

# twilight

INSTRUMENTOS DE MEDICIÓN INDUSTRIAL

**Monitor para aceite de Freir**

**AT-DOM24**

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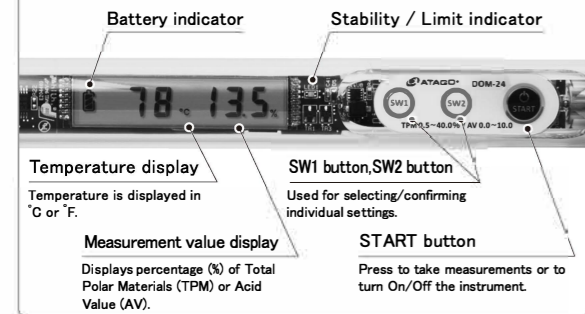
# Frying Oil Monitor

**DOM-24** Cat. No. 9341  
**DOM-24 Ti** Cat. No. 9344

9341-E081  
**ATAGO®**  
 Instruction Manual

## Names and Functions of Components

### < LCD and Control Panel >



### Battery compartment

Open the cover to insert or remove batteries.

Lanyard hole

### Stability / Limit indicator (LED)

A red or green light will appear when the measurement value exceeds the upper limit value, when measurement is complete, or when measurement errors arise. The LED that illuminates once a stable measurement is displayed will automatically turn off after 30 seconds.

### LCD

Measurement results, temperature, and remaining battery charge are displayed.

### Immersion line

Do not submerge the instrument above this line (do not submerge the LCD section in oil).

### Sensor cover

Protects the sensor. Remove the cover only when cleaning the unit.

### Sensor

Detects percentage (%) of Total Polar Materials (TPM) in oil.

## Contents

- ◆ Main unit...1
- ◆ Instruction Manual (this book)...1
- ◆ AAA batteries...2
- ◆ Inspection Certificate...1

ATAGO instruments are rigorously inspected to ensure each unit meets the highest standards of quality assurance.

## Introduction

Thank you for purchasing the instruments. Carefully read and follow all instructions. Keep this manual for future reference.

### Safety Instructions

Read and follow all safety instructions before operating the instrument. Failure to comply with the following instructions may result in personal injury or property damage.

### WARNING

- ◆ Take care to avoid burns. The sensor section (below the immersion line) may become extremely hot due to the oil sample. Do not touch the tip of the instrument after measuring.
- ◆ Ensure safety when handling hazardous materials. Observe precautionary measures and use protective equipment. Be aware of the hazards of such chemicals and emergency response guidelines.
- ◆ ATAGO may not be held liable for any injury or damage arising in connection with handling of hazardous materials during the use of the instrument.
- ◆ Do not drop the instrument or subject it to strong physical shock.
- ◆ Do not attempt to repair, modify, or disassemble the instrument.

### CAUTION

- ◆ Carefully read this manual to have basic knowledge of the function of each component.
- ◆ ATAGO is not liable for any loss and damage caused by the measurement and use of this instrument.
- ◆ Only use the specified battery type. Observe proper polarities, properly aligning the anodes and cathodes.
- ◆ Store the instrument away from direct sunlight/heat sources and excessive amounts of dust/debris.
- ◆ Do not subject the instrument to strong vibration.
- ◆ Do not subject the instrument to extreme cold temperature.
- ◆ Do not place the instrument under anything heavy.

## How to Insert the Batteries/How to Turn the Power On and Off

- 1 Turn the battery compartment cover as shown in the picture and remove the cover.



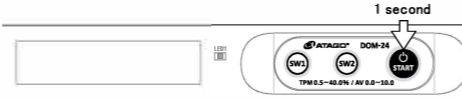
- 2 Insert the 2 AAA alkaline batteries with the positive (+) terminal ends first. Place the cover back onto the battery compartment and turn to secure the cover in place.



