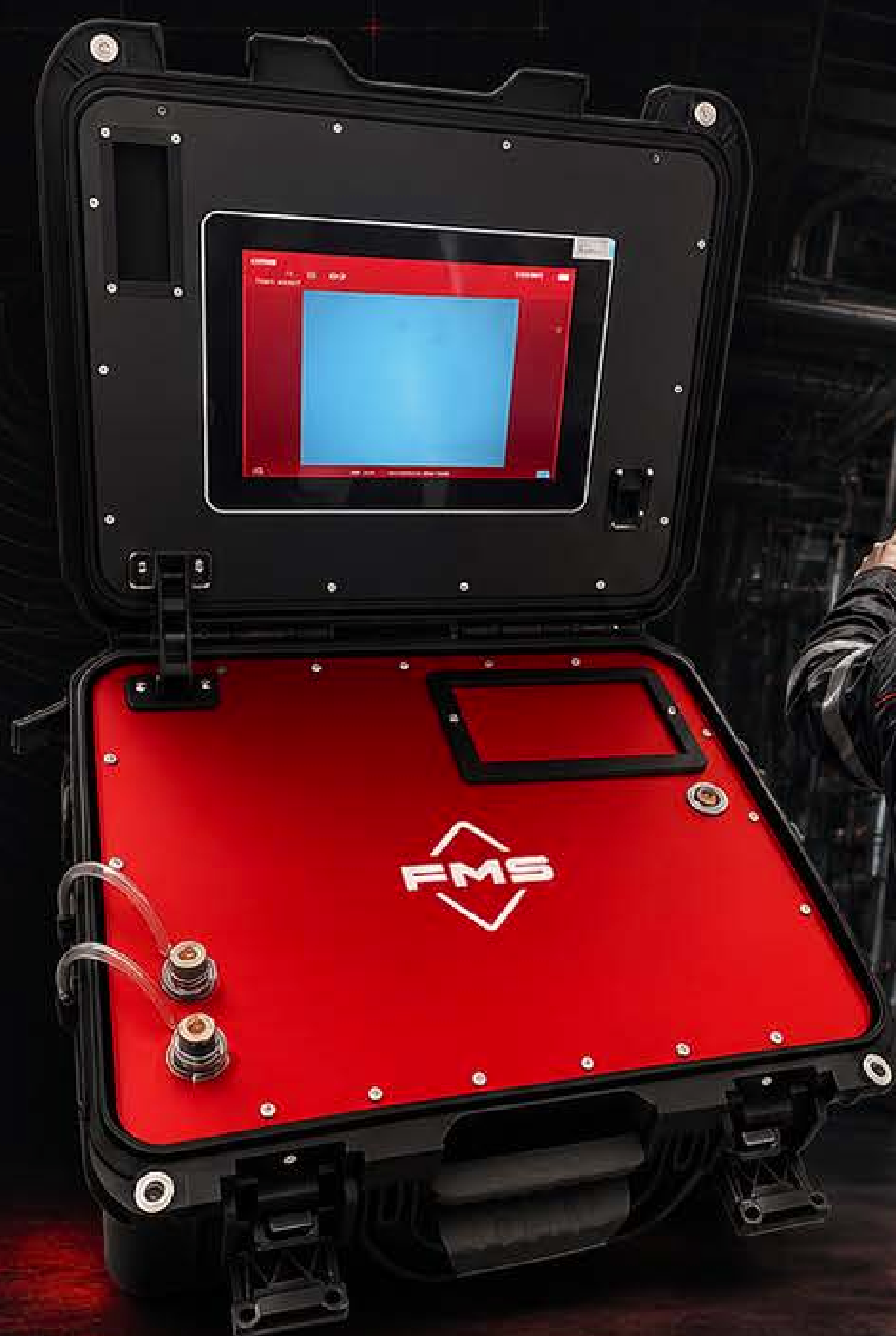


USER HANDBOOK

FMS-PB 1000

DATE 07/26



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2

INTRODUCTION



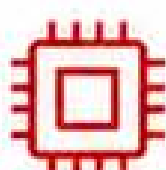
This handbook describes the key features of the FMS-PB1000 system, a portable system to monitor contamination in industrial equipment lubricated systems. The system has been developed to provide a fast, accurate, and reliable assessment of lubricating oil condition directly at the point of use. By integrating state-of-the-art sensors, an automated hydraulic system, and an intuitive user interface, the device provides critical information to support predictive maintenance programs and condition monitoring.



In a single procedure lasting approximately two minutes, the system captures, processes, and stores analysis data, facilitating lubricant conditions assessment and monitoring of its evolution over time. Results can be viewed directly on the device or exported for documentation and further analysis.



