

RMS8120i Microbial Analyzer



METTLER TOLEDO

Service Manual RMS8120i Microbial Analyzer

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1 Safety Instruction

Operation, maintenance and servicing of RMS8120i Microbial Analyzer may expose individuals to potential safety and health hazards. All work must be performed in accordance with procedures described in the METTLER TOLEDO Operator's or Service Manuals. This section describes the types and locations of potential hazards that could cause physical harm to service personnel. Warnings are inserted throughout this manual to alert service personnel to potential hazards. Standard warning conventions including hazard signal words (example, Danger) and symbols are described below. These words and symbols are used to indicate physical, mechanical, or procedural conditions that could result.

This manual includes safety information with the following designations and formats.

1.1 Definition of Equipment and Documentation Symbols and Designations



WARNING

RISK OF ELECTRICAL SHOCK.

Prior to servicing power supply assemblies, verify that the analyzer is powered off and the power cord to the analyzer is disconnected.



CAUTION

Possible instrument damage or malfunction.
Consult caution/warning instructions.



WARNING

The RMS8120i is a Class 1 laser product that contains a Class 3B laser as specified by IEC 60825-1 3rd ED (2014). Identifies an activity or area where operators are exposed to an eye hazard if procedural or engineering control is not observed.

Indicates a laser product is present. Laser radiation, avoid exposure to beam. Denotes lasers or laser systems that can produce an eye hazard if viewed directly. This includes intrabeam viewing of specular reflections.



WARNING

Identifies an area where electrostatic discharge may be present.
The operator must wear a ground strap while servicing the analyzer.

Symbol	Laser Information	Consequence	Warning Instruction
	The internal Class 3B laser in the RMS8120i laser assembly module.	Severe injury to eyes and skin if exposed to the Class 3B laser.	Do not open or attempt to service the laser module.

Symbol	Instruction on a device	Attention
	Power On Symbol	This symbol on the toggle switch indicates that the control places the equipment into a fully powered state.
	Power Off Symbol	This symbol on the toggle switch indicates that using the control will disconnect power to the device.



NOTICE

Important operating information.

The following is a list of general safety instructions and warnings. Failure to adhere to these instructions can result in damage to the equipment and/or personal injury to the operator.

- Follow all warnings, cautions, and instructions indicated on and supplied with this product.
- Install equipment as specified in this instruction manual.
- Follow appropriate local and national codes.
- Use only factory-documented components for repair. Tampering or unauthorized substitution of parts and procedures can affect the performance and cause unsafe operation of your process, as well as void factory warranties.
- Protective covers must be in place unless qualified personnel are performing maintenance.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment against hazards may be impaired.
- Water **MUST** be drained from the sensor prior to shipping it back to the factory for repair or recalibration to avoid damage from freezing.
- The analyzer should be opened by qualified personnel only.
- Do not attempt to repair, modify, or otherwise alter the RMS8120i analyzer or its components. Unauthorized repair or modification will void the user warranty and create a safety hazard.
- Use caution while adjusting the water flow rate inside the analyzer.
- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.
- DO NOT run the analyzer in On-line Mode with the RMS8120i online shutoff valve in the closed position.
- DO NOT run the RMS8120i when no liquid is flowing through the analyzer.
- The RMS8120i weighs approximately 36.28 kg (80 pounds). If, for any reason, it must be lifted or relocated, take the necessary precautions prior to and during the movement of the analyzer. Incorrect lifting could cause serious injury.
- Use of the RMS8120i analyzer in any manner other than or in excess of those specified by METTLER TOLEDO Thornton can impair the built-in safety protections, creating a hazard.

1.2 Electrical Safety Warnings

Basic electrical hazard awareness is essential to the safe operation of any analyzer. Only qualified field service personnel should perform electrical service.

Elements of electrical safety include, but are not limited to the following:



CAUTION

Periodically inspect electrical cabling into and on the analyzer for signs of wear and damage.

Turn the instrument OFF before disconnecting the power cord and before cleaning, servicing, or performing maintenance on any electrical or internal component.

In the event of a blown fuse or thrown circuit breaker, determine the cause and correct the problem before attempting to resume the operation of the equipment. Replace only the fuses that are externally accessible and labeled. Only use replacement fuses of the specified type and electrical rating.

Assure the power to the instrument is turned OFF. A high voltage charge may remain on the power supply with the power OFF. Use an electrically insulated tool to disconnect the power supply and short (both male pins) to the instrument chassis.

Do not touch any switches or outlets with wet hands.

Use only approved power cords and electrical accessories, such as those supplied with the instrument, to protect against electric shock. Connect power cords only to properly grounded outlets.

It is recommended that a ground fault circuit interrupter be used when working in a wet environment. Installation of cable connections and servicing of this product require access to shock hazard voltage levels. Switch or circuit breaker shall be in close proximity to the equipment and within easy reach of the OPERATOR; it shall be marked as the disconnecting device for the equipment.

Main power must employ a switch or circuit breaker as the disconnecting device for the equipment.

Electrical installation must be in accordance with the National Electric Code and/or any other applicable to national or local codes.

Safety and performance require that this instrument be connected and properly grounded through a three-wire power source.

1.3 Safe Chemical Handling

Consult the Material Safety Data Sheet for each material and the precautions listed in this manual where the materials are used.

1.4 Correct Disposal of Unit

When the analyzer is finally removed from service, observe all local environmental regulations. Please note the UV lamp supplied with the unit contains mercury.

1.5 Environmental Protection

In conformance with the European Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. If you have any questions, please contact the responsible authority or the distributor from which you purchased this device. Should this device be passed on to other parties, the content of this regulation must also be related.



1.6 Operator / FSE

Use powder-free nitrile gloves whenever servicing or troubleshooting the analyzer.

1.7 Laser Safety

Do not look directly into the laser beam, aperture, or any reflection of the beam from a mirror-like surface. Do not place any objects into the beam, or remove the protective covers, or bypass the interlocks. Do not use controls or adjustments or perform procedures other than those specified. Do not remove, damage, or obliterate the laser warning labels. If any label becomes illegible, replace it.

1.8 Electrostatic Discharge (ESD)

The electronic components on the analyzer circuit boards are susceptible to electrostatic discharge (ESD). Static discharge of as little as 100 - 200 volts can damage or destroy a component. To put that in perspective, depending on the floor covering, relative humidity and other factors, walking across a floor generates between 250 - 35,000 electrostatic volts. Attempts to ground oneself and remove the static charge by grasping the instrument's chassis provides only momentary resolution.

The static protective service kit is designed to keep the FSE/FSR, replacement part, work surface, and instrument at the same ground level. Generally, an instruction set accompanies the kit, however, in the absence of specific instructions, follow ESD Procedure:

Note: ESD Procedure



WARNING

Use where the ESD symbol is present, and static protective equipment is not shipped with replacement part.

1. Place the work mat on a solid surface close to the instrument, allowing the ground strap to reach the instrument.
2. Attach the ground clip to the instrument of chassis.
3. Attach the other end of the ground clip cable and the connector from the wrist strap to the work mat.
(Exception: Some wrist strap cables provide a clip to connect to the same ground source as the mat cable.)
4. Attach wrist strap to your wrist, make sure the metallic button on the inside of the wrist strap is in direct contact with your skin.
5. Place Carrier PC board, removed from the instrument, on the work mat.
6. Replacement Carrier PC board should be placed on the work mat before removing the protective bag and remaining on the mat until installation.
7. Defective Carrier PC boards should be replaced in the static-protective bag before removal from the work mat area.

2 Introduction

2.1 Overview Technology Description

The RMS8120i Real-time Microbial Analyzer is an at-line sensor designed to detect microorganisms in pure and ultrapure water applications. The RMS8120i analyzer has continuous flow and measurement, allowing detection of any microbial changes regardless of the duration. The continuous design of the RMS8120i analyzer also allows for rapid detection of microorganisms, with results every 4 seconds.