- ◆ Fasten the battery compartment cover tightly to prevent water ingress or poor connection, which will cause erroneous measurements. Push the cover in firmly and turn.
- ◆ When the O-ring on the cover is dirty or damaged, the water resistance may be compromised.
- ◆ When the battery icon indicates the low power level ( ), replace both batteries with a brand new set of AAA alkaline batteries (1.5V).
- ◆ Check the expiration dates on batteries before purchase.

### How to Turn the Power On

Press and hold the START button for 1 second. The scale that was last set will be displayed: "o i L t P" (TPM% scale) or "o i L R u" (AV% scale).



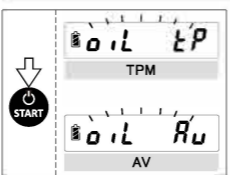
※The default factory setting is TPM%. Press the SW1 button to change the scale.

### How to Turn the Power Off

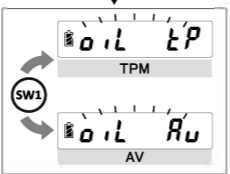
The instrument will power off automatically after 2 minutes of inactivity after a fixed measurement value is displayed. If you wish to manually turn the power off, press and hold the START button until the LCD turns off.



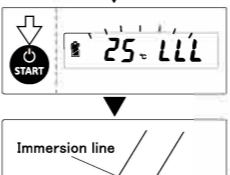
## Measurement Method



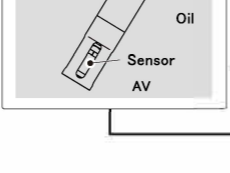
- 1 Press and hold the START button for approximately 1 second.



- 2 Press the SW1 button to change the scale.

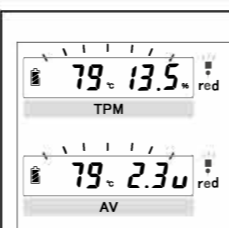


- 3 Press the START button. The instrument will begin taking measurements.

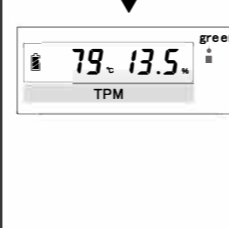


- 4 Insert the sensor into the oil, and stir the oil.

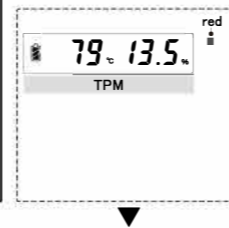
※Do not submerge the instrument above the immersion line (do not submerge the LCD section in oil). Be sure the sensor is completely submerged in the oil.



- 5 The temperature and the measurement value (TPM% or AV) will flash on the LCD. ※AV will be indicated by a "u" to the right of the value.

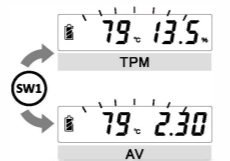


- 6 Measurement results (temperature and measurement value) will be displayed once stability is reached. The flashing values on the display will become fixed, and the LED located at the upper right corner of the LCD will turn green. This indicates that the measurement values have stabilized.



- 7 Press the START button to continue taking additional measurements.

### How to Switch Scales (TPM % ↔ AV)



- (1) After taking a measurement, perform the following steps to switch scales while the temperature and measurement values (TPM% or AV) are displayed.
- (2) Press the SW1 button.
- (3) If TPM% is currently shown, the display will switch to AV. If AV is currently displayed, it will switch to TPM%.
- (4) Repeat the steps to return to the original scale.

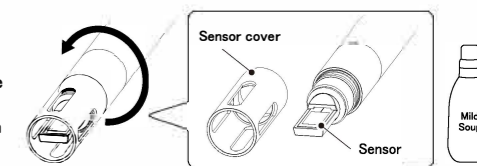
### Caution

- Do not submerge the instrument past the immersion line.
- Complete each measurement within 1 minute.
- Do not keep the instrument submerged in the oil after each measurement.
- An increase in the internal temperature of the instrument may result in measurement errors.
- Accurate measurement results cannot be obtained if bubbles are present in the oil sample. Wait for bubbles to dissipate (minimum 1 minute) before taking measurements.
- When food particles are present on the sensor section, submerge the instrument to the immersion line. Stir to remove the particles before taking a measurement.
- Take care to avoid burns. The sensor section (below the immersion line) may become extremely hot due to the oil sample. Do not touch the tip of the instrument after measuring.