Its portable and autonomous design allows it to be used both in the laboratory and in the field, significantly reducing inspection times and enabling maintenance decisions to be made with objective and timely information.



The core of the system is the measuring module, which is based on the patented digital image technology and video processing by Atten2. It quantifies particles greater than 4 microns present in fluids and classifies them according to the ISO, NAS or SAE standards. The system includes data displayed on an HMI screen to get direct readings from the measurement system, which are trended and stored. Remote communications are also available to ensure full communication.



Figure 1. FMS - PB1000



The internal device is protected through the following patents:

- European Patent n. 16382179.6
- US Patent n. 15/496,430

START-UP

PB 1000

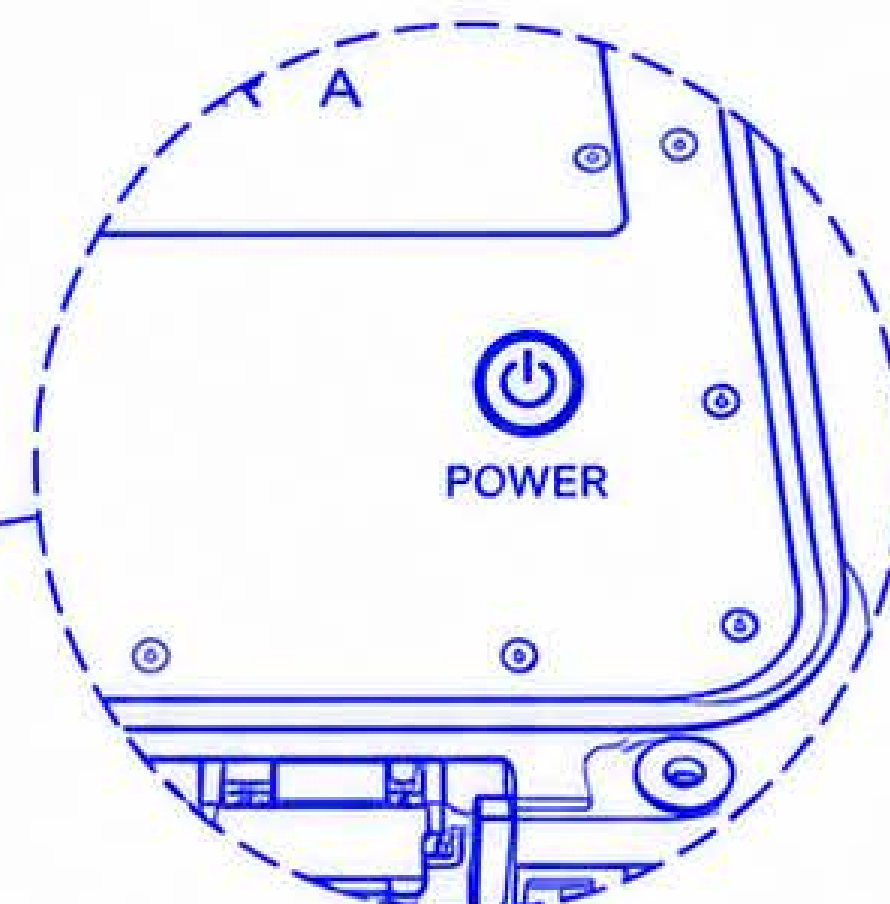
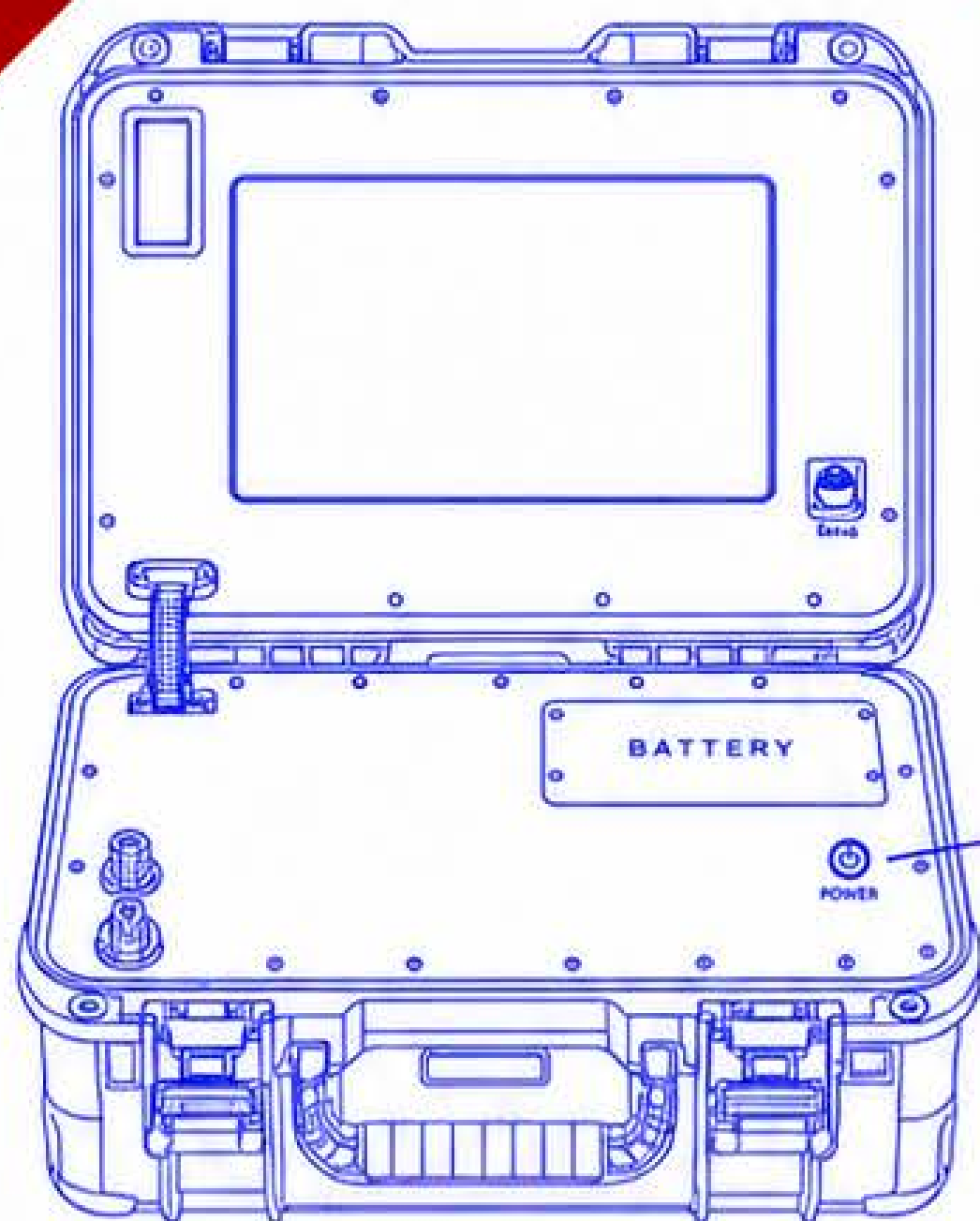