The M800 Transmitter is a multiparameter, multi-channel instrument featuring a large, color touchscreen display that provides measurement and setup information for the RMS8120i analyzer. The M800 Transmitter can control and monitor the operation of the RMS8120i analyzer and other analyzer connected to it (PN 82121825). Refer to the M800 Transmitter manual for setup and operation.

2.2 Dimensional Drawings

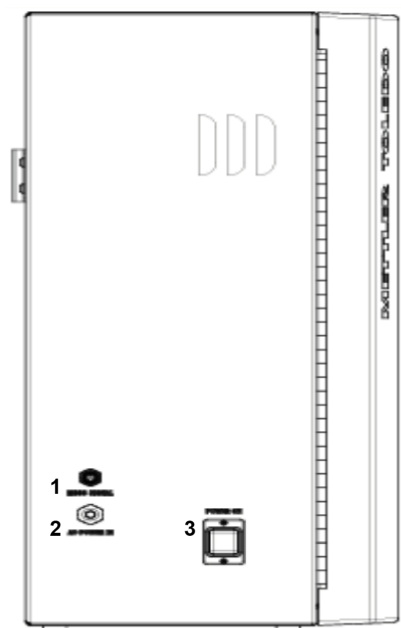


Figure 1 : Analyzer Left Side View

Label	Description
1	M800 connectivity
2	AC power input
3	Power switch

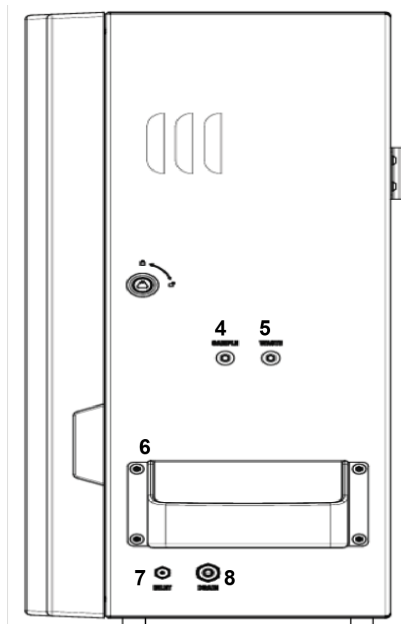


Figure 2: Analyzer Right Side View

Label	Description
4	Sample input
5	Waste output
6	Side tray
7	Online water inlet
8	Drain port

2.3 Mains Parts

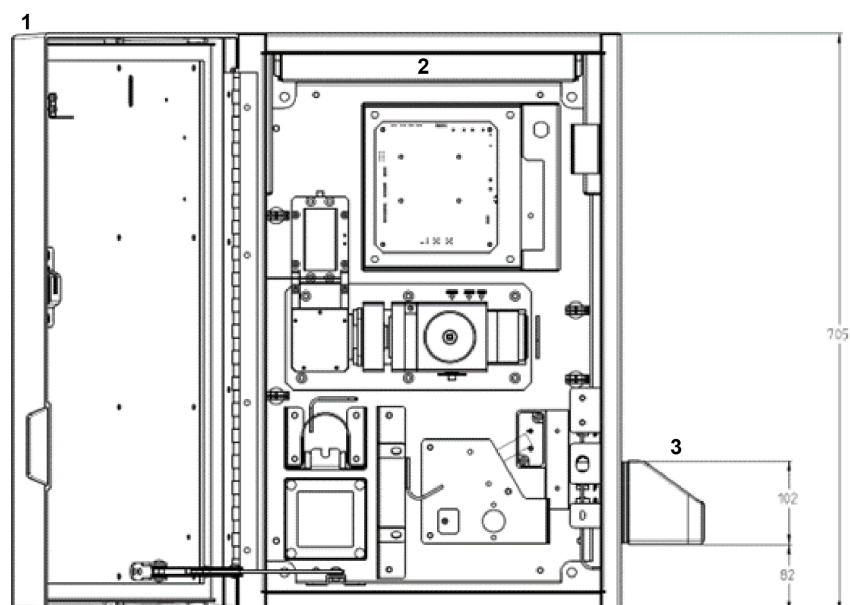


Figure 3: Main Parts

Label	Description
1	Door (open)
2	Main body of the analyzer
3	Side tray

2.4 Internal Components of the Analyzer

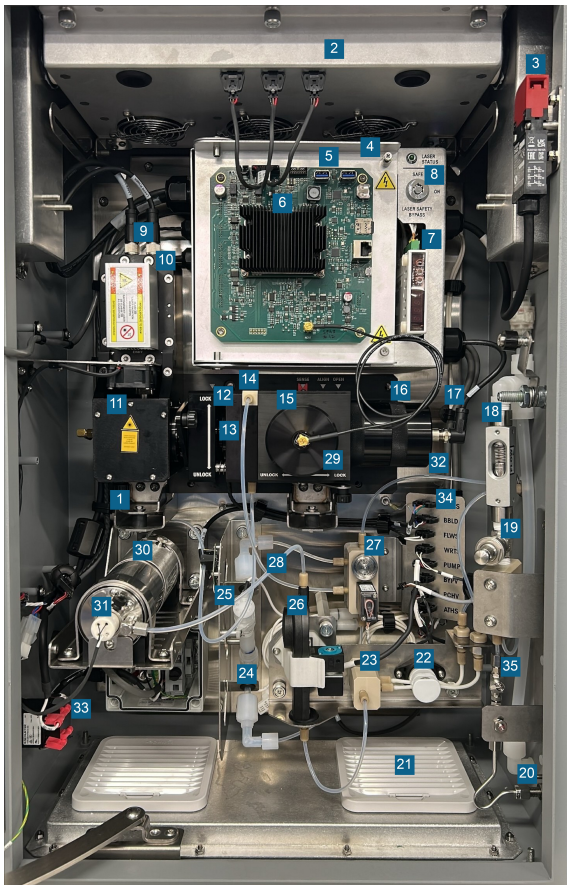


Figure 4: Internal Components of the Analyzer

Label	Description	Label	Description	Label	Description	Label	Description
1	Antivibration mount	10	Laser and laser heat sink	19	Flow valve connectors and flow switch	28	Ambient humidity sensor (hidden behind pump)
2	Top fans	11	Optical chamber	20	Online water inlet	29	LOM bottom lever
3	Door interlock	12	LOM top lever	21	Air vent and filters	30	UV chamber
4	UV ballast inside	13	Parabolic mirror	22	Pinch valve	31	UV bulb
5	Carrier board	14	Flow cell chamber	23	Pinch valve connector	32	Terminal block
6	SOM and SOM heatsink	15	Scattering detector (PD)	24	Flow meter connector	33	Power switch connectors
7	Flow meter converter	16	Fluorescent detector	25	Flow meter	34	Manifold
8	Ballast interlock	17	Fluorescent Detector Connectors	26	Pump	35	Ball valve
9	Laser comm and laser power connections	18	Inlet flow analyzer	27	Pressure regulator		

3 RMS8120i Installation

The RMS8120i analyzer is versatile and suitable for various applications and conditions. To achieve optimal performance and ensure safety for both the analyzer and the operator, it is essential to follow the basic guidelines provided. Failure to adhere to these guidelines may pose safety risks. For any specific concerns or questions about the guidelines or particular situations, please contact METTLER TOLEDO Thornton for assistance. Print and complete the checklist (Refer to [section 3.6 ► Page 12]) during installation. Installation is complete after verifying that the RMS8120i performs as intended. Verification is successful after completion of the installation procedure and the checklist. The completed checklist and a printout from the final run performed on the analyzer is left with their copy of the service order invoice for the customer to retain.



