Oil Content Analyzer
OCMA-550

Instruction Manual

CODE:GZ0000331789E

Preface

This manual describes the operation of the Oil Content Analyzer, OCMA-550.
Be sure to read this manual before using the product to ensure proper and safe operation of the product. Also safely store the manual so it is readily available whenever necessary.

Product specifications and appearance, as well as the contents of this manual are subject to change without notice.

Warranty and responsibility

HORIBA Advanced Techno Co., Ltd. warrants that the Product shall be free from defects in material and workmanship and agrees to repair or replace free of charge, at option of HORIBA Advanced Techno Co., Ltd., any malfunctioned or damaged Product attributable to responsibility of HORIBA Advanced Techno Co., Ltd. for a period of one (1) year from the delivery unless otherwise agreed with a written agreement. In any one of the following cases, none of the warranties set forth herein shall be extended;

- Any malfunction or damage attributable to improper operation
- Any malfunction attributable to repair or modification by any person not authorized by HORIBA Advanced Techno Co., Ltd.
- Any malfunction or damage attributable to the use in an environment not specified in this manual
- Any malfunction or damage attributable to violation of the instructions in this manual or operations in the manner not specified in this manual
- Any malfunction or damage attributable to any cause or causes beyond the reasonable control of HORIBA Advanced Techno Co., Ltd. such as natural disasters
- Any deterioration in appearance attributable to corrosion, rust, and so on
- Replacement of consumables

HORIBA Advanced Techno Co., Ltd. SHALL NOT BE LIABLE FOR ANY DAMAGES RESULTING FROM ANY MALFUNCTIONS OF THE PRODUCT, ANY ERASURE OF DATA, OR ANY OTHER USES OF THE PRODUCT.

Trademarks

Company names and brand names are either registered trademarks or trademarks of the respective companies. (R), (TM) symbols may be omitted in this manual.

Regulations

Conformable Directive

This equipment conforms to the following directives and standards:

CE

EMC: EN 61326-1
Class B, Basic electromagnetic environment
Safety: EN 61010-1
RoHS: EN IEC 63000
9. Monitoring and control instruments including industrial monitoring and control instruments

Warning: This product is not intended for use in industrial environments. In an industrial environment, electromagnetic environmental effects may cause the incorrect performance of the product in which case the user may be required to take adequate measures.

Installation environment

This product is designed for the following environment.

- Overvoltage Category II
- Pollution degree 2

Information on disposal of electrical and electronic equipment and disposal of batteries and accumulators

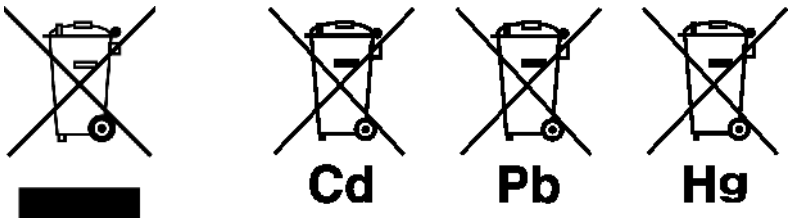
The crossed out wheeled bin symbol with underbar shown on the product or accompanying documents indicates the product requires appropriate treatment, collection and recycle for waste electrical and electronic equipment (WEEE) under the Directive 2012/19/EU, and/or waste batteries and accumulators under the Directive 2006/66/EC in the European Union.

The symbol might be put with one of the chemical symbols below. In this case, it satisfies the requirements of the Directive 2006/66/EC for the object chemical.

This product should not be disposed of as unsorted household waste.

Your correct disposal of WEEE, waste batteries and accumulators will contribute to reducing wasteful consumption of natural resources, and protecting human health and the environment from potential negative effects caused by hazardous substance in products.

Contact your supplier for information on applicable disposal methods.



FCC rules

Any changes or modifications not expressly approved by the party responsible for compliance shall void the user's authority to operate the equipment.

■ Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Korea certification

■ B급 기기 (가정용 방송통신기자재)

이 기기는 가정용(B 급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

For Your Safety

Hazard classification and warning symbols

Warning messages are described in the following manner. Read the messages and follow the instructions carefully.

● Hazard classification

⚠DANGER	This indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This is to be limited to the most extreme situations.
⚠WARNING	This indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	This indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

● Warning symbols

Description of what should be done, or what should be followed

Description of what should never be done, or what is prohibited

Safety precautions

This section provides precautions for using the product safely and correctly and to prevent injury and damage. The terms of DANGER, WARNING, and CAUTION indicate the degree of imminency and hazardous situation. Read the precautions carefully as it contains important safety messages.

⚠ WARNING
Electric shock To prevent electric shock, ground the product. Do not ground the product to dangerous places such as a gas pipe.
Samples may be dangerous substances. Fully understand the properties of the samples to be measured, and handle them appropriately.
Fire • For your safety, make sure to unplug the power plug from the electrical outlet when not in use. • Clear dust on the power plug periodically (a few times a year). If the power supply cord is left plugging into the electrical outlet for a long period of time, electrical tracking may occur due to dust and moisture, and it may result in an ignition or a fire.
Fire or electric shock • Do not bundle the power supply cord during use. • Do not damage, bend, or stretch the power supply cord forcibly. • If it cannot be plugged into an electrical outlet firmly, stop use of the power supply cord. If may result in overheating, fire, or an electrical shock.
Be sure not to disassemble or modify the product, except as instructed in this manual. It may cause electric shock or product failure.

⚠ CAUTION
Chemical hazard (solvent S-316) Inhalation or accidental ingestion of a large amount of solvent S-316 may be harmful. Observe the following rules when handling: • Ventilate the work area sufficiently. • Wear a protective mask and protective gloves. • Wash hands well after handling the solvent.
Chemical hazard (hydrochloric acid) Hydrochloric acid is toxic by skin or eye exposure. If it touches the skin, immediately rinse with water. If it reaches the eyes, rinse immediately under a large amount of running water and get medical attention.
Make sure that the liquid volume to be poured into the measurement cell is below a specified liquid volume (approx. 6.5 mL). If a liquid volume is poured beyond a specified liquid volume, the liquid may leak out, thus causing the circuits and wiring in the product to short-circuit. If liquid containing hydrochloric acid leaks and comes in contact with the skin, irritation and burning may occur.
Take care not to pinch your fingers when opening or closing the right cover. During closing the right cover, do not release your hand until you hear a click sound.

CAUTION
Avoid any impact on the product. If the product is damaged and liquid leaks, the internal wiring may short-circuit. If liquid containing hydrochloric acid leaks and comes in contact with the skin, irritation and burning may occur.

Product Handling Information

Operational precautions

Use of the product in a manner not specified by the manufacturer may impair the protection provided by the product. And it may also reduce product performance.
Observe the cautions below.

- This product is specified for use with solvent S-316. Do not use any other solvent than S-316 to perform extraction and measurement. It may cause product failure.
- Samples containing emulsifying substances (surface-active substances) cannot be measured.
- Samples containing acetone or toluene cannot be measured. These samples may damage the product.
- Samples containing impurities and samples with high viscosity should be filtered, diluted, or otherwise preprocessed appropriately before measurement.
- Take care to avoid spilling samples or solvents on the main unit. It may cause product failure.
- Avoid operating and storing the product under the following locations and conditions:
  - Humidity above 80%.
  - Temperature less than 0°C or over 40°C
  - Locations subject to sudden temperature changes
  - Direct exposure to sunlight
  - Presence of corrosive gases
  - Dusty locations
  - Poor ventilation
  - Locations subject to vibration
  - Close proximity to large electric motors or voltage transformers
- When handling liquids during measurement, calibration, or otherwise, remove the USB memory stick from the USB memory port and cap the port. If a liquid spills on a USB memory stick or the USB memory port, the liquid may enter the interior of the product from the USB memory port and cause product damage.
- Do not overturn the main unit. It may cause liquid to leak from the unit inside.
- Do not press the keys or the screen with a sharp or hard object.
- Do not block the fan vent on the back of the main unit.
- Before performing maintenance or inspection, read and understand the chapter "Maintenance" (page 80) in this manual.
- Wipe with water when cleaning the exterior of the product, never use the organic solvent.
- Make sure that the power supply voltage is correct for the product before switching the power ON.
- When the product will not be used for an extended period of time, remove the plug from the power outlet.
- Do not use the provided power cable for other than this product.
- If an abnormality occurs, disconnect the power supply cable from the power inlet. Also install the product with the power supply cable easily plugged off.

