly

Installing the Batteries

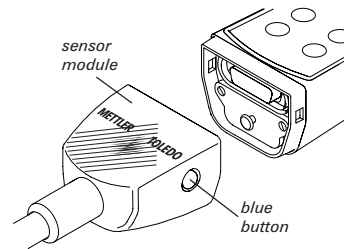


Insert the batteries into the housing as shown in the illustration. Place the battery cover with screws into position. Before fitting the cover, lightly grease the 'O' ring seals to facilitate future easy removal of the battery cover. Secure by using a screwdriver.

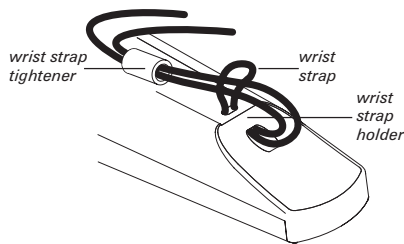
Connecting a Sensor Module



Before installing a sensor module, read the Care of the Sensor Module section of the appropriate sensor module manual for information on handling and anti-static precautions.



Fitting the Wrist Strap



Pass the wrist strap through the holder on the back of the MX300 meter. Loop the strap through itself, as shown in the illustration. Tighten the wrist strap while in use by pushing the wrist strap tightener towards the wrist until it is comfortably tight.

Holding the sensor by the module, align the sensor module with the MX300 meter body and push the sensor module firmly into the MX300 meter until it engages.

To remove the sensor module, use thumb and forefinger to squeeze the two blue buttons on either side of the sensor module. Holding the sensor by the module, pull firmly away from the MX300 meter.

Program Menu

The Program Menu allows you to set:

- Calibration Reminder Interval
- Continuous Datalogging Memory Interval
- Time and Date
- Manual Temperature Compensation
- Options relevant to the sensor module connected.

You can only enter the Program Menu if the current measurement has endpointed. If necessary, press **Read** to endpoint.

To access the Program Menu press and hold the **Mode** key for 2 seconds. The display will show $\bar{1} 0 \bar{0}$ and then update to the first Menu option.

Press **Mode** to scroll through the options, **▲** or **▼** to change a value and **Mode** to enter a changed value. Press **Read** to exit the Program Menu at any time. If you press **Read** when a value is flashing, that value will not be entered.

Manual Temperature Compensation

MTC You can enter sample temperature manually between -5.0 and 105.0°C when no sensor module is connected. When a sensor module is connected the sample temperature range will be limited to that available for the parameters of the sensor module. (An ATC sensor will override manual compensation.) The MX300 meter has a preset temperature of 25°C . Use **▲** and **▼** to change temperature. Press **Mode** to enter the value and move on.

Continuous Datalogging Memory Interval

[DL] This can be set, in hours and minutes, between 0 and 24 hours (where 0 = no interval set). Readings will be stored to memory at this interval. Set the interval using **▲** and **▼**. Press **Mode** to enter the value and move on.

Calibration Reminder Interval



This first menu option can be set, in hours, between 0 and 99 (where 0 = no reminder).

When the selected time has elapsed the calibration reminder symbol will appear.

The MX300 meter has a preset reminder interval of 0 hours (no reminder). Change the interval using **▲** and **▼**. Press **Mode** to enter the value and move on.

Time and Date



In this menu, time is shown first on the main display, followed by day with month and finally the year.

Time and date are displayed during calibration recall, and will be sent via the serial output.

Set the time and date using **▲** and **▼**. Press **Mode** to enter the value and move on. The display digits for the year will not flash to be changed unless **▲** or **▼** are pressed.

The settings for the Calibration Reminder Interval, Continuous Datalogging Memory Interval, Time and Date, and Manual Temperature Compensation will be used for all parameters, where appropriate.

Sensor Module Options

The next option on the display will depend upon whether a sensor module is connected to the MX300 meter.

No sensor module connected:

The MX300 meter will cycle through the options again, displaying the Calibration Reminder Interval next.

Sensor module connected:

The screen will display the first option relevant to that sensor module. Details of these options are given in the relevant sensor module manual.

When you have entered the required changes, press **Read** to exit the Program Menu.

Calibrating

Before commencing calibration it is essential that you have read the Program Menu section of this manual. Set the Calibration Reminder Interval, Continuous Datalogging Memory Interval, Time and Date, and Manual Temperature Compensation, as required.

Continue by following the instructions in the Calibration section of the appropriate sensor module manual.

Precautions

Samples must be compatible with ABS plastic and epoxy.