## Cleaning

### Cleaning the sensor

After taking measurements, wait until the instrument has thoroughly cooled off before washing. Remove the sensor cover (turn it according to the picture) and gently wash the surface of the sensor with mild soap and a soft sponge, then rinse with water. Wipe off the water with a clean cloth and dry the sensor thoroughly. Clean the sensor cover and the tip of the instrument in the same way as the sensor.



- Take care to avoid burns. The sensor section (below the immersion line) may become extremely hot due to the oil sample. Do not touch the tip of the instrument after measuring.

## Scales

This unit measures and displays Total Polar Materials (TPM) or Acid Value (AV) %.

### (1) Total Polar Materials (TPM) %

Displays the amount of substances that are produced by the deterioration of cooking oil. It is primarily used in Europe as an indicator of cooking oil freshness and quality. In order to accurately and precisely measure Total Polar Materials (TPM) %, it is necessary to use the column chromatography method for measurement, as based on the findings from The JOCS (Japan Oils Chemists' Society) "Standard Methods for the Analysis of Fats, Oils and Related Materials" research report. The column chromatography method requires 1 entire day for measurement. It cannot be conducted without the proper reagents, equipment, and facilities necessary for analysis.

The instrument measures the dielectric constant (permittivity) properties within heated cooking oil and fats and converts them into Total Polar Materials (TPM) %. This allows for quick measurements. The instrument was developed and manufactured through rigorous performance testing, with the aim of establishing a standard unit that produced the measurement values of oils and fats comparable to the amounts of Total Polar Materials obtained through research and analysis facilities.

※If you would like case studies for measurement values of oils and fats obtained with the instrument, please feel free to contact ATAGO for more information.

### (2) Acid Value (AV)

Acid value is one type of numerical value used as an indicator to quantify the deterioration of cooking oil. It is commonly used in Japan.

This instrument detects the capacitance of the substances within cooking oil and displays it as acid value (AV). However, the correlation between capacitance and acid value (AV) will somewhat differ, depending on the type of cooking oil and frying method.

This instrument's acid value (AV) scale is based on the average correlation between capacitance and acid value (AV). If you wish to use the acid value (AV) as a general estimate, or as a quantitative way (with a numerical value) of managing the state of cooking oil deterioration (acid value (AV) will increase as cooking oil continues to deteriorate), the instrument's scale can be used as is (proceed to the "Measurement Method" section).

However, if you wish to match the acid value (AV) with an official method of analysis, or if you would like to obtain precise and accurate measurement values, create your own customized user scale (proceed to the Settings Menu ③ "Acid value (AV) scale setting").

## Error Messages

The following messages alert the user when an operation has failed.

Measurement temperature is 226°C or higher.	Measurement temperature is -1°C or lower.
Measurement value (TPM%) is 40.5% or more. Measurement value (AV) is 10.0 or more.	Measurement value (TPM%) is 0.0 or less. Measurement value (AV) is -0.6 or less.
Measurement value significantly fluctuates.	Measurement value (TPM%) exceeds the set upper limit value. Measurement value (AV) exceeds the set "USH" value at "Acid Value (AV) scale setting".
The battery is low. The unit will power off after 10 seconds.	