Solvent handling precautions

- It is recommended that new solvent from the same production lot is used for calibration liquid preparation, zero calibration, span calibration, and measurement. Solvents from different production lots may have different mix ratios. If it is necessary to use solvents from different production lots or reprocessed solvent, all mix the volumes to be used to use in a glass container, in order to equalize all mix ratios.
- Do not store solvent S-316 in a plastic container. Plastic components may dissolve into solvent S-316.
- There are Safety Data Sheets (SDS). Contact your dealer.

Disposal of the product

When disposing of the product, follow the related laws and/or regulations of your country.

Manual Information

Description in this manual

Note

This interprets the necessary points for correct operation and notifies the important points for handling the product.

Reference

This indicates the part where to refer for information.

Tip

This indicates reference information.

Original language

This is the English translation of an original Japanese document.

Contents

Figures

Tables

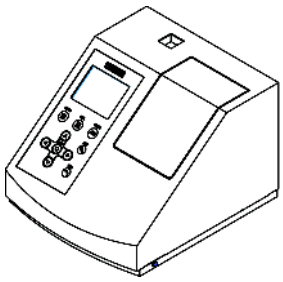
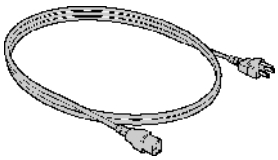
Product Outline

Overview

OCMA-550 is a compact oil content analyzer using the solvent S-316. The solvent extracts the oil content from a sample, binds it and is being measured by the infrared detector.
A concentration of the oil, which is solved into a solvent inside the measurement cell, can be measured only by setting up the measurement cell.
OCMA-550 conforms to ASTM D7066-4.

Accessories

The package contains the main unit and accessories indicated below. Make sure that none of the items are missing or damaged.

Name	Remarks	Quantity	Image
Main unit	OCMA-550	1	
Dropper	Polyethylene, 2.5 mL	1	
B-heavy oil	10 mL	1	
Measurement cell	Quarts (20 mm)	1	
Cell cap	For measurement cell	1	
Power cable	-	1	
Manual	This manual	1	

Part names

Exterior

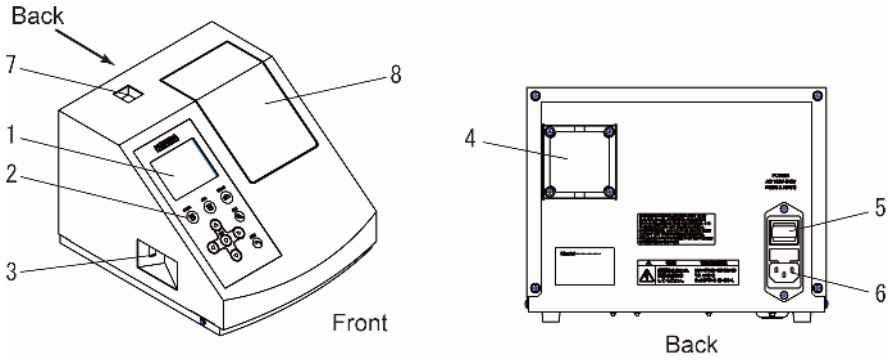


Fig. 1 Exterior

No.	Name	Description
1	LCD	This displays hold measurement results and items necessary for various operations.
2	Operation buttons	Buttons for performing a variety of operations
3	USB memory port	A USB memory stick can be inserted into this port.
4	Fan	A fan for internal temperature adjustment is located inside this vent.
5	Power switch	Switches the power of this product ON and OFF.
6	Power cable connector	Connects the provided power cable.
7	Measurement cell tray	A measurement cell can be placed here.
8	Measurement cover	Cover of measurement part.

Note

Some USB memory stick may not work with the OCMA.
Use a FAT/FAT32 formatted USB memory stick. Other formats may not be available with this product.
Even FAT/FAT32 formatted, some USB memory sticks may not work. In this case, try other type.
If you need the USB memory stick manufactured and verified by HORIBA Advanced Techno, contact your local dealer.

Measurement part

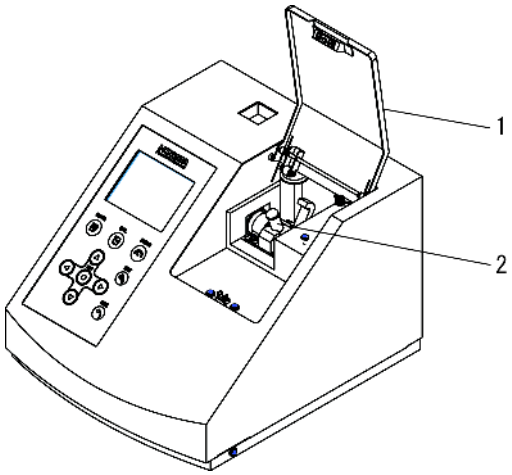


Fig. 2 Measurement part

No.	Name	Description
1	Measurement cover	Open this cover when the measurement cell is set up.
2	Measurement cell	Pour a measurement solvent into this cell.

Note

- **Always keep the measurement cover closed during hold measurement. Stable hold measurement cannot be performed when the measurement cover is open.**
- **Do not dispense the sample into the measurement cell with the measurement cell set to the measurement cell tray or measurement part. If liquid leaks, the main unit may be damaged.**

Operation buttons

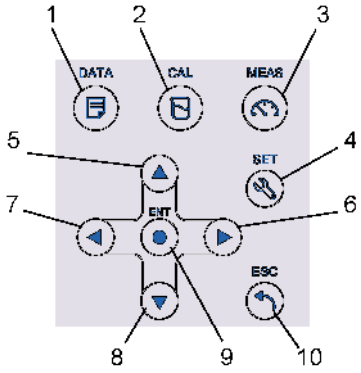


Fig. 3 Operation buttons

No.	Name	Image	Description
1	DATA button		Press this button to open the Data Top screen (refer to "Data Top screen" (page 49)).
2	CAL button		Press this button with the Hold Measurement Top screen appearing to move to the zero calibration mode or span calibration mode setting (refer to "Calibration" (page 20)).
3	MEAS button		Press this button to move to the hold measurement mode (refer to "Hold measurement" (page 40))
4	SET button		Press this button to move to the Setting Top screen (refer to "Setting Top screen" (page 64)).
5	Up button		Press this button to change selections. The item above the currently selected item will be selected.
6	Right button		Press this button to change selections. The item to the right of the currently selected item will be selected. If there is the next page, the next page will be displayed.
7	Left button		Press this button to change selections. The item to the left of the currently selected item will be selected. If there is the previous page, the previous page will be displayed.
8	Down button		Press this button to change selections. The item below the currently selected item will be selected.
9	ENT button		Press this button to enter the current selection or value, or move to the next action.
10	ESC button		Press this button to undo the last action and return to the previous process. When pressed during hold measurement, hold measurement stops or is paused.

LCD

Tip

The LCD backlight will be turned OFF automatically when the period of the set [B-Light Off Time] has passed after the last button operation (refer to "B-Light Off Time" (page 78)). Any button operations turn ON the light again.

Hold Measurement/Calibration screen example

This screen appears when hold measurement or calibration is performed.

Reference

- **"Calibration" (page 20)**
- **"Hold measurement" (page 40)**

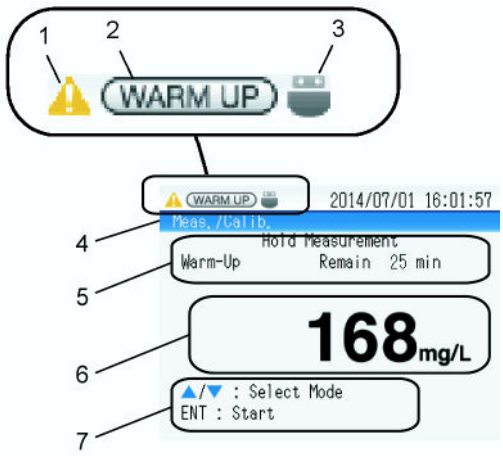


Fig. 4 Hold Measurement/Calibration screen example

No.	Name	Description
1	Alarm icon	Blinks when an abnormal condition occurs during measurement (refer to "Alarm displays and actions" (page 84)). Yellow: Caution alert Red: Warning alarm
2	Warm-up icon	Blinks for 25 minutes after the power is turned ON.
3	USB icon	Lights up while a USB memory stick is inserted.
4	Screen title	Indicates the name of the screen.
5	Process display	Shows the hold measurement or calibration process.
6	Measured value display	Shows the measured value.
7	Operation guide display	Shows the button operations to move to the next action.