Figure 2. Power button

3.1 Kit definition

Upon receiving the PB 1000, carefully inspect the packaging before opening it. If you notice any dents, punctures, or other obvious signs of shipping damage, contact the shipping company and your distributor immediately before putting the equipment into operation. Once the equipment is unpacked, verify that all components are present and in good condition.

The equipment is delivered with the following components:

- 1 System
- 1 Charger 220 power supply AC
- 1 Box of accessories
- 2 Bottles for taking samples
- 1 Line of suction
- 1 Line of discharge

Note: Depending on the configuration requested at the time of purchase, the contents of the supply may vary.

3.2 Initial verification

Before starting, please confirm that:

The suitcase shows no visible damage.

The touchscreen is in perfect condition.

The connectors Inlet and Outlet are clean and protected.

The suction and discharge lines are free of bends, cracks, and obstructions.

The charger and its cable show no damage.

All the accessories are inside the supplied box.

3.3 Conservation of the packaging

It's recommended to keep the original packaging and all protective materials used during transport. These materials offer the best protection for storing or transporting the equipment and they are recommended if shipping for maintenance or technical service is required.

3.4 Starting up

The portable monitoring system already has a percentage of battery to operate for the first time; however, it is recommended to connect the included charger and use the equipment while the battery recharges to 100%.

When you press the Power button. This will turn on a red light, and the device will start up; this procedure takes about 30 seconds before the main interface screen is displayed.

4 FMS-PB 1000 Interfaces

The system is provided with hydraulic interfaces that connect to the supplied hoses.