Using Continuous Measurement Mode

In normal mode, the MX300 meter will auto-off 10 minutes after the last key press, whether the MX300 meter is measuring or has endpointed. If you select continuous measurement mode, the MX300 meter will not auto-off.



To select continuous measurement mode press and hold **M** for 2 seconds. The continuous measurement mode icon will be displayed. To return to normal mode press and hold **M** for 2 seconds.

Using Continuous Datalogging Mode

Readings can be stored in the memory by selecting continuous datalogging mode. Before selecting this mode, set the interval at which readings are recorded in memory. The procedure for setting the Continuous Datalogging Memory Interval is set out in the Program Menu section of this manual.

When continuous datalogging mode is selected together with continuous measurement mode, the MX300 meter will not auto-off after 10 minutes. If continuous measurement mode is not selected, the MX300 meter display will power down after 10 minutes but the MX300 meter will continue to measure. When the interval set for the continuous datalogging memory interval is reached the display will update and the reading will be stored in the memory.



To select continuous datalogging mode press and hold **R** for 2 seconds. The continuous datalogging mode icon will be displayed. To cancel this mode press and hold **R** for 2 seconds.

NOTE: Before using continuous datalogging mode, check that sufficient memories are available to store the required readings in the memory. This is essential as no further readings will be recorded when the MX300 meter has used the 199 memories for the type of sensor module in use. If insufficient available memories exist for continuous datalogging, memories should be deleted as set out in the Using the Memory section of this manual.

Using the Memory

The MX300 meter can store up to 199 endpointed results for any type of sensor module, irrespective of the number of sensor modules which have been connected for that parameter. With the Two Parameter Sensor Module Duo, 199 sets of pH and Conductivity, together with their associated Temperature readings, can be stored - the Three Parameter Sensor Module Trio stores Dissolved Oxygen and Temperature as well.

Entering a Reading into Memory

Press **M** when the measurement has endpointed.

The display will show M and the number under which the result has been stored. M and 199 which are flashing indicate that the 199 memories allocated to the type of sensor module in use have already been used.

The last reading entered into the memory can be cleared by pressing **M** again immediately after the reading has been stored.

Recalling Memory

You can only recall stored memories if the current measurement has endpointed.

Press **R** - the last stored memory is displayed. MR 1 to MR 199 indicates which memory is being displayed. M 0 indicates no memories are stored. Press **▲** or **▼** to scroll through the memories.

To download memories to a printer or computer, see the Interfacing by Serial Output section of this manual.

Clearing the Memories

Press **R**, then **▲** or **▼** to cycle either up or down through the memories until M C is displayed, after the first or last memory.

Press **Mode** to clear the memories, M 0 indicates the memories have been cleared (press **Read** to exit without clearing the memories).

Endpointing a Reading

While the sensor module is reading the decimal point will flash. Endpointing a reading can be achieved by:

Using Auto End Point

This feature operates in all modes. The display freezes automatically when a stable endpoint is reached and **[A]** is displayed. The Auto End Point indicator **A** is displayed while the MX300 meter is reading.

A reading can be manually endpointed at any time in auto mode by pressing **Read**.

Using Manual Mode

To use this method press and hold **Read** for 2 seconds. The Auto End Point indicator **A** will disappear from the display. To return to Auto End Point press and hold **Read** for 2 seconds.

In this mode the MX300 meter will continue reading until the **Read** button is pressed to manually endpoint the reading. During reading the stability indicator **[r]** may appear to show that the MX300 meter recognises that a stable endpoint has been reached. Press **Read** to confirm this endpoint and to freeze the display.

Interfacing by Serial Output

The MX300 meter can interface with computers, printers and other RS232 compatible devices. The RS232 Interface Kit (Art. No. 51303002) is a module with cable which locates into the 15 way connector socket in the base of the MX300 meter.

Type of communication for the printer is
uni directional, baud rate 2400,
data format - 7 data bits : 1 stop bit : even parity

The baud rate for computer connection changes to 19200 and the data format is unchanged.

Printing Results from the Memory

Connect the RS232/printer cable (Art. No. 51303002) to the MX300 meter module. Press **R** for 2 seconds to recall to the display and print all the information stored in the memory. The transfer of data can be stopped by disconnecting the printer cable from the MX300 meter module.

When all data has been transferred the MX300 meter will revert to the screen displayed before connection of the RS232/printer cable.

Transferring Data to a Computer

Connect the RS232/printer cable (Art. No. 51303002) to the MX300 meter module.



Press **R** for 2 seconds and the fast data transfer icon will be displayed. All stored readings and associated information stored in the memory will be transferred to the computer. The transfer of data can be stopped by disconnecting the RS232/printer cable from the MX300 meter module.