Example of item selection screen

This screen appears for the operations of data management or setting.

Reference

- **"Data Top screen" (page 49)**
- **"Setting Top screen" (page 64)**

Fig. 5 Example of item selection screen

Example of pop-up screen

The pop-up screen below appears for changing operation settings.

Selection list display

This appears when a setting item of selection type is selected.

Reference

- **"Selection list display" (page 12)**
- **"Setting" (page 64)**

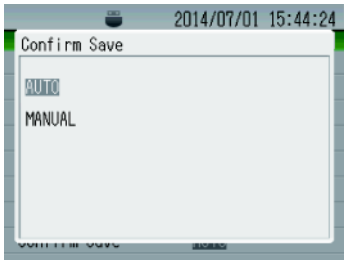


Fig. 6 Pop-up screen example (selection list)

● Numeric keys

These appear when a setting item of numerical type is selected.

Reference

- **"Numeric keys" (page 13)**
- **"Setting" (page 64)**

Fig. 7 Pop-up screen example (numeric keys)

● Character keys

If [Save Memo] is set to "ON" in the hold measurement settings, these appear when measured values are saved.

Reference

- **"Character keys" (page 14)**
- **"Save Memo" (page 73)**

Fig. 8 Input screen example (character keys)

Basic Operation

Power ON

WARNING

Electric shock
To prevent electric shock, ground the product.
Do not ground the product to dangerous places such as a gas pipe.

1. **Insert the provided power cable into the power cable connector on the back of the main unit.**

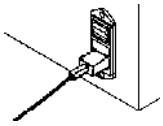


Fig. 9 Power cable connection

2. **Turn ON the power, using the switch on the back of the main unit.**
   The unit powers ON and the initial screen appears on the display followed by the Hold Measurement Top screen. The warm-up icon blinks for 25 minutes.

Fig. 10 Initial screen

Tip

The model, program number, and version that are shown on the initial screen vary by product.

Fig. 11 Hold Measurement Top screen

Note

The main unit is not stable while the warm-up icon blinks.
Although measurement is possible while the warm-up icon blinks, the alarm icon will blink after measurement is finished and an invalid data error will occur (refer to "Current Alarm screen" (page 50) and "Alarm displays and actions" (page 84)).

3. **Refer to "System Setting screen" (page 77) to set the date and time.**

Warm up

For correct measurement, be sure to wait until the warm-up icon turns OFF before starting calibration or measurement.
For high-precision measurement, warm up the analyzer at least an hour before calibration or measurement.
For measurement at 0°C to 10°C, wait a further 10 minutes after the warm-up icon turns OFF.

Power OFF

1. **Turn OFF the power switch.**
2. **Place the cap on the sample inlet.**
3. **Remove the power cable plug from the power outlet.**
4. **Dispose of the drainage liquid.**

Reference

"Solvent S-316" (page 91)

Operations while the sequence is in progress

When an error occurs

When a light source error or unstable data alarm occurs, hold measurement stops, the Hold Measurement Top screen returns, and the alarm icon blinks.

Reference

"Alarm displays and actions" (page 84)

Connecting a USB memory stick

This section explains how to connect a USB memory stick to the product.
When a USB memory stick is connected, the following operations can be performed.

- Saving the hold measurement history to a USB memory stick
- Saving the calibration history to a USB memory stick
- Saving the settings of the main unit to a USB memory stick

Note

- **Some USB memory stick may not work with the OCMA.**
  Use a FAT/FAT32 formatted USB memory stick. Other formats may not be available with this product.
  Even FAT/FAT32 formatted, some USB memory sticks may not work. In this case, try other type.
  If you need the USB memory stick manufactured and verified by HORIBA Advanced Techno, contact your local dealer.
- **Do not lose the cap for the USB memory port.**
- **When handling liquids during hold measurement, calibration, or other actions, remove the USB memory stick from the USB memory port and cap the port. If liquid spills on a USB memory stick or the USB memory port, the liquid may enter the interior of the product from the USB memory port and causes product damage.**
- **If any of the operations are attempted without inserting a USB memory stick into the USB memory port or state in which there is no capacity in the USB memory, a message of "Process has failed" will appear.**
- **For details on each operations, refer to "USB Memory screen" (page 53).**

1. **Remove the cap from the USB memory port on the left side of the product.**
2. **Insert the USB memory stick into the USB memory port.**

Fig. 12 Inserting a USB memory stick

The USB icon lights up on the screen.

Fig. 13 USB icon

Using pop-up screens

A pop-up screen for selection or entry will appear when it is necessary for you to select an item or enter a number or characters and when configuring settings or performing other operations. If [Save Memo] is set to "ON" in the measurement settings, a pop-up screen will appear for entering the data name, before measured values being saved.
The procedures for using the pop-up screens are explained below.

Selection list display

This screen is used to configure settings. Values that can be selected are shown in a list.

Reference

"Setting" (page 64)

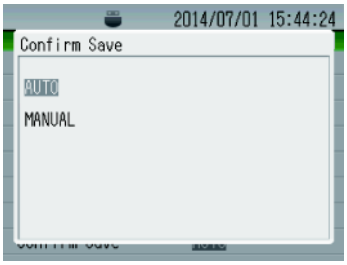


Fig. 14 Example of selection list pop-up screen

The buttons and button functions, which can be used with a selection list, are described in the table below.

Table 1 Operable buttons with a selection list pop-up screen

Button		Function
ENT button		Applies the currently selected setting and closes the screen.
Up button		Selects the next item up.
Down button		Selects the next item down.
ESC button		Cancels changes and closes the screen.

Follow the steps below to change a setting.

1. **Press the up or down button to select the desired item.**
2. **Press the ENT button.**
   The selected value is applied.

Numeric keys

This screen is used to configure settings. Numeric keys and an input box appear.

Reference

"Setting" (page 64)

Fig. 15 Example of numeric key pop-up screen

The buttons and button functions, which can be used while a numeric key pop-up screen is shown, are described in the table below.

Table 2 Operable buttons with a numeric key pop-up screen

Button		Function
ENT button		Applies the currently entered value and closes the screen.
Up button		Selects the next key up.
Down button		Selects the next key down.
Left button		Selects the next key to the left.
Right button		Selects the next key to the right.
ESC button		Cancels changes and closes the screen.

Follow the steps below to change a setting.

1. **Press the up/down/left/right button to select a numeric key.**
   The selected key is shown in red.
2. **Press the ENT button.**
   The selected value appears in the input box.
3. **Repeat steps 1. to 2. to enter the desired numeric value in the input box.**
4. **Press the up/down/left/right button to select the [ENT] key, and press the ENT button.**
   The entered value, which appears in the input box, is applied.

Character keys

This screen is used to enter names of memo data such as measurement conditions.
If [Save Memo] is set to "ON" in the hold measurement settings, this screen appears immediately before measured values are saved.

Reference

"Save Memo" (page 73)

Fig. 16 Example of character key pop-up screen

The buttons and button functions, which can be used while a character key pop-up screen is shown, are described in the table below.

Table 3 Operable buttons with a character key pop-up screen

Button		Function
ENT button		Applies the currently entered value and closes the screen.
Up button		Selects the next key up.
Down button		Selects the next key down.
Left button		Selects the next key to the left.
Right button		Selects the next key to the right.
ESC button		Cancels changes and closes the screen.

Follow the steps below to change a setting.

1. **Press the up/down/left/right button to select a character key.**
   The selected key is shown in red.
2. **Press the ENT button.**
   The selected character appears in the input box.
3. **Repeat steps 1. to 2. to enter the desired characters in the input box.**
4. **Press the up/down/left/right button to select the [ENT] key, and press the ENT button.**
   The characters that appear in the input box are applied.

Preparation

Measurement preparation cautions

⚠ CAUTION
Chemical hazard (solvent S-316) Inhalation or accidental ingestion of a large amount of solvent S-316 may be harmful. Observe the following rules when handling: • Ventilate the work area sufficiently. • Wear a protective mask and protective gloves. • Wash hands well after handling the solvent.
Chemical hazard (hydrochloric acid) Hydrochloric acid is toxic by skin or eye exposure. If it touches the skin, immediately rinse with water. If it reaches the eyes, rinse immediately under a large amount of running water and get medical attention.