CAUTION

DO NOT subject the RMS8120i analyzer to any severe thermal or humidity fluctuations because such fluctuations may cause damage

Please handle the RMS8120i analyzer with care. Avoid dropping, bumping, or subjecting it to mechanical shocks, as these can damage internal components and may necessitate recalibration or service. The analyzer is specifically designed for analyzing pure and ultrapure water samples. Using coloured liquids is not recommended unless thorough applications development has been conducted, as they may impact performance. Additionally, samples containing particles larger than 50 µm can adversely affect performance and should be avoided.

3.1 Space and Load Requirements for RMS8120i Analyzer

Weight and Support:

The analyzer weighs approximately 80 lbs (36.28 kg) as shipped. The mounting structure should support at least 90 kg (200 lbs) to accommodate the analyzer and related operational activities such as placing calibration solutions on the side tray.

Installation Surface:

For bench or surface installation, use a clean, stable, dry, level, and flat surface, preferably away from other activities. The required surface space is 760 mm x 915 mm (30" x 36"). The bench must support a minimum of 90 kg (200 lbs) including operational activities.

Clearance:

Provide 76.2 cm (30") clearance in front of the analyzer for enclosure door access. Maintain 7.6 to 12.6 cm (3 to 5") clearance around the rest of the analyzer for airflow and operational clearance.

Utilities:

Electrical power outlets and the water sample source should be nearby. A drain or catchment vessel open to the atmosphere must be available for waste discharge.

Access:

Ensure that the location and mounting shelf position allow easy access to the attachment plug, LAN, USB, and analog output ports.

Noise and Vibration:

Install the analyzer away from AC noise sources and isolate it from vibration during operation for optimal performance and safety.

3.2 RMS8120i Unpack and Inspection

Upon receiving the package containing your RMS8120i analyzer, carefully inspect the shipping box for any visible signs of damage. If you notice any damage to the shipping container, notify the shipping company immediately. While unpacking, thoroughly examine all contents for any signs of damage or issues. If you have any doubts about the integrity of any components, contact METTLER TOLEDO Thornton immediately for assistance.

Shipping Checklist

Please verify that your shipment contains the items listed on your sales order. The shipment should contain the standard set of components listed below unless otherwise noted.

- Quick Start Guide with QR code
- RMS8120i analyzer
- Back wall panel mount kit
- 12" x 12" sterile dry wipes
- Analyzer key kit
- Sample cooling coil
- Outlet tubing kit
- Inlet tubing kit with clear PFA tube, 15 micron filter, elbow connectors, extra fittings, and ferrules
- Sampling bottle kit
- M800 Grounded shield (lever nut) Wago 5 kit



CAUTION

If items are missing or a shipping container is damaged, notify METTLER TOLEDO immediately.

3.3 RMS8120i Mounting Checklist

Mounting the RMS8120i Analyzer

- Installation Options:
The RMS8120i can be either wall-mounted or placed on a stable surface.
- Accessibility:
Before installation, ensure the instrument's location and position allow easy access to the AC input, LAN, and analog output ports.
- Utilities:
Electrical power outlets and the water source for testing should be close by. A drain open to the atmosphere is required for discharging tested samples.
- Surface Installation:
If installing on a surface, ensure the surface is stable, dry, and level. The RMS8120i is top heavy and should be placed away from other activities.



WARNING

EXERCISE CAUTION WHEN LIFTING THE ANALYZER.



NOTICE

Ensure that the unit enclosure is level or leaning backwards relative to the shelf.

3.4 Operating Environment Guidelines for RMS8120i Analyzer

Temperature

1. Maintain the installation site temperature below 37 °C (98.6 °F).
2. Ensure good airflow around the analyzer to allow its thermoelectric control system to maintain a constant internal temperature.
3. Do not obstruct the top of the analyzer; avoid placing objects or covering it, as the enclosure is actively cooled by a fan located on top. Obstruction can damage the thermoelectric control system.

Particulate Matter

1. Ensure the installation site's air is free from excessive dust, smoke, or other particulate matter.
2. Dust and debris can clog air filters, reduce airflow, and form layers on electronic components, leading to overheating.

Vibration

1. Install the RMS8120i on the mounting bracket.
2. The mounting structure or workbench should be free of excessive high-amplitude, low-frequency vibrations.
3. Be mindful of vibrations transmitted from adjacent equipment to ensure stable operation and accuracy.

3.5 RMS8120i Installation Checklist

Table 1: RMS8120i Installation Checklist

Action	Action
RMS8120i – Unpack	RMS8120i – Mounting Installation
RMS8120i – Cable Installation	RMS8120i – Operating Requirement
RMS8120i – Install Accessories	M800 – Installation
RMS8120i – Power Requirement (Refer to [Section 11: System requirements ► Page 24])	

3.6 RMS8120i Installation

RMS8120i - Cable Installation

Purpose: To describe the procedure for setting up the RMS8120i with M800. Materials Required: Standard Tool Kit.

Time: 1.5 Hrs

Table 2: RMS8120i Cable Installation

Action	Steps	Reference

RMS8120i - Install Installation

Table 3: RMS8120i Accessories Installation

Action	Steps	Reference

M800 - Installation

Table 4: RMS8120i Installation

Action	Steps	Reference

4 ISM Sensor Info

4.1 Config: Measurement: RMS Cleaning

RMS Cleaning will execute the cleaning protocol to thoroughly clean the fluidic path of the RMS8120i device, ensuring optimal performance and maintenance.

Clean ID: Enter the unique identifier associated with the cleaning protocol to be used.

Batch Vol: Specify the volume of the cleaning agent to be used for the cleaning process.

Prime Vol: Enter the volume required to prime the analyzer before starting the cleaning protocol.

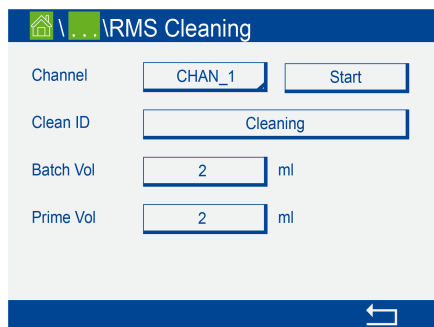
The screenshot shows the 'RMS Cleaning' menu. It has a title bar with a home icon and the text '\ RMS Cleaning'. Below the title bar, there are four input fields: 'Channel' with a dropdown menu showing 'CHAN_1' and a 'Start' button; 'Clean ID' with a text box containing 'Cleaning'; 'Batch Vol' with a text box containing '2' and a unit 'ml'; and 'Prime Vol' with a text box containing '2' and a unit 'ml'. At the bottom right, there is a back arrow icon.

Figure 5: RMS Cleaning Menu

4.2 Config: Measurement: RMS Service

This menu is primarily designed to provide insights into the service components and evaluate their performance.

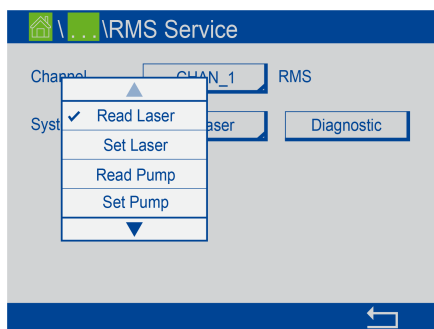
The screenshot shows the 'RMS Service' menu. It has a title bar with a home icon and the text '\ RMS Service'. Below the title bar, there are two input fields: 'Channel' with a dropdown menu showing 'CHAN_1' and a unit 'RMS'; and 'System' with a dropdown menu showing 'Laser' and a 'Diagnostic' button. A dropdown menu is open over the 'System' field, showing the following options: 'Read Laser' (checked), 'Set Laser', 'Read Pump', and 'Set Pump'. At the bottom right, there is a back arrow icon.