## Settings Menu

### How to access the settings menu

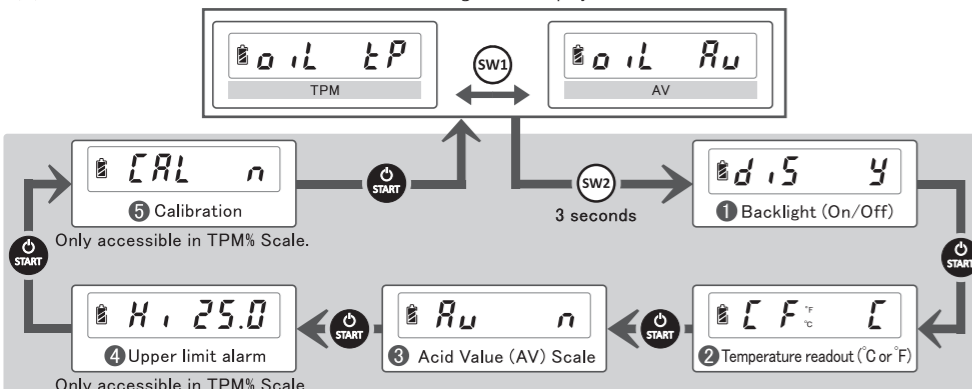
Individual settings can be selected through the settings menu. The settings menu can be accessed either in TPM% or acid value (AV) scale. Only ① Backlight (On/Off), ② Temperature readout (C or F) and ③ How to Set the Acid Value (AV) Scale can be set in AV scale.

(1) Press the START button for 1 second. The instrument will power on and "o i L t P" (TPM%) or "o i L R u" (AV) will be displayed.

To set to a scale other than what is displayed, press the SW1 button to change the scale.

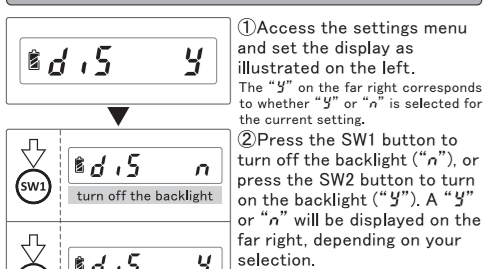
(2) Press and hold the SW2 button for 3 seconds.

(3) Press the START button to move to the next settings menu display.

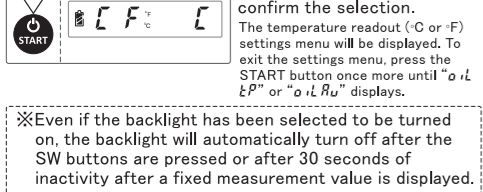


### Settings Menu: Individual Settings

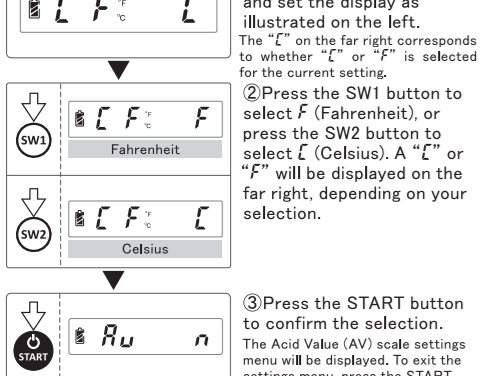
#### 1 How to Turn the LCD Backlight On/Off



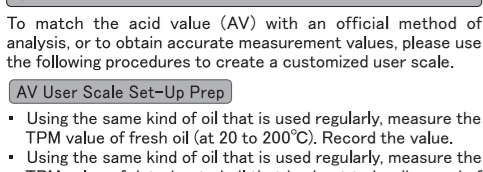
#### 2 How to Select the Temperature Readout



#### 3 How to Set the Acid Value (AV) Scale



#### 4 How to Set the Upper Limit Alarm

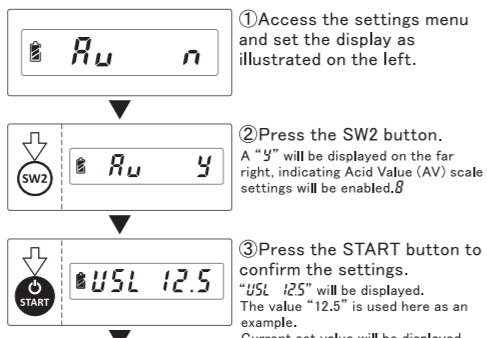


To match the acid value (AV) with an official method of analysis, or to obtain accurate measurement values, please use the following procedures to create a customized user scale.