To obtain correct measurement results, it is important to eliminate factors affecting measured values and to keep calibration and measurement conditions as even as possible. Observe the precautions below.

- Be sure to wash your hands before starting work. If oil from your fingers gets on the measurement cell on the product, the measuring utensils, or other parts, the measured value will be affected and correct measurement will be impossible.
- When measuring sample or reagent quantities, use suitable measuring utensils and measure accurately. When using a microsyringe or measuring syringe, take care that foam and bubbles are not drawn into the syringe. Foam and bubbles will increase measurement error.
- To prevent changes due to evaporation, store prepared calibration liquid in a clean glass container with a lid (a screw-top bottle is recommended) in a cool dark place.

In addition, read "Operational precautions" and "Solvent handling precautions" in this manual.

Preparation fixings

■ Items required

- Solvent S-316 (optional)
- Zero liquid for calibration (refer to "Zero liquid for calibration" (page 16))
- Span liquid for calibration (refer to "Span liquid for calibration" (page 16))
- Hydrochloric acid (in case of measuring oil in water, refer to "Hydrochloric acid" (page 18))
- Measurement cell
- Cell cap

■ Cleaning the measuring syringe

Clean the measuring cylinders with pure solvent S-316.

Zero liquid for calibration

Prepare pure solvent S-316, the same as for measurement.

Span liquid for calibration

Use pure solvent S-316, the same as for measurement, to prepare the span liquid for calibration.

■ Using B-heavy oil

Use B-heavy oil (specific gravity 0.895 at 20°C). If you know the oil type to be measured, you can also use that oil type for the calibration oil.

● Items required

- Scale
- Glass container with a lid (screw-top bottle is recommended)
- Measuring flask
- Solvent S-316 (optional)
- B-heavy oil (specific gravity 0.895 at 20°C) or calibration oil (when the oil type to be measured is known)

Note

- **Clean the glass utensils to be used with pure solvent S-316, and let them air dry completely. If the utensils cannot be dried completely, purge them 3 or 4 times using solvent S-316.**
- **It is difficult to measure B-heavy oil with a microsyringe because it has a high viscosity. Use a suitably sized glass container with a lid (a screw-top bottle is recommended) for measurement.**

Preparation method

Prepare the liquid with a concentration of about twice of the measured value of the sample.

Tip

You can change the calibration value to be input as appropriate for the volume that is actually measured.

1. **Use a scale to accurately measure the B-heavy oil in a glass container (with a lid) of suitable size.**
2. **Transfer the B-heavy oil from the glass container to the measuring flask, while cleaning with S-316.**
3. **Fill the measuring flask to the graduation with solvent S-316.**
4. **Insert the stopper into the measuring flask and mix the contents well.**

Table 4 Example of span liquid preparation

Concentration of span liquid (mg/L)	Measuring flask volume (mL)	B-heavy oil quantity (mg)
200	250	50
50	100	5
20	250	5

Hydrochloric acid

When an acid is added to a water sample containing organic matter, the solvent and the sample separate easily (salting-out effect).
When performing oil content extraction, the salting-out effect can be produced by adding approx. 6 mol/L hydrochloric acid.
The procedure for preparing 6 mol/L hydrochloric acid using commercially available concentrated hydrochloric acid (36%) is explained below.

■ Hydrochloric acid preparation method

● Items required

- Glass beaker
- Glass measuring utensil (measuring flask, measuring cylinder, etc.)
- Glass rod
- Pure water
- Commercially available concentrated hydrochloric acid (36%)

Note

Clean the glass utensils to be used with pure water, and let them air dry completely.

● Preparation method

1. **Use a measuring cup to determine a specific volume of pure water and transfer it to the glass beaker.**
2. **Add the same volume (as the pure water) of commercially available hydrochloric acid, adding gradually by running the hydrochloric acid down the glass rod.**

Note

Always add the hydrochloric acid to the pure water. Do not pour in the hydrochloric acid all at once. Using an incorrect preparation method may cause heat generation and explosive boiling.

Condition settings

Standard calibration conditions and measurement conditions are set by default in the product. Once the warm-up icon has turned OFF, calibration and measurement can be started immediately.

Calibration condition settings

The default settings for the calibration conditions and the pages to refer to for the setting procedures are shown below.

Measurement condition	Default setting	Setting procedure page
Span Point	200.0 mg/L	"Span Point" (page 76)
Calib. Point	1point	"Calib. Point" (page 76)
Calib. Curve	-	"Calib. Curve" (page 76)

Measurement condition settings

The default settings for the measurement conditions and the pages to refer to for the setting procedures are shown below.

Measurement condition	Default setting	Setting procedure page
Meas. Limit Time	300 sec	"Meas. Limit" (page 66)
Stab-Wait Time	180 sec	"Stab-Wait Time" (page 67)
Measurement unit	mg/L	"Measurement Unit" (page 68)
Solvent Vol.	8.0 mL	"Solvent Vol." (page 69)
Sample Vol.	16.0 mL	"Sample Vol." (page 70)
Conc. correction	1.0	"Conc. Correction" (page 71)
Zero Shift Value	0.0 mg/L	"Zero Shift Value" (page 72)
Confirm Save	AUTO	"Confirm Save" (page 72)
Save Memo	OFF	"Save Memo" (page 73)
Display Negative	OFF	"Display Negative" (page 73)
Display Raw Data	OFF	"Display Raw Data" (page 74)

Calibration

Calibration cautions

CAUTION

Chemical hazard (solvent S-316)
Inhalation or accidental ingestion of a large amount of solvent S-316 may be harmful.
Observe the following rules when handling:
- Ventilate the work area sufficiently.
- Wear a protective mask and protective gloves.
- Wash hands well after handling the solvent.

To obtain correct measurement results, it is important to eliminate factors affecting measured values and to keep calibration and measurement conditions as even as possible. Observe the precautions below.

- It is recommended to perform measurement in the stable condition that the temperatures of the main unit, the measurement liquid, the solvent, the room are from 5°C to 30°C, and the room humidity is less than 80%. If the temperature of the measurement liquid or the solvent is lower than the internal temperature of the main unit, dew condensation may occur inside the main unit and the measurement cell, and the indicated value may fluctuate or shift.
  If the room temperature is less than 5°C, the viscosity of solvent S-316 will increase and the indicated value may be low. In this case, raise the room temperature over 5°C.
- When the air has a high concentration of hydrocarbons, for instance in oil refinery, hydrocarbons may be adsorbed inside the product and affect measurement.
- Be sure to wash your hands before starting work. If oil from your fingers gets on the measurement cell, the measuring utensils, or other parts, the measured value will be affected and correct measurement will be impossible.
- Start measurement immediately after closing the measurement cover.
- Be sure to perform zero calibration before measurement or every 3 to 4 hours.
  Perform span calibration every day. If the lot of solvent to be used changes, perform zero and span calibration again with using calibration liquid readjusted before measurement with solvent of new lot.
- During measurement, close the measurement cover of this product. Stable measurement cannot be performed with the measurement cover open.
- Be sure to perform zero calibration before performing span calibration. If zero calibration is performed after span calibration, correct measurement will be impossible.
- For zero calibration, span calibration and hold measurement, use the same measurement cell. If the measurement cell is replaced with a new one, perform the calibration again, and then perform the hold measurement.
- Purging is necessary to prevent effects from the previous measurement liquid.
- When measuring sample or reagent quantities, use suitable measuring utensils and measure accurately. When using a microsyringe or measuring syringe, take care that foam and bubbles are not drawn into the syringe. Foam and bubbles will cause a measurement error.
- If an abnormality occurs during measurement or calibration, operation may stop. The alarm icon will blink. Check the alarm information on the Current Alarm screen (refer to "Current Alarm screen" (page 50) and "Alarm displays and actions" (page 84)).
- If the measurement cell is washed with water, dry it adequately and make sure that there is no moisture that adheres to the inside of the window.
- Do not touch the window of the measurement cell with bare hands.

In addition, read "Operational precautions" and "Solvent handling precautions" in of this manual.

Points to check prior to calibration

Points to check prior to zero calibration

Is the warm-up icon off?	If the warm-up icon is blinking, wait until it turns OFF.
Is the alarm icon off?	If the alarm icon is blinking, check the error information and remove the cause (refer to "List of alarms" (page 84)).
Is the window of the measurement cell dirty?	If the window of the measurement cell is dirty, wipe it with gauze and so on.