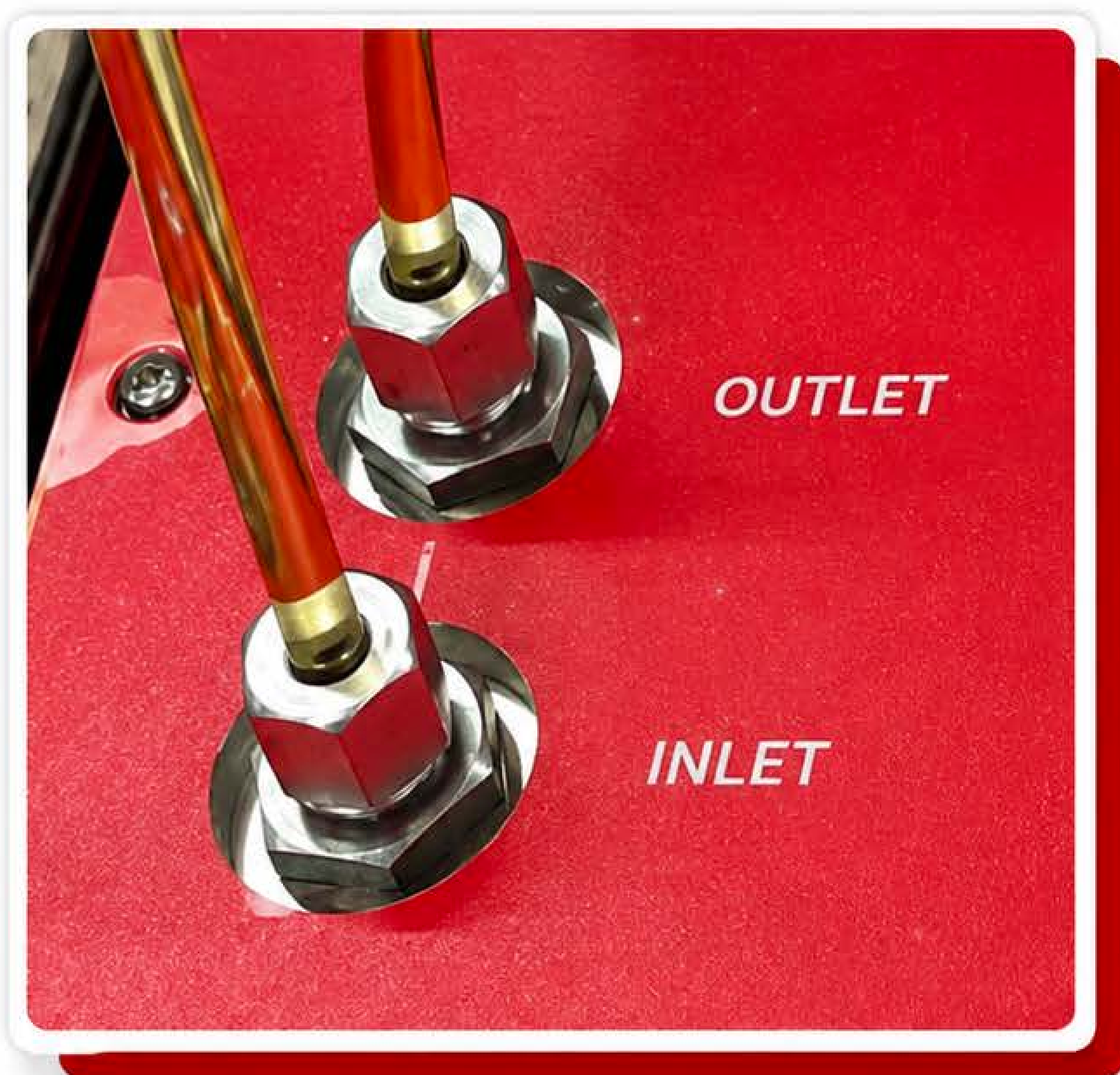


Figure 3. Hydraulic interfaces of FMS-PB1000

Additionally, **PB-1000** has additional interfaces on the side and on the inside:

- Power supply button.
- Power supply.
- Ethernet.

5 General Specifications

ELECTRICAL	Nominal	Minimum	Maximum	UNIT.
Power supply	220 VAC			
Battery life	3h			
Communications	HMI			
	Remote connections via Wi-Fi			
Ethernet	Configuration purposes			
Dimensions				
Height	173			mm
Width	424			mm
Depth	340			mm
Weight				
When circuit empty	12,6			Kg
Operating temperature		0	50	°C
Humidity RH		0	95	%
Inlet pressure		0	2,5	bar
Operating oil flow	0.2			l/min
Housing	IP65 (closed) IP20 (open)			
MATERIALS				
Wettable Material	BK7, Aluminum, VITON, 316 SSteel, FKM, PEEK, PTFE, Polyacetal, Nickel			
External Material	Polypropylene NK-7			
Certifications	CE			
Branding	Serial Number, Logo.			
Lifetime	After 2 years verification/ After 4 Overhaul			
Calibration	Following ISO 11171 standards			
Viscosity	1500 (max)			cSt
Languages	Spanish/English/Portuguese/French/German			

Figure 4. FMS-PB 1000 general specifications.

USER FEATURES

6. User Features

The FMS-PB1000 is controlled via an HMI screen with the following features:

- Test tag and CSV storing.
- Trend visualization
- Pump control
- Remote communication available



Figure 5. Main PB screen.