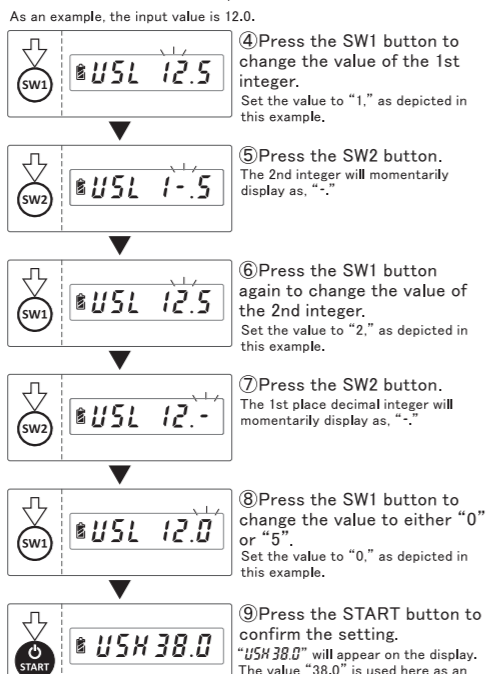
- Using the same kind of oil that is used regularly, measure the TPM value of fresh oil (at 20 to 200°C). Record the value.
- Using the same kind of oil that is used regularly, measure the TPM value of deteriorated oil that is about to be disposed of (at 20 to 200°C). Record the value.
- The acid value (AV) of the deteriorated cooking oil.

The acid value (AV) of the deteriorated cooking oil can be determined by various means, such as through a third-party lab, titration, test strips or reagents. If you are unable to determine the acid value (AV), please contact ATAGO.

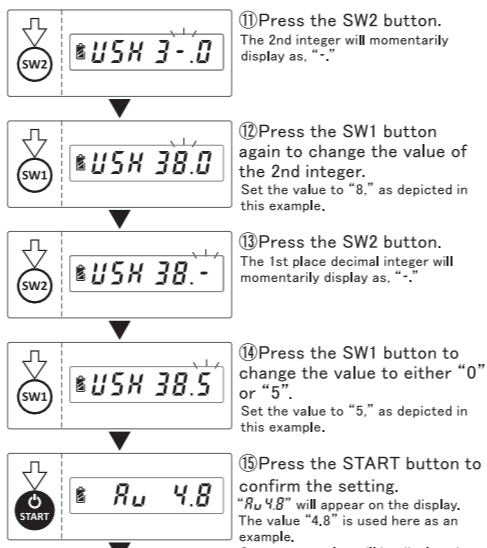
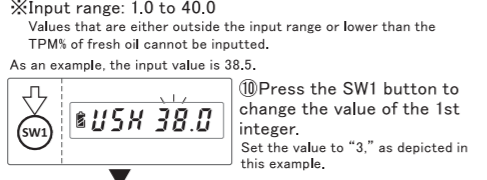
※Please refer to ① to ⑤ below for information on each individual setting.



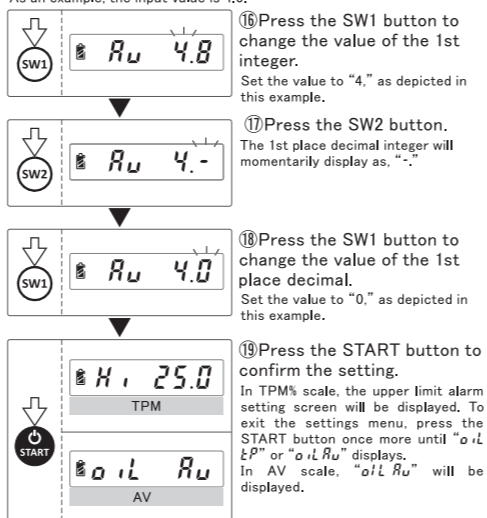
Input the total polar materials (TPM) % value of the new oil. ※The default factory setting is 6.0. ※Input range: 0.5 to 39.5. Values that are either outside the input range or higher than those of deteriorated oil cannot be inputted. As an example, the input value is 12.0.