When all data has been transferred the fast data transfer icon will disappear from the display and the MX300 meter will revert to the screen displayed before connection of the RS232/printer cable.

Problem Solving

Error Codes

Error codes which relate only to one parameter are set out in the relevant sensor module manual.

Err 1 - Cal 1 out of range

Err 2 - Cal 2 out of range

Err 3 - Cal out of temperature range

Err 4 - No sensor module connected

This message will be displayed if the **Read** button is pressed when no sensor module is connected.

Errors in Date Entered

Date flashes and reverts to previous setting - invalid date entered.

Display/Controls Inactive

Low battery power or batteries fitted incorrectly - remove batteries and replace correctly (with new batteries if necessary).

Test Plug

A test plug (Art. No. 51303001) is provided to test the functionality of the MX300 meter. Connect this to the MX300 meter, using the same method as connecting a sensor module. The MX300 meter will operate in mV mode and will begin testing, first at 0 mV and then at 180 mV. At the end of each test the display will show mV OK and either 0 mV or 180 mV, if the MX300 meter is functioning correctly. If it is not, the actual mV reading will be displayed. The display will cycle between the results at two-second intervals.

Spares and Accessories

Art. No.	Description
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51303000	MX300 (meter only)
51303110	Field Case for MX300 Meter and 1 Sensor Module
51303210	Field Case for MX300 Meter and 5 Sensor Modules

Snap Fit Electrodes/Sensors

51303900	pH Sensor Module, 3-in-1, plastic body (PSU), gel (InLab®481)
51303901	pH Sensor Module, 3-in-1, plastic body (PSU), refillable, with ATC (InLab®482)
51303902	ISFET Sensor Module, 3-in-1, plastic body, with ATC (InLab®489)
51303903	Redox Sensor Module, 3-in-1, plastic body (InLab®581)
51303904	Conductivity Sensor Module, 4 carbon ring, plastic body, with ATC (InLab®781)
51303905	Dissolved Oxygen Sensor Module, with ATC (InLab®681)
51303906	Two Parameter Sensor Module Duo (pH and Conductivity) (InLab®982)

51303006	Magnetic Stirrer Sensor Tip
51303007	Wrist Strap
51303008	BNC Module
51303009	Mini-DIN Module for Conductivity Cells (InLab®700 Series)
51303013	1 metre Extension Cable (15 pin D sub)
51303014	3 metre Extension Cable (15 pin D sub)
51303015	10 metre Extension Cable (15 pin D sub)
51303017	Soft Case
51303018	Dissolved Oxygen Membrane Kit
51303019	Electrode Sinkers
51303020	BOD Membrane Replacement Kit
51300240	Plastic Sample Beaker
51300047	Guide to pH Measurement
51300075	Guide to Ion Selective Measurement
51724716	Guide to Conductivity and Dissolved Oxygen Measurement

51303907	Three Parameter Sensor Module Trio (pH, Conductivity and Dissolved Oxygen) (InLab®983)
51303908	Thermocouple Sensor Module (K-type) (InLab®181)
51303909	Humidity Sensor Module (InLab®986)
51303911	pH Electrode, replacement for Duo/Trio, plastic body (PSU), Gel, no ATC
51303912	Temperature Thermocouple, rounded, replacement for Thermocouple Sensor Module

Sensors with 1 Metre Cables

51302119	Conductivity Sensor, 4 plate, plastic body (InLab®730)
51302255	Conductivity Sensor, 2 plate, glass body (InLab®720)

Accessories

51303001	Test Plug
51303002	RS232 Interface Kit - connects to computers, LCP-45 and GA-42 printers (needed for use with Data-matePro, Fast Data Dump Program)
51303004	Retort Stand Holder
51303005	BOD Kit

Reagents

51302069	30 sachets of pH 4.01 Buffer
51302047	30 sachets of pH 7.00 Buffer
51302070	30 sachets of pH 9.21 Buffer
51302079	30 sachets of pH 10.01 Buffer
51302049	30 sachets of 1413 µS Conductivity Standard
51302050	30 sachets of 12.88 mS Conductivity Standard
51302153	84 µS Conductivity Standard (500 mL)
51300138	1413 µS Conductivity Standard (500 mL)
51300139	12.88 mS Conductivity Standard (500 mL)
51300140	Zero Oxygen Solution (500 mL)

Spares

51303021	Battery Compartment Sealing Kit (battery cover, screws, door 'O' ring, 'D' connector 'O' ring)
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