Points to check prior to span calibration

Did you perform zero calibration?	If not, first perform zero calibration.
Is the warm-up icon off?	If the warm-up icon is blinking, wait until it turns OFF.
Is the alarm icon off?	If the alarm icon is blinking, check the error information and remove the cause (refer to "List of alarms" (page 84)).
Is the window of the measurement cell dirty?	If the window of the measurement cell is dirty, wipe it with gauze and so on.

Items required

Zero calibration

- OCMA-550 (main unit, measurement cell, cell cap)
- Measuring syringe (10 mL, optional): 1
- Zero liquid for calibration (refer to "Zero liquid for calibration" (page 16))

Span calibration

- OCMA-550 (main unit, measurement cell, cell cap)
- Measuring syringe (10 mL, optional): 1
- Span liquid for calibration (refer to "Span liquid for calibration" (page 16))

Preliminary measurement

Preliminary measurement is performed to adjust the cell temperature to the hold measurement condition.
Perform preliminary measurement before starting calibration or measurement.
Calibration with the measurement cell condition adjusted to the condition during measurement can provide precise measurement. For example, when many samples are to be measured sequentially, performing preliminary measurement before calibration is recommended.

Note

- **Be careful not to touch the both ends of the measurement cell.**
- **When setting up the measurement cell, be careful not to spill solvents on the measurement section. This may cause a failure.**
- **Do not pour zero liquid beyond a predetermined liquid volume. This may cause the measurement cell to be damaged.**
- **Be sure to put the cell cap on the measurement cell.**
- **Do not handle the measurement cell with seizing the cap. This may cause the measurement cell to fall and be damaged.**
- **Take out the measurement cell immediately after preliminary measurement. Do not leave the measurement cell in the unit for 60 minutes or longer.**

1. **Press the MEAS button until the process display on the screen shows [Hold Measurement].**
   The hold measurement mode is entered.

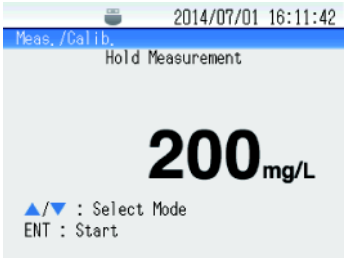


Fig. 17 Start of hold measurement mode

2. **Use the measuring syringe (optional) to dispense approx. 6.5 mL of zero liquid for measurement to the specified level of the measurement cell.**

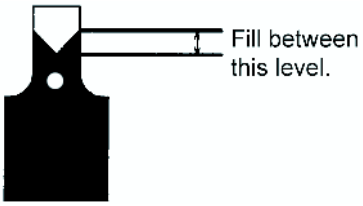


Fig. 18 measurement cell

3. **Put the cell cap on the measurement cell.**
4. **Push and open the measurement cover.**

5. **Set up and push the measurement cell into the cell holder with the white circle mark facing front.**

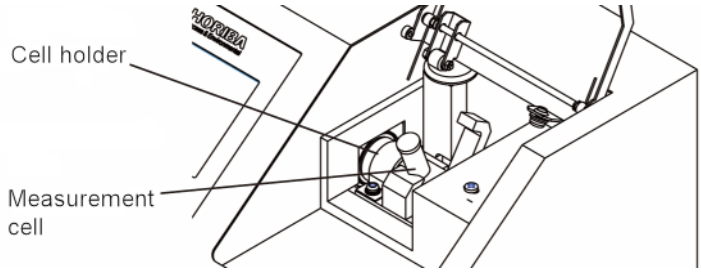


Fig. 19 Setting the measurement cell

6. **Close the measurement cover.**
7. **Press the ENT button.**
   Stability is determined and hold measurement is started.
8. **Check that the display of the measured value has changed from blinking to lighting, and then press the ESC button.**
   The screen returns to the start state of the hold measurement mode.

Note

If an alarm icon is blinking, take corrective action by referring to "Alarm displays and actions" (page 84).

Zero calibration

Note

- **When pouring solvents into the measurement cell, be careful that air bubbles are prevented from entering into the measurement cell. If air bubbles remain in the measurement cell, shake the measurement cell slowly to remove the air bubbles. Moreover, pour solvents with the measurement cell protected from getting wet. If the measurement cell gets wet, wipe off solvents with a soft cloth such as towels, and dry the measurement cell adequately before setting it up.**
- **Be careful not to touch the both ends of the measurement cell.**
- **If the measurement cell is not correctly set up, this may cause a measurement error.**
- **When setting up the measurement cell, be careful not to spill solvents on the measurement section. This may cause a failure.**
- **Be sure to put the cell cap on the measurement cell.**
- **Do not pour a liquid beyond a predetermined liquid volume. This may cause the measurement cell to be damaged.**
- **Do not handle the measurement cell with seizing the cap. This may cause the measurement cell to fall and be damaged.**
- **Take out the measurement cell immediately after zero calibration. Do not leave the measurement cell in the unit for 60 minutes or longer.**

1. **Press the CAL button or up/down button with the Hold Measurement Top screen appearing until the process display shows [Zero Calibration].**
   The zero calibration mode is entered.

Fig. 20 Start of the zero calibration mode

2. **Use the measuring syringe (optional) to dispense approx. 6.5 mL of zero liquid for calibration to the specified level of the measurement cell.**

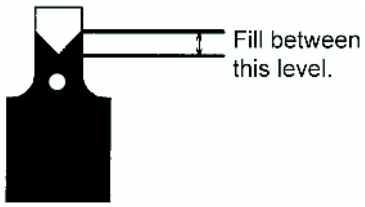


Fig. 21 Measurement cell

3. **Put the cell cap on the measurement cell.**
4. **Push and open the measurement cover.**

5. **Set up and push the measurement cell into the cell holder with the white circle mark facing front.**

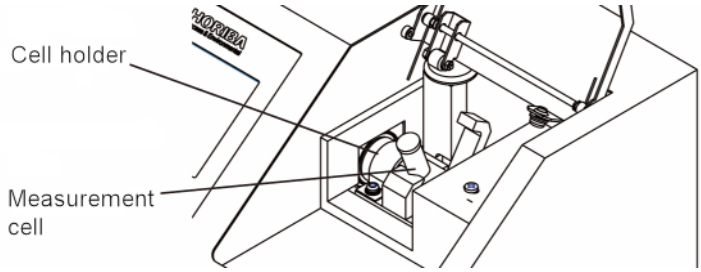


Fig. 22 Setting the measurement cell

6. **Close the measurement cover.**
7. **Press the ENT button.**
   Stability is determined and zero calibration is started.
8. **Check that the display of the calibrated value has changed from blinking to lighting, and then press the ESC button.**
   The screen returns to the start state of the zero calibration mode.

Note

If an alarm icon is blinking, take corrective action by referring to "Alarm displays and actions" (page 84).

Span calibration

Reference

- "Calibration condition settings" (page 19)
- "Calibration Setting screen" (page 75)

Note

- When pouring solvents into the measurement cell, be careful that air bubbles are prevented from entering into the measurement cell. If air bubbles remain in the measurement cell, shake the measurement cell slowly to remove the air bubbles. Moreover, pour solvents with the measurement cell protected from getting wet. If the measurement cell gets wet, wipe off solvents with a soft cloth such as towels, and dry the measurement cell adequately before setting it up.
- Be careful not to touch the both ends of the measurement cell.
- If the measurement cell is not correctly set up, this may cause a measurement error.
- When setting up the measurement cell, be careful not to spill solvents on the measurement section. This may cause a failure.
- Be sure to put the cell cap on the measurement cell.
- Do not pour a liquid beyond a predetermined liquid volume. This may cause the measurement cell to be damaged.
- Do not handle the measurement cell with seizing the cap. This may cause the measurement cell to fall and be damaged.
- Take out the measurement cell immediately after span calibration. Do not leave the measurement cell in the unit for 60 minutes or longer.

1. **Press the CAL button or up/down button with the Hold Measurement Top screen appearing until the process display shows [Span Calibration].**
   The span calibration mode is entered.