Input the total polar materials (TPM) % value of deteriorated oil. ※The default factory setting is 38.0. ※Input range: 1.0 to 40.0. Values that are either outside the input range or lower than the TPM% of fresh oil cannot be inputted. As an example, the input value is 38.5.

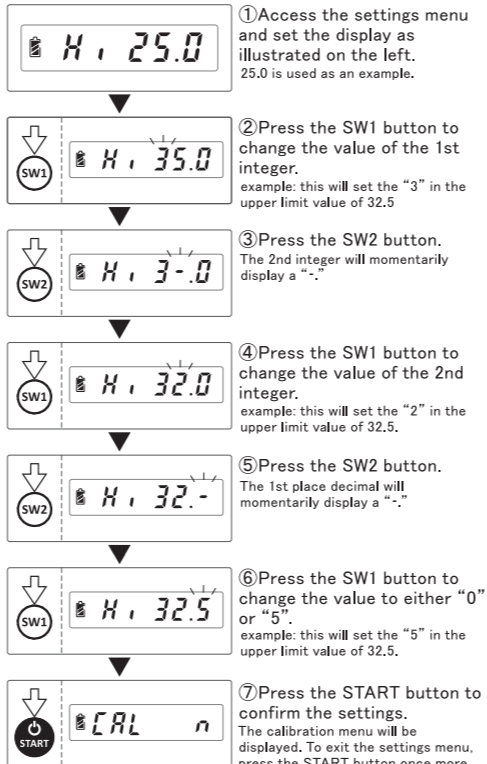


Input the acid value (AV) of deteriorated oil. ※The default factory setting is 4.8. ※Input range: 0.1 to 9.9. Values that are outside the input range cannot be inputted. As an example, the input value is 4.0.



#### 4 How to Set the Upper Limit Alarm

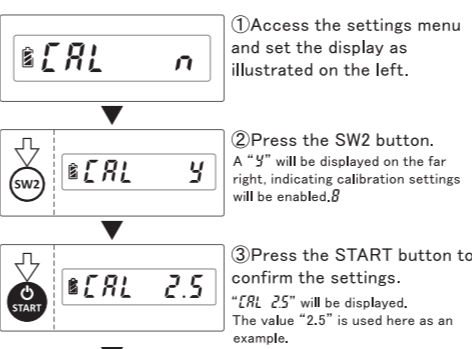
An upper limit alarm can be set to notify if a measurement value of Total Polar Materials (TPM) % exceeds the permissible upper limit (an oil sample can be considered degraded if the measurement value exceeds the permissible upper limit). The setting procedure is illustrated below. The default factory setting is 25.0%.