Figure 6: RMS Service Menu

There are multiple options for service components available, including:

1. Read Laser
2. Set Laser
3. Read Pump
4. Set Pump
5. Read Valve
6. Set Valve
7. Read Bypass
8. Set Bypass

These options allow for precise monitoring and control of key components, facilitating effective maintenance and troubleshooting.

- Read Laser:

When you select one of these options and click on Diagnostics, detailed information about the laser will be displayed, including its status, performance metrics, and any diagnostic data available

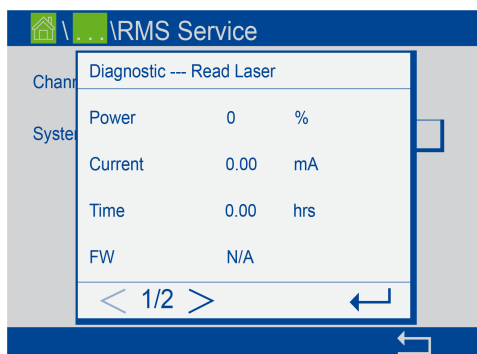


Figure 7: Read Laser 1/2

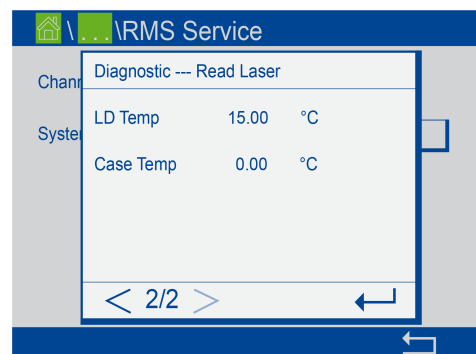


Figure 8: Read Laser 2/2

- Set Laser:

Allows you to adjust the laser power settings and begin monitoring the laser performance through the ISM feature for optimal operation and maintenance.

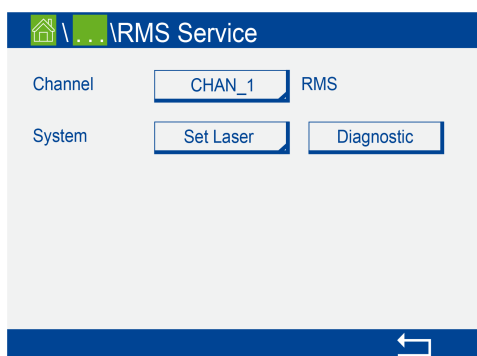


Figure 9: Set Laser Option

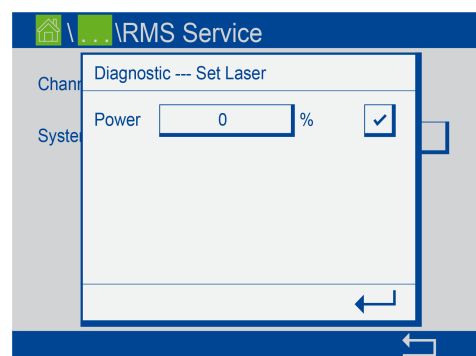


Figure 10: ISM feature to monitor

- Read Pump:

Selecting this option provides detailed information about the RMS pump, including the flow control setup, the inline water flow rate in mL/min, PID (Proportional-Integral-Derivative) controller status (On/Off), and the pump's operational status (On/Off).

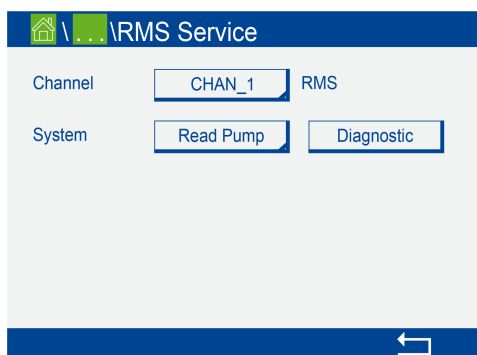


Figure 11: Read Pump Option

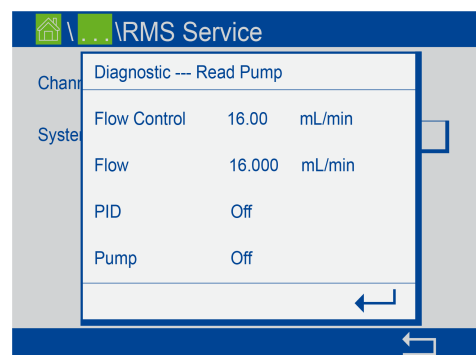


Figure 12: Pump Control Settings

- Set Pump:

This option allows a technician to configure the pump after replacement. The technician can set the flow control volume and choose whether to turn the PID controller and the pump itself on or off.

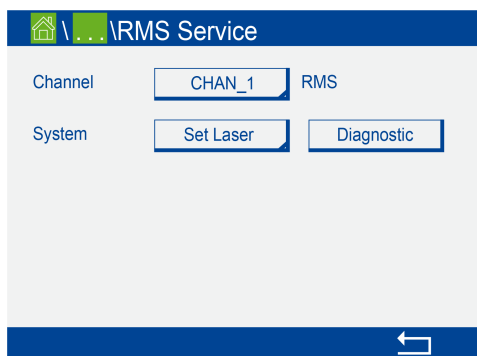


Figure 13: Set Pump Option

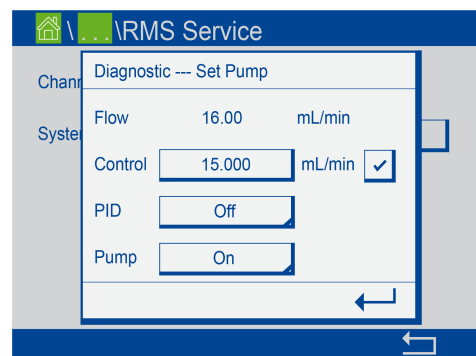


Figure 14: Pump Control Settings

- Read Valve:

Displays the current status of the pinch valve. You can also select between "Online" or "Bottle" modes to change the valve's operating position.

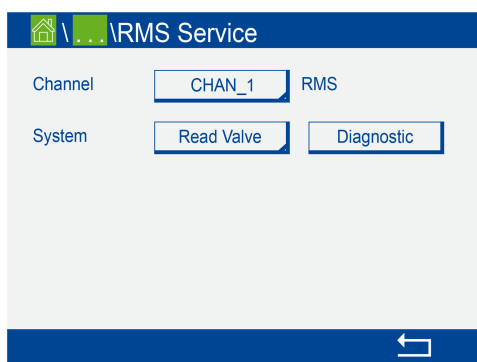


Figure 15: Read Valve Option

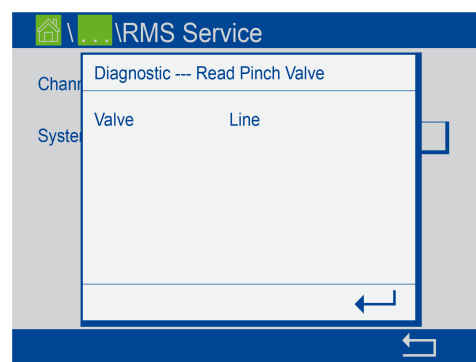


Figure 16: Pinch Value Settings

- Set Valve:

Allows you to select which valve you want to monitor, choosing between the Line valve and the Bottle valve for detailed observation and control.