6.1. HMI

6.1.1. Main screen

The Home screen provides access to all settings, shortcuts, and the main measurement panel. It also displays the battery status, current time zone, and current programming version.

- Battery status
- Access to measuring
- Access to change language
- Internet connection access
- Access to time zone settings
- Quick access
- Current date and time
- Current firmware version

LANGUAGE SCREEN FMS-PB1000

6.1.2. Language screen

The language screen allows you to translate the entire monitoring system interface as required. By entering the language screen, you will find all the available translations for the device interface. Press on the language you wish to display on the unit, and all menus will be automatically translated.



Figure 6. Language screen

6.1.3. Network settings

The network settings screen allows you to establish a connection to a Wi-Fi network. Connecting the monitoring case serves both to update the firmware and to download the analysis reports. To download analysis reports, the device scanning the QR code and the suitcase must be on the same Wi-Fi network. It is recommended to create a network hotspot using a mobile device.

To complete the configuration, follow these steps:

- 1 Upon entering the network settings screen, you will find a menu with the networks available within range of the device.
- 2 Press the “Search for Networks” button to have the device update nearby networks.
- 3 Open the menu of available networks and tap on the network you want to connect to. The network will be selected in the drop-down menu.
- 4 Press on the “Password” field; a keyboard will appear where you must enter the password for the selected network.
- 5 Press the “Save” button to connect.

PREPARATION PROCESS

FMS-PB1000



Figure 7. Network settings

> 6.1.4 Preparation process

To perform the first analysis with the portable system, prepare the equipment to process the sample by following these steps.

- 1 Position the case on a table with enough space to handle samples, the cleaning accessories, and near a power source if you need to recharge the equipment.
- 2 Turn on the equipment.
- 3 Connect the suction and discharge lines to the corresponding ports.
- 4 It is recommended to have a bottle of cleansing fluid (diesel or similar) to perform a flushing (internal circuit cleaning) before and after each analysis to remove dirt from the line and remnants of the previous lubricant.
- 5 Place both lines in the bottle with the cleaning fluid to perform a flushing procedure.

> 6.1.5 Sample procedure

In order to measure a sample, the following steps should be followed:

SAMPLE INFORMATION SCREEN

FMS-PB1000

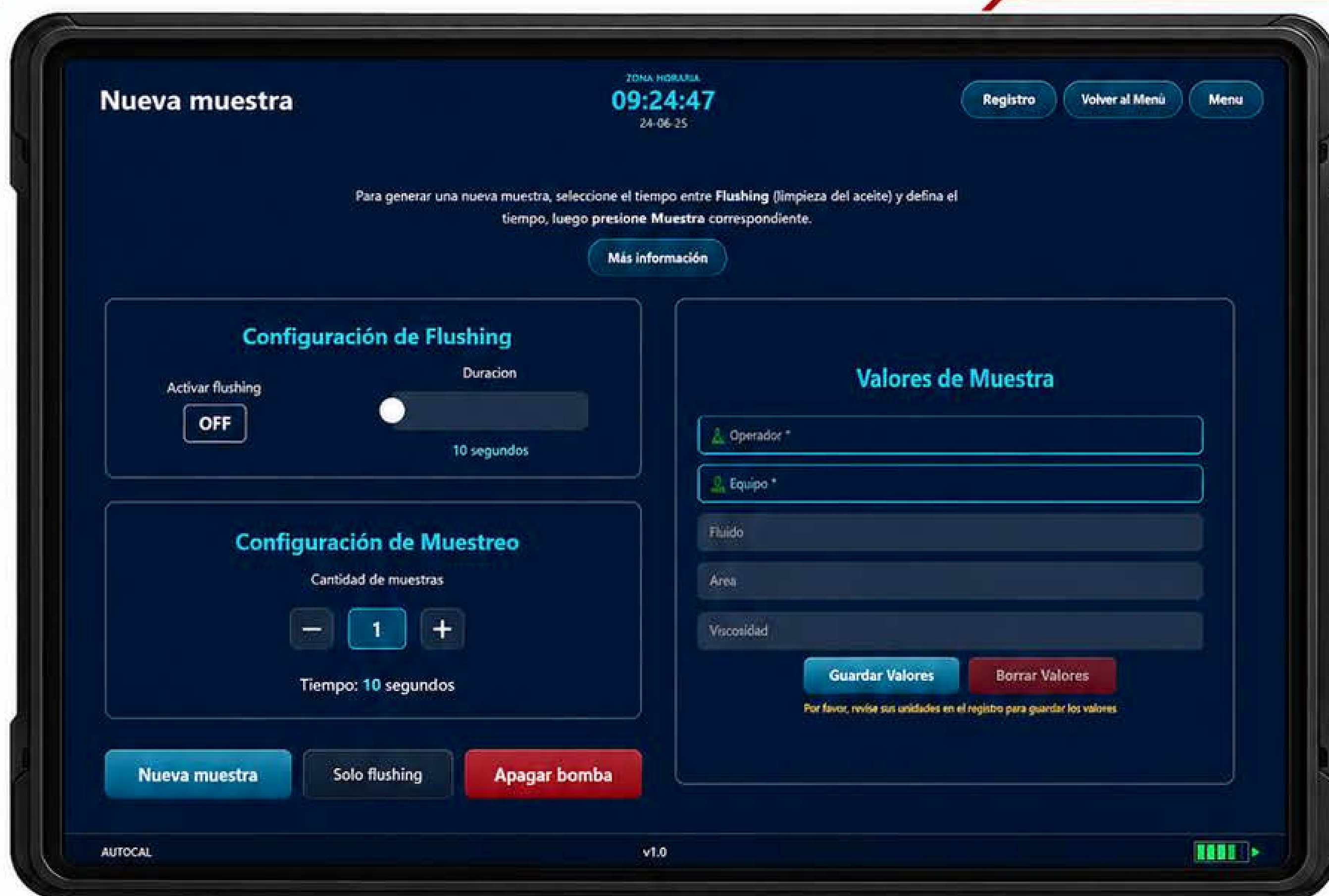


Figure 8. Sample information screen

- 1 With the equipment properly installed and clean, place the suction line in the jar containing the oil to be sampled.
- 2 To perform an analysis, you can repeat the procedure and capture a sample or press the “new sample” button, where you can enter fluid parameters and configure multiple flushing samples and periods before capturing the information.
- 3 On this screen, you can also perform the “Only Flushing” function, after configuring the time from 1 to 60 seconds.
- 4 To register a new sample, it is required to include at least the Operator and Equipment parameters.
- 5 Once the sample registration is configured, the flushing (if required) and the number of samples you wish to register, press the New Sample button to begin the procedure. The analysis time for each sample is 2 minutes.



Access the Main Panel and press the Start button. The pump will begin circulating the fluid, and the button will turn green and display "Measure." Maintain recirculation for at least 1 minute to internally clean the equipment's lines.

MEASUREMENT SCREEN

FMS-PB1000

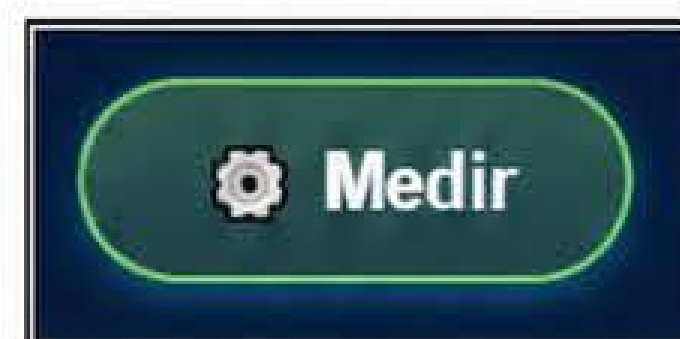
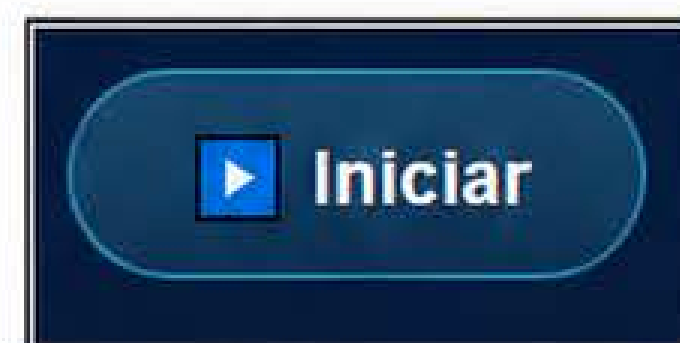


Figure 9. Measurement screen.

Once the analysis is complete, the records section will automatically appear, where the sample will be saved. All analyses performed are saved on this screen, and the information for each sample can be edited.

Registros

OPERADOR

Filtro operador...

EQUIPO

Filtro equipo...

CÓDIGO EQUIPO

Filtro código...

ACTITE

Filtro actite...

VISCOSIDAD

Filtro visco...

FECHA/HORA

Filtro fecha...