Fig. 23 Start of the span calibration mode

2. **Use the measuring syringe (optional) to dispense approx. 6.5 mL of span liquid for calibration to the specified level of the measurement cell.**

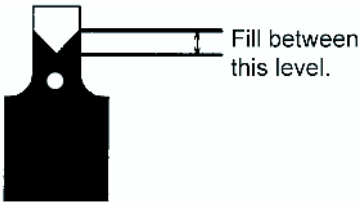


Fig. 24 Measurement cell

3. **Put the cell cap on the measurement cell.**
4. **Push and open the measurement cover.**

5. **Set up and push the measurement cell into the cell holder with the white circle mark facing front.**

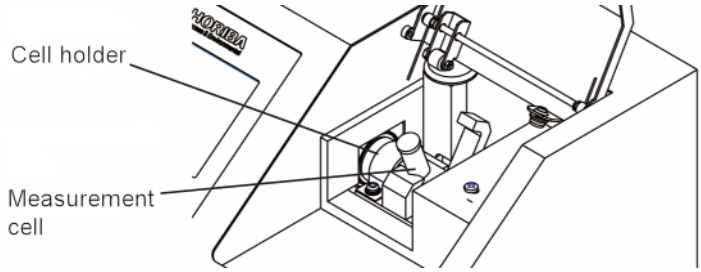


Fig. 25 Setting the measurement cell

6. **Close the measurement cover.**
7. **Press the ENT button.**
   Stability is determined and span calibration is started.
8. **Check that the display of the calibrated value has changed from blinking to lighting, and then press the ESC button.**
   The screen returns to the start state of the span calibration mode.

Note

If an alarm icon is blinking, take corrective action by referring to "Alarm displays and actions" (page 84).

Calibration (ASTM D7066-4)

Calibration cautions

CAUTION

Chemical hazard (solvent S-316)
Inhalation or accidental ingestion of a large amount of solvent S-316 may be harmful.
Observe the following rules when handling:
- Ventilate the work area sufficiently.
- Wear a protective mask and protective gloves.
- Wash hands well after handling the solvent.

To obtain correct measurement results, it is important to eliminate factors affecting measured values and to keep calibration and measurement conditions as even as possible. Observe the precautions below.

- If the temperature of the measurement liquid or the solvent is lower than the internal temperature of the main unit, dew condensation may occur inside the main unit and the measurement cell, and the indicated value may fluctuate or shift.
  If the room temperature is less than 5°C, the viscosity of solvent S-316 will increase and the indicated value may be low. In this case, raise the room temperature over 5°C.
- When the air has a high concentration of hydrocarbons, for instance in oil refinery, hydrocarbons may be adsorbed inside the product and affect measurement.
- Be sure to wash your hands before starting work. If oil from your fingers gets on the measurement cell, the measuring utensils, or other parts, the measured value will be affected and correct measurement will be impossible.
- Start measurement immediately after closing the measurement cover.
- Be sure to perform zero calibration before measurement or every 3 to 4 hours.
  Perform span calibration every day. If the lot of solvent to be used changes, perform zero and span calibration again with using calibration liquid readjusted before measurement with solvent of new lot.
- During measurement, close the measurement cover of this product. Stable measurement cannot be performed with the measurement cover open.
- Purging is necessary to prevent effects from the previous measurement liquid.
- Be sure to perform zero calibration before performing span calibration. If zero calibration is performed after span calibration, correct measurement will be impossible.
- When measuring sample or reagent quantities, use suitable measuring utensils and measure accurately. When using a microsyringe or measuring syringe, take care that foam and bubbles are not drawn into the syringe. Foam and bubbles will cause a measurement error.
- For zero calibration, span calibration and hold measurement, use the same measurement cell. If the measurement cell is replaced with a new one, perform the calibration again, and then perform the hold measurement.
- If an abnormality occurs during measurement or calibration, operation may stop. The alarm icon will blink. Check the alarm information on the Current Alarm screen (refer to "Current Alarm screen" (page 50) and "Alarm displays and actions" (page 84)).
- If the measurement cell is washed with water, dry it adequately and make sure that there is no moisture that adheres to the inside of the window.
- Do not touch the window of the measurement cell with bare hands.

In addition, read "Operational precautions" and "Solvent handling precautions" in of this manual.

Points to check prior to calibration

Points to check prior to zero calibration

Is the warm-up icon off?	If the warm-up icon is blinking, wait until it turns OFF.
Is the alarm icon off?	If the alarm icon is blinking, check the error information and remove the cause (refer to "List of alarms" (page 84)).
Is the window of the measurement cell dirty?	If the window of the measurement cell is dirty, wipe it with gauze and so on.

Points to check prior to span calibration

Did you perform zero calibration?	If not, first perform zero calibration.
Is the warm-up icon off?	If the warm-up icon is blinking, wait until it turns OFF.
Is the alarm icon off?	If the alarm icon is blinking, check the error information and remove the cause (refer to "List of alarms" (page 84)).
Is the window of the measurement cell dirty?	If the window of the measurement cell is dirty, wipe it with gauze and so on.

Items required

■ Zero calibration

- OCMA-550(main unit, measurment cell, cell cap)
- Measuring syringe (10 mL, optional): 1
- Zero liquid for calibration (refer to Zero liquid for calibration)

■ Span calibration

- OCMA-550(main unit, measurment cell, cell cap)
- Measuring syringe (10 mL, optional): 1
- Span liquid for calibration (refer to Span liquid for calibration)

Zero liquid for calibration

Prepare pure solvent S-316, the same as for measurement.

Span liquid for calibration

Use pure solvent S-316, the same as is used for measurement, to prepare the span liquid for calibration.
For details of calibration, please refer to the original text of ASTM D7066-4.

● Items required

- Microsyringe (25 μL, optional): 1
- Measuring flask
- Solvent S-316 (optional)
- Calibration oil described in ASTM D7066-4

Note

- **Clean the glass utensils to be used with pure solvent S-316, and , purge them 3 times or 4 times using solvent S-316.**

● Preparation method

1. **Draw the calibration oil into the microsyringe and transfer to the measuring flask.**
2. **Fill the measuring flask to the graduation with solvent S-316.**
3. **Insert the stopper into the measuring flask and mix the contents well.**

Hydrochloric acid

When an acid is added to a water sample containing organic matter, the solvent and the sample separate easily (salting-out effect).
When performing oil content extraction, the salting-out effect can be produced by adding approx. 6 mol/L hydrochloric acid.
The procedure for preparing 6 mol/L hydrochloric acid using commercially available concentrated hydrochloric acid (36%) is explained below.

■ Hydrochloric acid preparation method

● Items required

- Glass beaker
- Glass measuring utensil (measuring flask, measuring cylinder, etc.)
- Glass rod
- Pure water
- Commercially available concentrated hydrochloric acid (36%)

Note

Clean the glass utensils to be used with pure water, and let them air dry completely.

● Preparation method

1. **Use a measuring cup to determine a specific volume of pure water and transfer it to the glass beaker.**
2. **Add the same volume (as the pure water) of commercially available hydrochloric acid, adding gradually by running the hydrochloric acid down the glass rod.**

Note

Always add the hydrochloric acid to the pure water. Do not pour in the hydrochloric acid all at once. Using an incorrect preparation method may cause heat generation and explosive boiling.

Preliminary measurement

Preliminary measurement is performed to adjust the cell temperature to the hold measurement condition.
Perform preliminary measurement before starting calibration or measurement.
Calibration with the measurement cell condition adjusted to the condition during measurement can provide precise measurement. For example, when many samples are to be measured sequentially, performing preliminary measurement before calibration is recommended.

Note

- **Be careful not to touch the both ends of the measurement cell.**
- **When setting up the measurement cell, be careful not to spill solvents on the measurement section. This may cause a failure.**
- **Do not pour zero liquid beyond a predetermined liquid volume. This may cause the measurement cell to be damaged.**
- **Be sure to put the cell cap on the measurement cell.**
- **Do not handle the measurement cell with seizing the cap. This may cause the measurement cell to fall and be damaged.**
- **Take out the measurement cell immediately after preliminary measurement. Do not leave the measurement cell in the unit for 60 minutes or longer.**

1. **Press the MEAS button until the process display on the screen shows [Hold Measurement].**
   The hold measurement mode is entered.