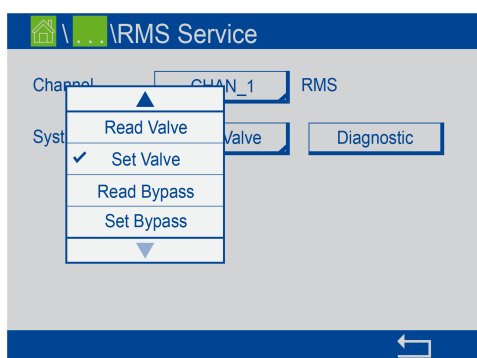


Figure 17: Set Valve Selection

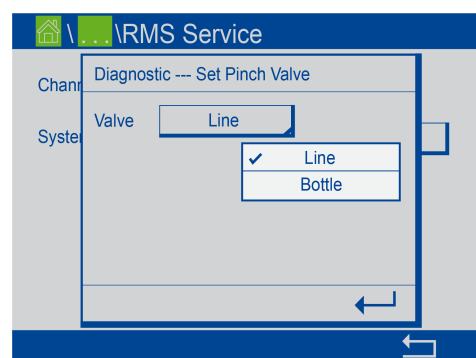


Figure 18: Selection Between Line and Bottle

- Read Bypass:

This option allows you to check the current setting of the bypass valve, indicating whether it is turned On or Off.

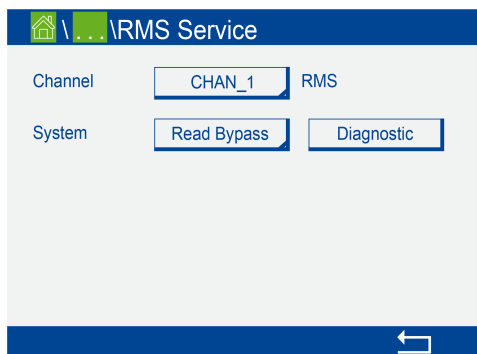


Figure 19: Read Bypass Setting

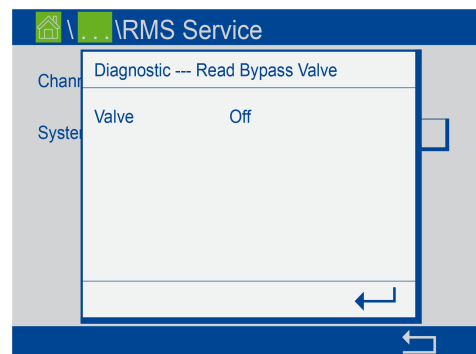


Figure 20: Bypass Valve Settings

- Set Bypass:

Allows you to turn the bypass valve On or Off, enabling control over the bypass flow in the analyzer.

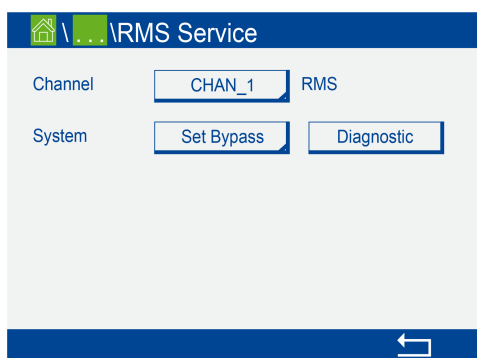


Figure 21: Set Bypass Setting

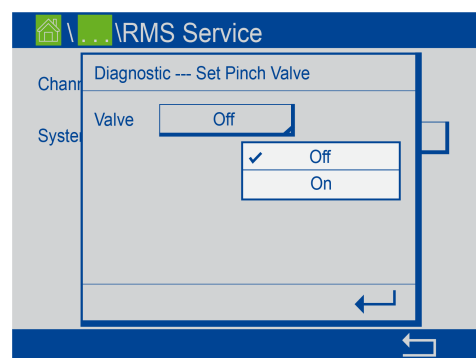
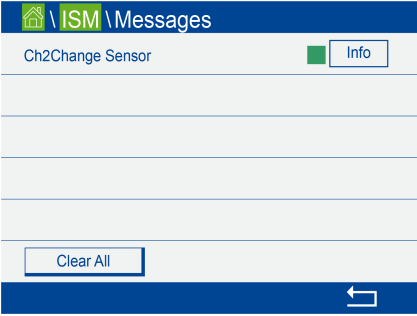
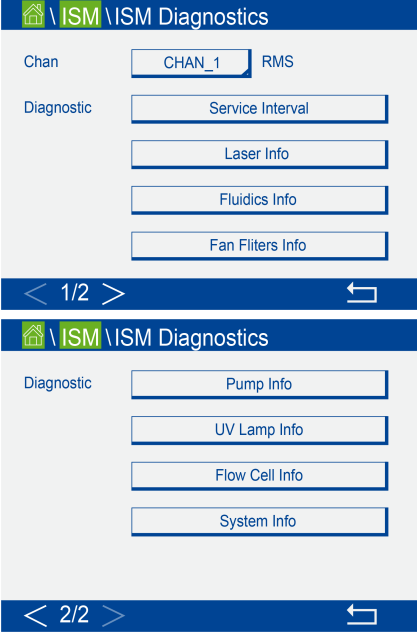
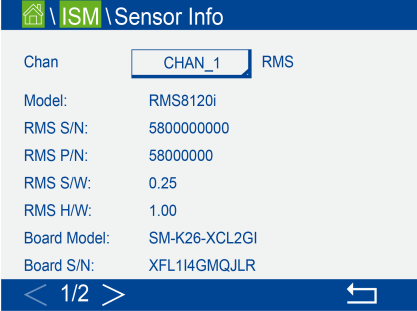
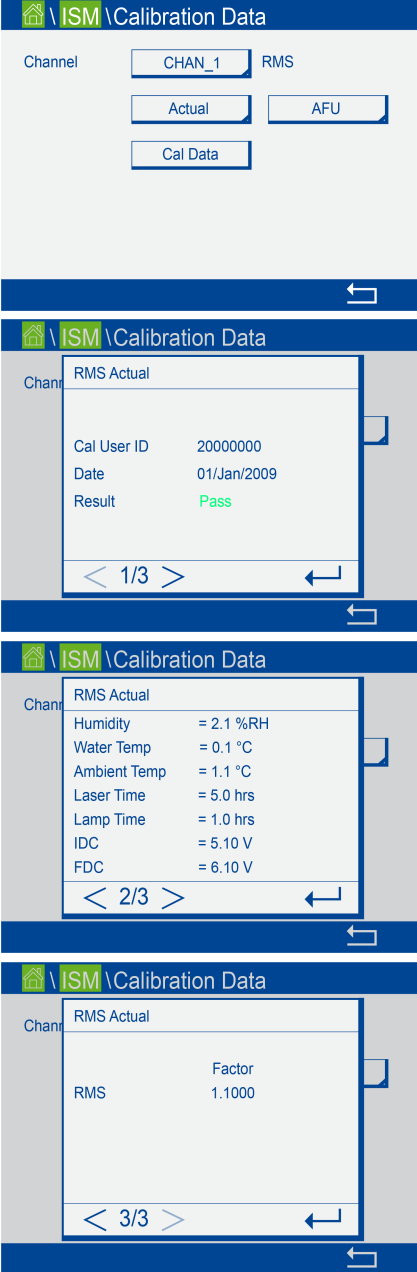
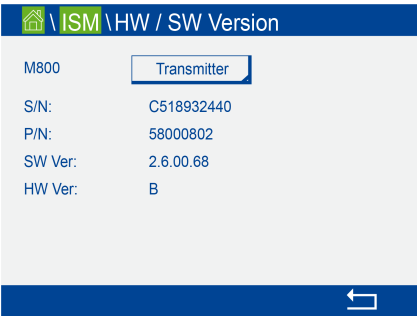
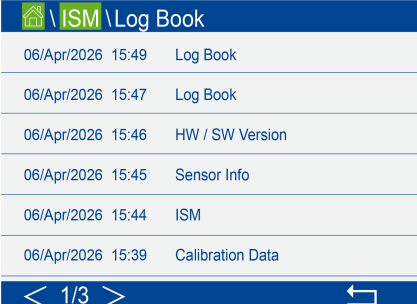


Figure 22: Pinch Valve On/Off

5 Additional M800 Menus for RMS8120i Service

M800 ISM PATH: H \ ISM	ISM (Intelligent Sensor Management)	
iMonitor PATH: H \ ISM \ iMonitor	iMonitor shows the countdown timer for services provided by METTLER TOLEDO: • Calibration (TTCal) • Cleaning (TTClean) • UV lamp (UV DLI) • Fluidics • Fan Filters • Laser (Laser DLI) • Pump • Flow cell	

Messages PATH: H \ ISM \ Messages	Messages provide real-time status and notifications on analyzer performance, alarms, diagnostics, and operational events.	
ISM Diagnostics PATH: H \ ISM \ ISM Diagnostics	ISM Diagnostics tracks service intervals and health details for components: Laser, Fluidics, Fan Filters, UV Lamp, Flow Cell, and the overall analyzer.	
Sensor Info PATH: H \ ISM \ Sensor Info	Sensor Info shows detailed data on the connected RMS8120i: serial number, hardware and software versions.	