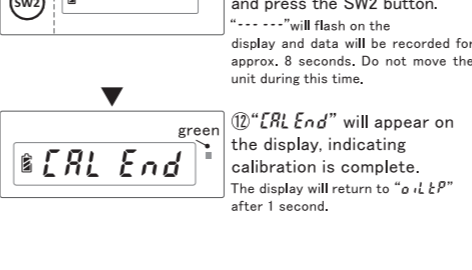
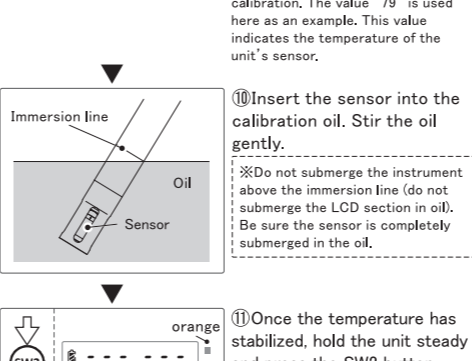
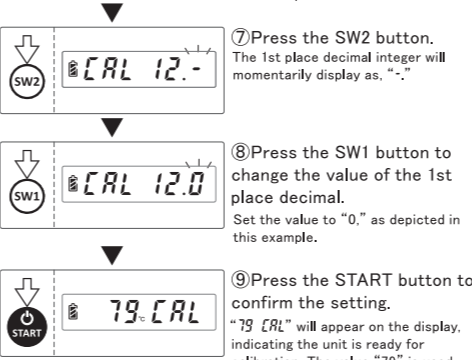
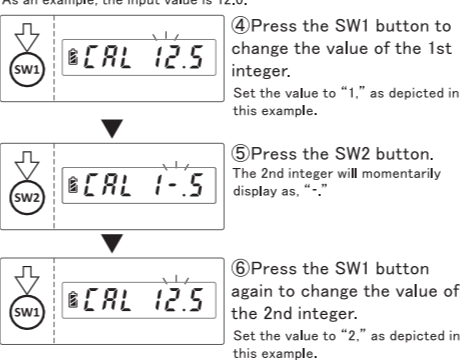
## 5 Calibration Method

Should any doubts regarding the accuracy of the measurement values (TPM) % arise, follow the calibration procedures illustrated below. Note: Be sure to measure and record the Total Polar Materials (TPM) % and the measurement temperature of the fresh oil you use on a daily basis. These optimum values will be used for calibration.

Be sure to heat up fresh oil that will be used for calibration before performing calibration procedures. Heat the oil up to the same optimal temperature as previously recorded.



Set The Total Polar Materials (TPM) % value of the fresh oil used for calibration by following the steps below. As an example, the input value is 12.0.



## Storage and Maintenance

- Clean the sensor before storing the instrument (please refer to the "Cleaning" section of this instruction manual).
- Store the instrument in a dry place away from direct sunlight.
- Store the instrument in an area with a stable temperature (between 10 to 40°C).
- Do not use organic solvents (paint thinner, benzene, gasoline, etc.) on the plastic LCD or control panel.

## Repair and Warranty

The instrument is warranted for one year from the date of purchase. This warranty is void if the instrument shows evidence of the following. Send the included batteries as well if they are still in use.

- Having been disassembled by unauthorized personnel
- Damages to the sensor
- Water damage or having been dropped
- Having been misused and/or operated outside the environmental specifications
- Leakage from batteries other than those included with the unit

Repair services are available for a fee after the warranty expires. Contact an ATAGO authorized service center for service and support.

Please have the serial number information ready when contacting a service center.

## Specifications

Measurement range	Total Polar Materials (TPM) : 0.5 to 40.0% Acid Value (AV) : 0.00 to 9.99 Temperature : 0 to 225°C/32 to 437°F	Power supply	Size AAA alkaline battery × 2
Resolution	Total Polar Materials (TPM) : 0.5% Acid Value (AV) : 0.01 Temperature : 1°C/1°F	International Protection class	IP67
Accuracy	Total Polar Materials (TPM) : ±2.0% (20 to 200°C) Acid Value (AV) : Approx. ±0.2 (Varies with user's scale setting.) Temperature : ±1°C/±2°F	Material (Main unit)	DOM-24 SUS316L DOM-24 Ti titanium *Battery compartment SUS303 Sensor cover SUS316L
Automatic temperature compensation range	0 to 225°C (Accuracy guaranteed from 20 to 200°C) 32 to 437°F (Accuracy guaranteed from 68 to 392°F)	Dimensions	φ 22mm × 490mm
		Weight	DOM-24 400g(Main unit only) DOM-24 Ti 291g(Main unit only)

The product is in conformity with the requirements of the EMC Directive 2004/108/EC.

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