Ver Análisis Filtros

Volver al Main

Limpiar Filtros

Mostrando de 4 a 6 registros

FECHA/HORA	OPERADOR	EQUIPO	CÓDIGO EQUIPO	ACTITE	VISCOSIDAD	RY (CST)	ISO (14µm/h)	NAS	PPM	AW	AIR	DO (DI)	TEMP (°C)	BURBUJAS (MIN/MONITORING)	MOVL (EQU/ITERA/10)	RAO	ACCIONES	
01/07/2026 08:26	Juan Pérez	Compresor Principal	COMP-001	Shell Omala S4 RS 68	ISO 68	1.0	24.3/23.4/19.7	12	0	1.00	166.68	-11.67	28.31	1500/1513/1504/4558/1571/24	161.3/176.7/1621.10	5.86/76.30	50	Editar Eliminar
01/07/2026 08:25	Juan Pérez	Compresor Principal	COMP-001	Shell Omala S4 RS 68	ISO 68	1.0	24.3/23.3/20.4	12	0	1	162.38	-12.82	28.42	1768/1541/1303/4965/1549/32	161.3/173.0/1710.70	5.77/66.14	50	Editar Eliminar
01/07/2026 08:25	Juan Pérez	Compresor Principal	COMP-001	Shell Omala S4 RS 68	ISO 68	1.0	11.0/10.0/9.2	1	0	0.68	0	-16	28.31	0/0/0/8000	0/0/0/0/0	0/0	50	Editar Eliminar
30/06/2026 17:49	Juan Pérez	Compresor Principal	COMP-001	Shell Omala S4 RS 68	ISO 68	30.8	11.0/10.0/9.2	1	5760	0.63	0	106	27.37	0/0/0/8000	0/0/0/0/0	0/0	50	Editar Eliminar

Anterior

Página 1 de 1

Siguiente

Figure 10. Data log.

6.1.6 Filtered analysis and reporting section

The analyses performed by the portable system are stored in the "Filtered Analyses" section. There, you can evaluate the trends of the tests performed, view the sensor images, and see the results tables.



Figure 11. Filtered analysis.

EXPORT DATA

To export the data in PDF or Excel format, follow these steps:

- 1 On the Home screen, select the shortcut “Records”.
- 2 In the upper right corner, press “Filtered Analysis”.
- 3 Select the checkboxes for the analyses you want to export.
- 4 Select the output format (PDF or Excel).
- 5 Press “Export Selected”.
- 6 The system will generate a QR code that must be scanned with a mobile device connected to the same network as the equipment.



Figure 12. QR code.

The data exported in PDF format is presented as follows: sample document of 5 selected samples for export.