Calibration Data PATH: H \ ISM \ Calibration Data	Calibration Data stores information and calibration parameters for the RMS8120i, including Cal factor, date of calibration, calibration results, and system information for tracking and documentation.	
HW/SW Version PATH: H \ ISM \ HW/SW Version	HW/SW Version shows the software version details of the transmitter and boards in the RMS8120i.	
Logbook PATH: H \ ISM \ Logbook	Logbook records key events such as alarms, system changes, and activities, enabling users to review historical logs for maintenance.	

6 Maintenance Performed by the User

1. Refer to the Operational Manual to perform routine quarterly internal cleaning to maintain optimal system performance.
2. Refer to the Operational Manual to conduct thorough shutdown preparation before water system maintenance event or intervention or if water system shutdown is longer than 24 hours.
3. Refer to the Operational Manual to conduct proper cleaning after any shutdown period to restart RMS8120i.
4. Include a dedicated section on handling particles and isolation procedures during maintenance, especially when other chemicals are present in the water, to ensure safety and prevent cross-contamination.

7 Maintenance Performed by Service

1. METTLER TOLEDO provides support for optimal performance, calibration and maintenance services for all RMS8120i analyzers.
2. Basic preventive maintenance is recommended every 12 months, and full preventive maintenance is recommended every 36 months.
3. Full preventive maintenance consists of the following:

Table 5: RMS8120i Maintenance by Vendor

Services Part Number	Service Descriptions	Service frequency
31013102	RMS8120i Calibration Solution Kit	Annually
31013104	RMS8120i PM Kit	Annually
31013105	UV Lamp, RMS8120i Kit	Annually
31013106	Laser RMS8120i Kit	Every 3 years
31013107	Flowcell RMS8120i Kit	
31053459	Pump RMS8120i Kit	Every 3 years
31055539	Air Filters RMS8120i Kit	Annually
31055540	RMS8120i Fluidic Filters 15-micron Kit	Annually
31013097	Pinch Valve Tubing RMS8120i Kit	Annually

7.1 Flow Adjustment during Service

Use caution while adjusting the water flow rate inside the analyzer during startup.

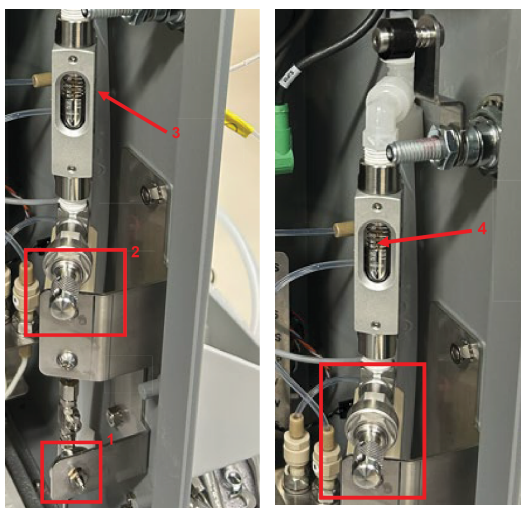


Figure 23

1. Turn on the online water supply and open the ball valve labeled (1).
2. Open the Flow Switch labeled (2) and adjust the flow rate to 130 mL/min labeled (3).
3. Close the door and inspect the M800 to confirm that the flow rate stabilizes at 15 mL/min $\pm$ 1 mL/min.
4. Once the flow rate on the M800 is stable, open the door again and adjust the Flow Switch to a flow rate between 50 and 80 mL/min labeled (4).
5. Close the door after adjusting the flow rate.

8 Service Parts Replacement



CAUTION

Wear gloves at all times when performing troubleshooting and replacement parts. Refer to the associated document number for the parts replacement instructions listed in the tables below.

8.1 Main Consumables

Table 6: RMS8120i Consumables

Part Number	Consumables Description	Part Number	Consumables Description
31013102	RMS8120i Calibration Solution Kit	31053459	Pump RMS8120i Kit
31013104	RMS8120i PM Kit	31055539	Air Filters RMS8120i Kit
31013105	UV Lamp, RMS8120i Kit	31055540	RMS8120i Fluidic Filters 15 micron Kit
31013106	Laser RMS8120i Kit	31013097	Pinch Valve Tubing RMS8120i Kit
31013107	Flowcell RMS8120i Kit		

8.2 Secondary Parts Accessories

Table 7: RMS8120i Secondary Parts

Part Number	Consumables Description
31013042	RTD Temp Sensor RMS8120i Kit

8.3 Spare Parts

Table 8: RMS8120i Spare Parts

Part Number	Consumables Description	Part Number	Consumables Description
31053460	Bubble Sensor RMS8120i Kit	31055538	UV Ballast, RMS8120i Kit
31053461	Humidity Sensors, RMS8120i Kit	31013098	Electronic Board Assembly RMS8120i Kit
31053463	Pinch Valve, RMS8120i Kit	31013091	Fluidic Components, RMS8120i Kit
31053464	Flow Switch, RMS8120i Kit	31013093	Tubing, RMS8120i Kit
31053465	Pressure Regulator, RMS8120i Kit	31013094	Ferrules, RMS8120i Kit
31055504	Bypass Valve, Wired, RMS8120i Kit	31013088	Pressure Reducing Valve Pre-set 15psi kit
31013092	UV Oxidation Chamber	31013046	Overflow Chamber Check valve
31013099	Internal Power Supply Kit	31053462	Calibration Bottle Cap (extra) with Tubing
31055505	SiPM Board, RMS8120i Kit	31013043	Parabolic Mirror, RMS8120i Kit
31055506	Laser Fan RMS8120i Kit	31013044	Relay, RMS8120i Kit
31055507	System Fans, RMS8120i Kit	31013045	Fuse, RMS8120i Kit

9 Errors and Warnings

The RMS8120i LED on the front shows faults and errors to alert users and service personnel on the status of the analyzer.

9.1 Faults

"Fault" on the analyzer occurs when critical error in hardware or software component was detected, the measurement is not reliable when "Fault" occurs. When the analyzer encounters these errors, the "Fault" LED on the analyzer will turn red. Below is a table of "Fault" that may occur.