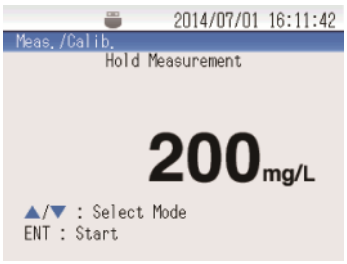


Fig. 26 Start of hold measurement mode

2. **Use the measuring syringe (optional) to dispense approx. 6.5 mL of zero liquid for measurement to the specified level of the measurement cell.**

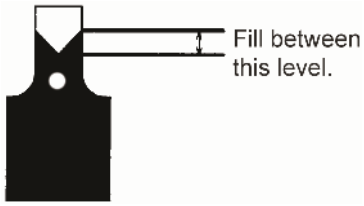


Fig. 27 measurement cell

3. **Put the cell cap on the measurement cell.**
4. **Push and open the measurement cover.**

5. **Set up and push the measurement cell into the cell holder with the white circle mark facing front.**

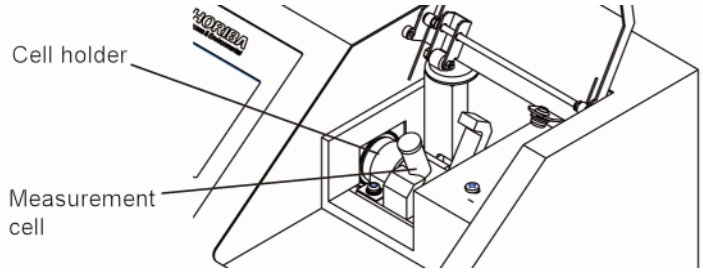


Fig. 28 Setting the measurement cell

6. **Close the measurement cover.**
7. **Press the ENT button.**
   Stability is determined and hold measurement is started.
8. **Check that the display of the measured value has changed from blinking to lighting, and then press the ESC button.**
   The screen returns to the start state of the hold measurement mode.

Note

If an alarm icon is blinking, take corrective action by referring to "Alarm displays and actions" (page 84).

Zero calibration

1. **Set the Calibration point to “5point” on the Calibration Setting screen.**

Reference

- **"Measurement condition settings" (page 19)**
- **"Calibration Setting screen" (page 75)**

Note

- **When pouring solvents into the measurement cell, be careful that air bubbles are prevented from entering into the measurement cell. If air bubbles remain in the measurement cell, shake the measurement cell slowly to remove the air bubbles. Moreover, pour solvents with the measurement cell protected from getting wet. If the measurement cell gets wet, wipe off solvents with a soft cloth such as towels, and dry the measurement cell adequately before setting it up.**
- **Be careful not to touch the both ends of the measurement cell.**
- **If the measurement cell is not correctly set up, this may cause a measurement error.**
- **When setting up the measurement cell, be careful not to spill solvents on the measurement section. This may cause a failure.**
- **Be sure to put the cell cap on the measurement cell.**
- **Do not pour a liquid beyond a predetermined liquid volume. This may cause the measurement cell to be damaged.**
- **Do not handle the measurement cell with seizing the cap. This may cause the measurement cell to fall and be damaged.**
- **Take out the measurement cell immediately after zero calibration. Do not leave the measurement cell in the unit for 60 minutes or longer.**

2. **Press the CAL button or up/down button with the Hold Measurement Top screen appearing until the process display shows [Zero Calibration].**
   The zero calibration mode is entered.

Fig. 29 Start of the zero calibration mode

3. **Use the measuring syringe (optional) to dispense approx. 6.5 mL of zero liquid for calibration to the specified level of the measurement cell.**

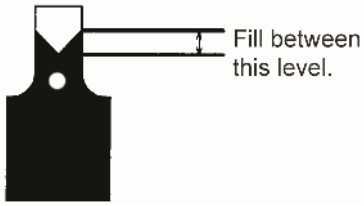


Fig. 30 Measurement cell

4. **Put the cell cap on the measurement cell.**
5. **Push and open the measurement cover.**

6. **Set up and push the measurement cell into the cell holder with the white circle mark facing front.**

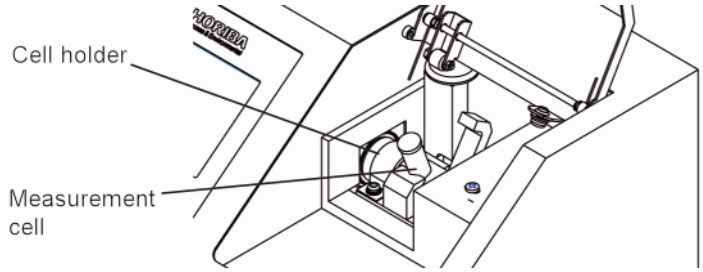


Fig. 31 Setting the measurement cell

7. **Close the measurement cover.**
8. **Press the ENT button.**
   Stability is determined and zero calibration is started.
9. **Check that the display of the calibrated value has changed from blinking to lighting, and then press the ESC button.**
   The screen returns to the start state of the zero calibration mode.

Note

If an alarm icon is blinking, take corrective action by referring to "Alarm displays and actions" (page 84).

Span calibration

1. **Set the Calibration point to “5point” on the Calibration Setting screen.**
2. **Set the span point 1 to 5 on the Calibration Setting Screen.**

Reference

- **"Measurement condition settings" (page 19)**
- **"Calibration Setting screen" (page 75)**

Note

- **When pouring solvents into the measurement cell, be careful that air bubbles are prevented from entering into the measurement cell. If air bubbles remain in the measurement cell, shake the measurement cell slowly to remove the air bubbles. Moreover, pour solvents with the measurement cell protected from getting wet. If the measurement cell gets wet, wipe off solvents with a soft cloth such as towels, and dry the measurement cell adequately before setting it up.**
- **Be careful not to touch the both ends of the measurement cell.**
- **If the measurement cell is not correctly set up, this may cause a measurement error.**
- **When setting up the measurement cell, be careful not to spill solvents on the measurement section. This may cause a failure.**
- **Be sure to put the cell cap on the measurement cell.**
- **Do not pour a liquid beyond a predetermined liquid volume. This may cause the measurement cell to be damaged.**
- **Do not handle the measurement cell with seizing the cap. This may cause the measurement cell to fall and be damaged.**
- **Take out the measurement cell immediately after span calibration. Do not leave the measurement cell in the unit for 60 minutes or longer.**
- **Set the span point increases from the span point 1 to the span point 5.**
  The initial settings for span point 1 to 5 are 40 mg/L, 80 mg/L, 120 mg/L, 160 mg/L, and 200 mg/L respectively.

3. **Press the CAL button or up/down button with the Hold Measurement Top screen appearing until the process display shows [1st Span Point].**
   The span calibration mode is entered.

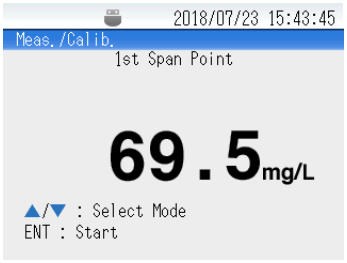


Fig. 32 Start of the span calibration (1st to 5th point) mode

4. **Use the measuring syringe (optional) to dispense approx. 6.5 mL of span liquid for calibration to the specified level of the measurement cell.**

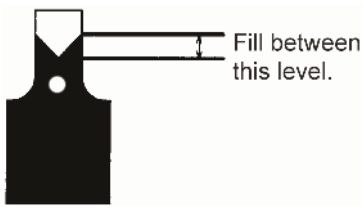


Fig. 33 Measurement cell

5. **Put the cell cap on the measurement cell.**
6. **Push and open the measurement cover.**
7. **Set up and push the measurement cell into the cell holder with the white circle mark facing front.**

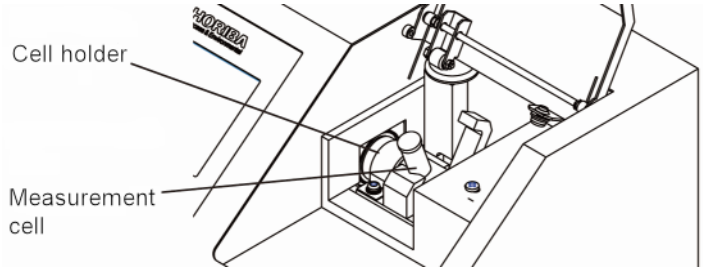


Fig. 34 Setting the measurement cell

8. **Close the measurement cover.**
9. **Press the ENT button.**
   Stability is determined and span calibration is started.
10. **Check that the display of the calibrated value has changed from blinking to lighting, and then press the ESC button.**
    The screen returns to the start state of the span calibration (1st to 5th point) mode.
11. **As with 1st span point , please also calibrate the 2nd span point to the 5th span point.**

Tip

Unnecessary span points can be invalidated from the Calibration Setting .
The span point value is red color in the initial setting, but it changes to black color by performing calibration.
Span points return to red color by changing the span point value or turning it invalid after calibration, but it will turn to black color by turning it to original span point value again.