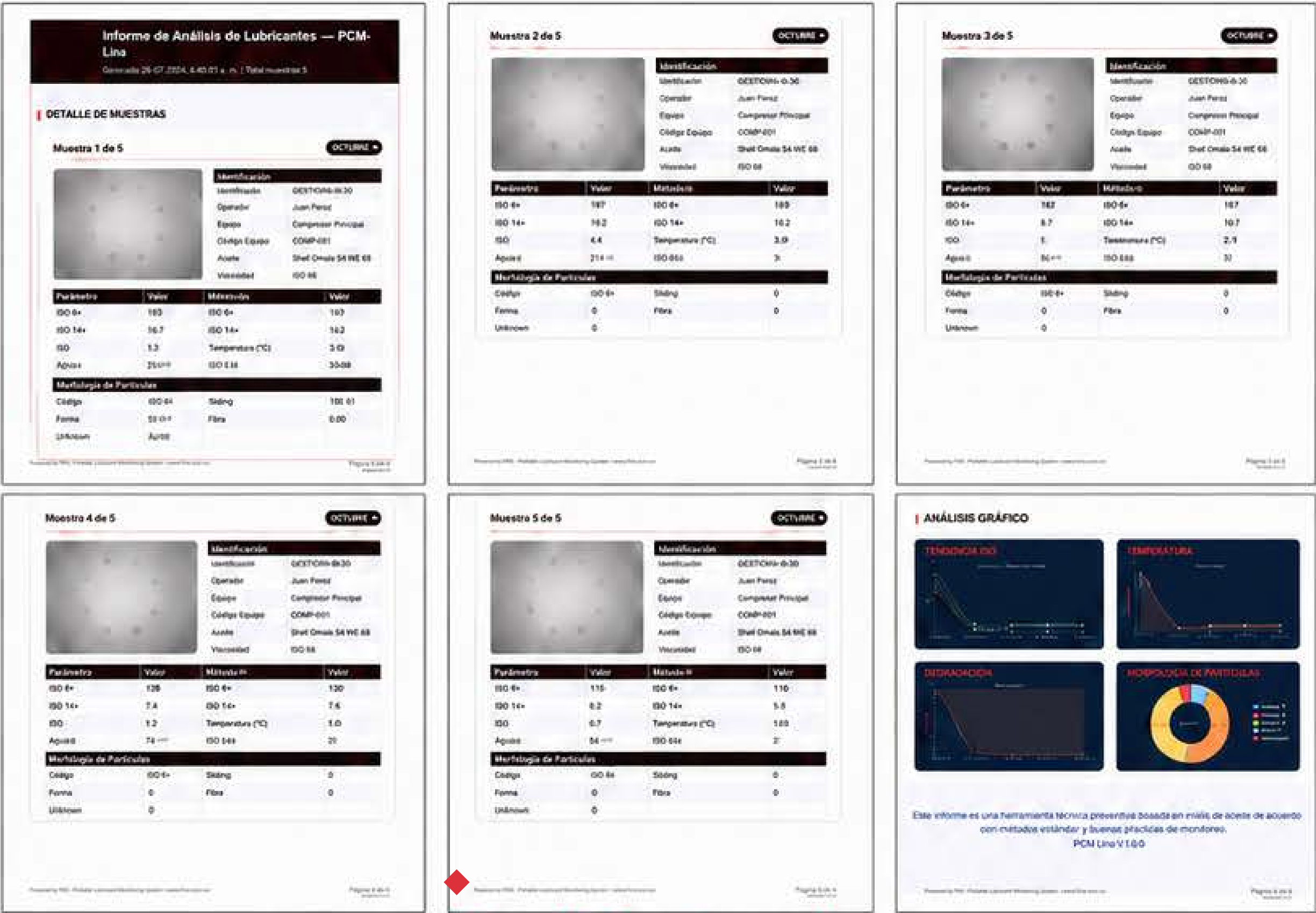


Figure 13. Report example.

6.2 Firmware update

The portable monitoring system can be updated to include new functions and features. To access and apply an update, follow these steps:

Make sure the equipment is connected to an internet network.

- ◆ Stay on the main screen of the device.
- ◆ If a firmware update is available for the device, a green banner will appear at the bottom of the main screen with the option to update to a new version.
- ◆ Press the “Install Now” button to start the update or “Later” to temporarily hide the banner.
- ◆ Pressing “Install Now” will begin the installation. This process may take several minutes depending on the updated content.
- ◆ Once the process is complete, the banner at the bottom will indicate that the device should be restarted by turning it off and on again using the Power button.



Figure 14. Update screen.

MAINTENANCE

FMS-PB1000

7

Maintenance

The proper maintenance of the PB-1000 is essential to ensure the accuracy of measurements and extend the lifespan of its sensors and internal components.

7.1

Cleaning after each analysis

After each analysis, it is recommended to perform a complete cleaning cycle to remove residues of the analyzed lubricant.

- Place the suction and discharge lines inside the container with cleaning fluid (diesel or equivalent).
- From the Main Panel, start recirculation mode or Solo Flushing.
- Keep circulation for approximately **1-2 minutes**, or the time required until the fluid is observed to come out completely clean.
- Retract and disconnect the cleaning fluid lines and allow them to drain for a few seconds before storing the equipment.

This procedure prevents contamination between samples and reduces the formation of deposits in the internal hydraulic circuit.

7.2

Exterior Cleaning

- Clean the suitcase using a soft, slightly damp cloth.
- Do **not** use solvents, abrasives, or harsh chemicals on the casing or touch screen.
- Keep the connectors, ports, and protective covers clean.

7.3

Periodic Inspection

Before using the equipment, it is recommended to check:

- State of the suction and discharge lines.
- Integrity of the connectors.
- Battery charging level.
- State of the charger.
- Cleaning of the ports: Inlet and Outlet.
- Absence of leaks in the circuit.

If damage is detected, replace the component before continuing to use the equipment.

7.4

Storage

When the equipment will not be used for extended periods:

- Perform complete flushing with cleaning fluid.
- Empty the external lines completely.
- Clean the exterior of the suitcase.
- **Store the unit inside its protective case.**

- The battery should be kept at an approximate charge of between 40% and 70% if it remains stored for several weeks.
- Store the equipment in a dry, clean place, protected from direct sunlight.

7.5 Preventive Maintenance

It is recommended to have an annual preventive check-up by an authorized technical service, which should consider at least:

- Verification of the pump's operation.
- Inspection of the status of the lines and connections.
- Battery testing.
- Verification of the correct functioning of the sensors.
- Update of the firmware, if applicable.
- Revision system overview and functional testing.

8 Troubleshooting

Issue	Cause	Solution
The device will not turn on.	Battery not charged or faulty.	Charge the battery for at least 1 hour.
No Wi-Fi signal found	Poor Wi-Fi signal	Bring the device and router or make the network hotspot visible in the configuration.
There is no flow when turning the pump on	Non-primed pump	Force Lubricant intake by raising the suction line above the equipment level until flow is achieved.
Reports are not exported to PDF or Excel.	No Wi-Fi network	Check that the suitcase is connected to the network
QR scanning does not show the report	Device on another Wi-Fi network	Check that both the suitcase and the device are on the same Wi-Fi network.