Table 9: Fault

Fault	Display	Cause	Corrective Action
F	UV Lamp Failure	UV lamp not working	Contact METTLER TOLEDO Technical support.
F	Laser Failure	Laser lamp not working	Contact METTLER TOLEDO Technical support.
F	Analyzer Fan Failure	Analyzer fans not working	Contact METTLER TOLEDO Technical support.
F	No flow detected	No flow detected at the Flowmeter (device)	Look at the incoming flow at the needle valve and adjust it based on the startup flow adjustment instructions. Contact METTLER TOLEDO Technical support for further assistance.
F	Overflow Chamber Failure	Inadequate flow of water coming into the analyzer and into the needle flow valve	Increase the incoming water flow rate.
F	NO analyzer detected	Transmitter communication to the RMS sensor/analyzer failed	Check the Transmitter connection.
F	Ambient Temperature too high	Analyzers are too hot	Turn off the analyzer and allow it to cool down. Contact METTLER TOLEDO Technical support for further assistance.
F	Flow Control Failed	Flow control is not able to set the flow to the required 15 mL/min $\pm$ 1.5 mL/min within the Fluidics system	Inspect the incoming flow at the needle valve and adjust it according to the startup flow adjustment instructions. Contact METTLER TOLEDO Technical support for further assistance.
F	Bad measurement	Measurement-related software fault	Call METTLER TOLEDO Technical support and tell them the fault message.
F	Sample Valve Failure	The Sample (Pinch) Valve fails	Call METTLER TOLEDO Technical support and tell them the fault message.
F	Humidity/Temp Analyzer Failure	The humidity/temperature analyzer cannot communicate	Call Mettler Toledo Technical support and tell them the fault message.
F	Laser Diode Temperature High	The laser needs to be cooled down	Call METTLER TOLEDO Technical support and tell them the fault message.
F	Pump Failure	The pump inside the unit is not working	Contact METTLER TOLEDO Technical support.
F	Unexpected fault	An unknown fault	Contact METTLER TOLEDO Technical support with the message displayed.

9.2 Errors

"Error" on the analyzer occurs when something out of normal within hardware or software component was detected, the measurement is still reliable when "Error" occurs. When the analyzer encounters "Error", the "Error" LED on the analyzer will turn yellow. Below is a table of Errors that may occur.

Table 10: Error

Error	Display	Cause	Corrective Action
E	UV lamp Life over time	365 days	Contact METTLER TOLEDO Technical support.
E	Laser Life over time	1095 days	Contact METTLER TOLEDO Technical support.
E	Inert Detector Overload	Particles overload due to stagnant water	Contact METTLER TOLEDO Technical support.
E	Fluorescence Detector Overload	Microbial overload due to stagnant water	Contact METTLER TOLEDO Technical support.
E	Analyzer Memory Error	Anlayzer Memory error detected	Contact METTLER TOLEDO Technical support.
E	Flow low	Water flow low when the flow that is at 13.5-16.5 mL/min	Look at the incoming flow at the needle valve and adjust it based on startup flow adjustment instructions. Contact METTLER TOLEDO Technical support for further assistance.
E	Flow high	Water flow high	Look at the incoming flow at the needle valve and adjust it based on startup flow adjustment instructions. Contact METTLER TOLEDO Technical support for further assistance.
E	AFU Count Reading High	> 10,000 AFU/mL	Contact METTLER TOLEDO Technical support for further assistance.
E	Inert Count Reading High	> 10,000 inert/mL	Contact METTLER TOLEDO Technical support for further assistance.
E	Water Temperature High	60°C	Ensure the conditioning coil is installed properly. Contact Mettler Toledo Technical support for further assistance.
E	Water Temp Low (Needs to be added to the Protocol)	5°C	Ensure the conditioning coil is installed properly. Contact METTLER TOLEDO Technical support for further assistance.
E	Ambient Temperature High	50°C	Turn off the analyzer and allow it to cool down. Contact METTLER TOLEDO Technical support for further assistance.
E	Ambient Temperature Low	10°C	Contact METTLER TOLEDO Technical support for further assistance.
E	Low RTC (Real Time Clock on analyzer) battery	The battery needs to be changed for the RTC inside the analyzer	Contact METTLER TOLEDO Technical support.
E	Humidity High	Ambient humidity too high	Check the fan filters and system fan. Contact METTLER TOLEDO Technical support for further assistance.
E	Laser Diode Temperature High	> 37°C	Turn off the analyzer and allow it to cool down. Contact METTLER TOLEDO Technical support for further assistance.
E	Bubble Detected	There are bubbles in the system, or the flow is too low	Check the flow rate of the online water supply, increase the flow rate to the appropriate value. Adjust flow switch based on startup flow adjustment instructions. Contact METTLER TOLEDO Technical support for further assistance.
E	Laser Enclosure Temperature High	> 37°C	Turn off the analyzer and allow it to cool down. Contact METTLER TOLEDO Technical support for further assistance.
E	Sample Valve Position Error	Sample valve position error	Contact METTLER TOLEDO Technical support.

10 Troubleshooting

When met with out of tolerance measurements, errors, or faults, follow the below troubleshooting steps to diagnose and correct the issue.

If...	Do	Refer to
The analyzer does not power on	- Verify that the power cord is fully inserted and locked into the jack located on the side of the analyzer. - Verify that the power cord is plugged in to an appropriate power supply.	- Installation - Startup / warm-up sequence
The analyzer does not respond to touch input	- Make sure to press intently on the screen with a stylus or fingernail, as light presses with pads of fingers may not register on the resistive touch-screen. - Clean the touchscreen with an appropriate microfiber cloth. - If cleaning is unsuccessful, power cycle the analyzer.	
The analyzer leaks	- Verify that luer and / or compression fittings are snug and secure. - Verify that external fluidic plumbing is secure and not damaged. - Verify that the sample input port is not being used for pressurized source input.	- Installation - On-line Connection Setup - Activating On-line Mode Operations - Appendix: Sample Processing
ON-LINE MODE: The analyzer does not pass initialization and / or exhibits persistent pump flow errors	- Verify that the online shutoff valve is in the open position. - Verify that the source shutoff valve is in the open position. - Verify that tubing and external fluidic connections are connected securely and free from occlusions, debris, and / or kinks. - Avoid using excessively long sample, online and waste tubing. - Verify that the pressurized source is properly connected to the ON-LINE INPUT. - Make note of the flow rate.	- Installation - On-line/ Sample Connection Setup - Activating On-line Mode Operations - Appendix: Sample Processing
The analog output equipped analyzer does not send current	Verify that the analog output cable is securely attached to the analog output port on the side of the analyzer.	Installation: Analog Output
The main screen trending chart does not display data	- Verify that initialization has completed and the main screen banner indicates the analyzer is in continuous monitoring. - Data points will be displayed immediately after entering continuous monitoring ONLY if the analyzer is configured for Real-time display mode. In the Logged display mode, data points are displayed on the trending chart ONLY after the entire volume of the log file write interval defined in Volume interval is processed.	
The analyzer is making atypical audible noises	Verify that tubing and external fluidic connections are connected securely and free from occlusions, debris, and / or kinks.	

11 RMS8120i Analyzer Specifications

RMS8120i analyzer requires a source of water connected to the analyzer as well as a drain for wastewater.

Technical Data of the RMS8120i

Flow rate	≥ 65 mL/min
Detection limit	1 AFU (Auto-Fluorescent Unit)
Minimum detection size	≥ 0.3 µm
Measurement range	0 - 10,000 AFU/mL
Analysis time	Continuous
Response time	~4 seconds
Data communication	4 - 20mA/Ethernet/IP/ Profinet/Profibus DP via the selected M800 Transmitter

Water Requirements

Temperature	5 - 70°C (41 - 158°F) 70 - 90°C* (158 - 194°F) with provided cooling coil
Inlet pressure	5 - 100 PSIG ¹ (0.34 - 6.89 barg)
Type / Quality	Water for Injection (WFI), Purified Water (PW), Ultrapure Water (UPW)

Power/Installation/Enclosure

Power requirements	100 - 240 VAC 50 - 60 Hz 3A
Monitoring location	At-line to drain
Inlet connection	0.125" (3 mm) O.D. compression fitting
Sample Outlet connection	0.125" (3 mm) O.D. 1/4 - 28 UNF flat bottom fittings
Waste Outlet connection	10 mm O.D. x 8 mm I.D. compression fitting
IP Ratings for Enclosure	IP 55
Enclosure material	Painted aluminum
Physical dimensions (WxHxD)	470 mm (W) x 705 mm (H) x 325 mm (D) 18.5" (W) x 27.75" (H) x 12.78" (D)
Weight	~80 lbs. (36.28 kg)

Environmental Conditions

Use	Indoor
Altitude	Up to 6,562' (2,000 m)
Environmental Temperature	5 - 45°C (41 - 113°F)
Environment	Pollution degree 2
Humidity (non-condensing)	80% maximum relative humidity up to 31°C (87.8°F), decreasing linearly to 33% relative humidity at 45°C (113°F)
Voltage	Mains supply voltage fluctuations up to ±10% of the nominal voltage of 100 - 240 VAC, 50 - 60 Hz Transient overvoltages: up to levels of overvoltage category II Temporary overvoltages occurring on the main supply

*Second cooling coil required for temperatures above 80°C

¹Calibration, cleaning and grab sample requires sample pressure of 0 psig (0 barg)

¹For installations with process pressure above 85 psig (5.9 bar(g)), the High-Pressure Regulator (P/N 58091552) is required. Refer to Sample Tubing Connections for additional information. Detailed installation instructions are supplied with the High-Pressure Regulator.

12 Consumables and Spare Parts Information

12.1 Consumables

Table 11: RMS8120i Consumables

Part Number	Description	Content
31013102	RMS8120i Calibration Solution Kit	Solution H, Solution L, Solution U, Solution P
31013104	RMS8120i PM Kit	Fluidic filter, UV lamp, air filters
31013105	UV Lamp, RMS8120i Kit	UV Lamp
31013106	Laser RMS8120i Kit	Laser, laser mounting
31013107	Flowcell RMS8120i Kit	Flowcell
31053459	Pump RMS8120i Kit	Pump
31055539	Air Filters RMS8120i Kit	Air Filters (2)
31055540	RMS8120i Fluidic Filters 15 micron Kit	Fluidic Filter
31013097	Pinch Valve Tubing RMS8120i Kit	Pinch Valve Tubing (2)

12.2 Accessories

Table 12: RMS8120i Accessories

Part Number	Accessory Description	Part Number	Accessory Description
31013089	RMS8120i Bypass Key (001) Kit	31013096	Side Tray RMS8120i Kit
31013090	RMS8120i Analyzer Key Kit	31013042	RTD Temp Sensor RMS8120i Kit
31013095	Back Wall Panel Mount RMS8120i Kit	31013047	Cooling Coil RMS8120i

12.3 Spare Parts

Table 13: RMS8120i Spare Parts

Part Number	Description	Part Number	Description
31053460	Bubble Sensor, RMS8120i Kit	31055538	UV Ballast, RMS8120i Kit
31053461	Humidity Sensors, RMS8120i Kit	31013098	Electronic Board Assembly RMS8120i Kit
31053463	Pinch Valve, RMS8120i Kit	31013091	Fluidic Components, RMS8120i Kit
31053464	Flow Switch, RMS8120i Kit	31013093	Tubing, RMS8120i Kit
31053465	Pressure Regulator, RMS8120i Kit	31013094	Ferrules, RMS8120i Kit
31055504	Bypass Valve, Wired, RMS8120i Kit	31013088	Pressure Reducing Valve Pre-set 15psi kit
31013092	UV Chamber	31013046	Overflow Chamber Check valve
31013099	Internal Power Supply Kit	31053462	Calibration Bottle Cap (extra) with Tubing
31055505	SiPM Board, RMS8120i Kit	31013043	Parabolic Mirror, RMS8120i Kit
31055506	Laser Fan, RMS8120i Kit	31013044	Relay, RMS8120i Kit
31055507	System Fans, RMS8120i Kit	31013045	Fuse, RMS8120i Kit

12.4 Service Tools

Table 14: RMS8120i Service Tools

Part Number	Service Tools Description
31013100	DataRay

12.5 Electrical Analyzer Diagram

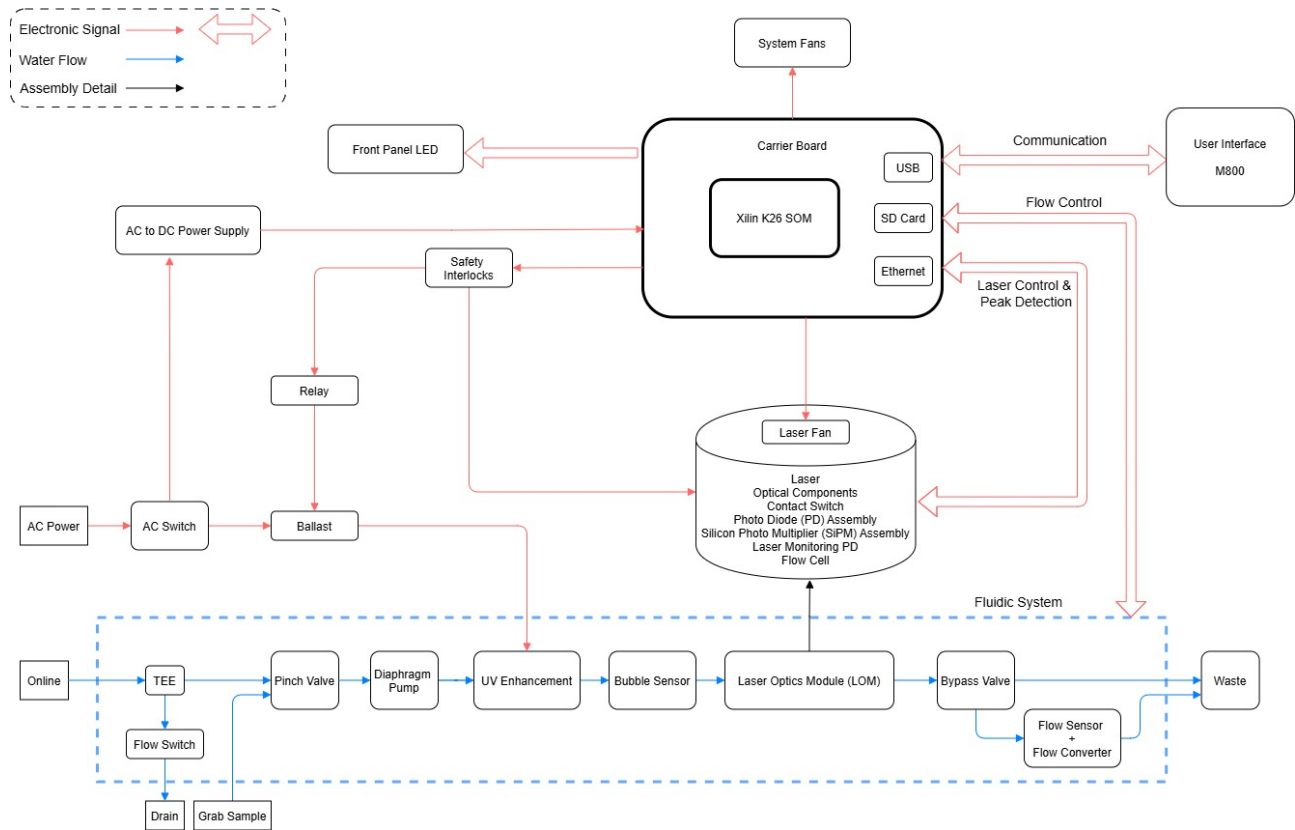


Figure 24

To protect your product's future:

METTLER TOLEDO Service assures the quality, measuring accuracy and preservation of value of this product for years to come.

Please request full details about our attractive terms of service.

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Subject to technical changes.

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Service Manual RMS8120i Microbial Analyzer