Note

- **If an alarm icon is blinking, take corrective action by referring to "Alarm displays and actions" (page 84).**
- **RSD (coefficient of variation) is calculated from the result of 1st to 5th span calibration.**
  In the case of RSD <15% and RSD ≧ 15%, how to draw the calibration curve changes (For details, see original text of ASTM standard).
  RSD can not be calculated if the span point is invalidated by three or more points.
  In the case of RSD ≧ 15%, the concentration of the prepared span solution may be different from the set span point value.

Measurement

Measurement cautions

⚠ CAUTION
Chemical hazard (solvent S-316) Inhalation or accidental ingestion of a large amount of solvent S-316 may be harmful. Observe the following rules when handling: • Ventilate the work area sufficiently. • Wear a protective mask and protective gloves. • Wash hands well after handling the solvent.
Chemical hazard (hydrochloric acid) Hydrochloric acid is toxic by skin or eye exposure. If it touches the skin, immediately rinse with water. If it reaches the eyes, rinse immediately under a large amount of running water and get medical attention.

To obtain correct measurement results, it is important to eliminate factors affecting measured values and to keep calibration and measurement conditions as even as possible. Observe the precautions below.

- It is recommended to perform measurement in the stable condition that the temperatures of the main unit, the measurement liquid, the solvent, the room are from 5°C to 30°C, and the room humidity is less than 80%. If the temperature of the measurement liquid or the solvent is lower than the internal temperature of the main unit, dew condensation may occur inside the main unit and the measurement cell, and the indicated value may fluctuate or shift.
  If the room temperature is less than 5°C, the viscosity of solvent S-316 will increase and the indicated value may be low. In this case, raise the room temperature over 5°C.
- When the air has a high concentration of hydrocarbons, for instance in oil refinery, hydrocarbons may be adsorbed inside the product and affect measurement.
- Be sure to wash your hands before starting work. If oil from your fingers gets on the measurement cell on the product, the measuring utensils, or other parts, the measured value will be affected and correct measurement will be impossible.
- Start measurement immediately after closing the measurement cover.
- Be sure to perform zero calibration before measurement or every 3 to 4 hours.
  Perform span calibration every day. If the lot of solvent to be used changes, perform zero and span calibration again with using calibration liquid readjusted before measurement with solvent of new lot.
- During measurement, close the measurement cover of this product. Stable measurement cannot be performed with the measurement cover open.
- Be sure to perform zero calibration before performing span calibration. If zero calibration is performed after span calibration, correct measurement will be impossible.
- Purging is necessary to prevent effects from the previous measurement liquid.
- When measuring sample or reagent quantities, use suitable measuring utensils and measure accurately. When using a microsyringe or measuring syringe, take care that foam and bubbles are not drawn into the syringe. Foam and bubbles will cause measurement error.
- For zero calibration, span calibration and hold measurement, use the same measurement cell. If the measurement cell is replaced with a new one, perform the calibration again, and then perform the hold measurement.

- When measurements of the day are finished, clean inside the measurement cell with pure zero solvent and let dry completely.
- If an abnormality occurs during measurement, or calibration, operation may stop. The alarm icon will blink. Check the alarm information on the Current Alarm screen (refer to "Current Alarm screen" (page 50) and "Alarm displays and actions" (page 84)).
- If the measurement cell is washed with water, dry it adequately and make sure that there is no moisture that adheres to the inside of the window.
- Do not touch the window of the measurement cell with bare hands.

In addition, read "Operational precautions" and "Solvent handling precautions" in the front matter of this manual.

Points to check prior to measurement

Did you perform calibration?	If not, first perform zero calibration, then perform span calibration.
Is the warm-up icon off?	If the warm-up icon is blinking, wait until it turns OFF.
Is the alarm icon off?	If the alarm icon is blinking, check the error information and remove the cause (refer to "List of alarms" (page 84)).
Is the window of the measurement cell dirty?	If the window of the measurement cell is dirty, wipe it with gauze and so on.

Items required

- OCMA-550 (main unit, measurement cell, cell cap)
- Measuring syringe (10 mL, optional): 1
- Solvent S-316 that the oil content is extracted from measurement sample.

Hold measurement

Note

- **When pouring solvents into the measurement cell, be careful that air bubbles are prevented from entering into the measurement cell. If air bubbles remain in the measurement cell, shake the measurement cell slowly to remove the air bubbles. Moreover, pour solvents with the measurement cell protected from getting wet. If the measurement cell gets wet, wipe off solvents with a soft cloth such as towels, and dry the measurement cell adequately before setting it up.**
- **Be careful not to touch the both ends of the measurement cell.**
- **If the measurement cell is not correctly set up, this may cause a measurement error.**
- **When setting up the measurement cell, be careful not to spill solvents on the measurement section. This may cause a failure.**
- **Be sure to put the cell cap on the measurement cell.**
- **Do not pour a liquid beyond a predetermined liquid volume. This may cause the measurement cell to be damaged.**
- **Do not handle the measurement cell with seizing the cap. This may cause the measurement cell to fall and be damaged.**
- **Take out the measurement cell immediately after measurement. Do not leave the measurement cell in the unit for 60 minutes or longer.**

1. **Press the MEAS button and the process display on the screen shows [Hold Measurement].**
   The hold measurement mode is entered.

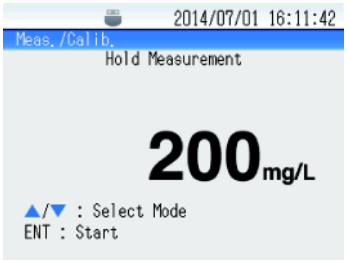


Fig. 35 Start of the hold measurement mode

2. **Use the measuring syringe (optional) to dispense approx. 6.5 mL of solvent containing oil extracted from the sample to the specified level of the measurement cell.**

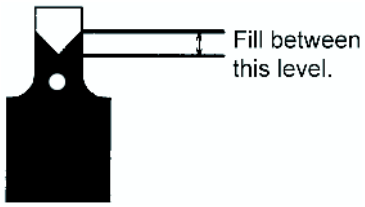


Fig. 36 Measurement cell

3. **Put the cell cap on the measurement cell.**
4. **Push and open the measurement cover.**

5. **Set up and push the measurement cell into the cell holder with the white circle mark facing front.**

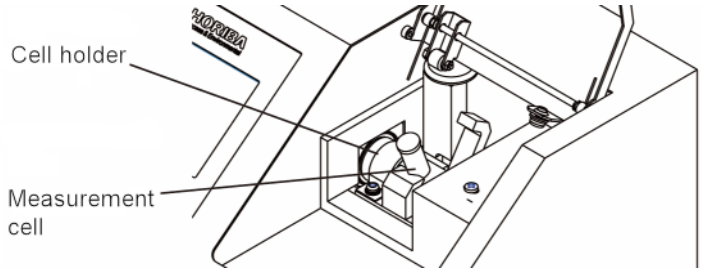


Fig. 37 Setting the measurement cell

6. **Close the measurement cover.**
7. **Press the ENT button.**
   Stability is determined and hold measurement is started.
8. **Check that the display of the measured value has changed from blinking to lighting, and then press the ESC button.**
   The screen returns to the start state of the hold measurement mode.

Note

If an alarm icon is blinking, take corrective action by referring to "Alarm displays and actions" (page 84).

Tip

- **If [Confirm Save] is set to "MANUAL", the operation guide display will show [ENT: Save ESC: Skip]. To save the measured value, press the ENT button. To skip, press the ESC button. For details on the [Confirm Save] setting, refer to "Confirm Save" (page 72).**
- **If [Save Memo] is set to "ON" in the measurement settings, a pop-up screen to input the data name will appear immediately before the measured value is saved. To save the measurement conditions or other memo with the measured value, enter the data name and press the ENT button. To save only the measured value without any additional memo, press the ESC button. For details on the [Save Memo] setting, refer to "Save Memo" (page 73). For details on the pop-up screen to input the data name, refer to "Character keys" (page 14).**

Examples of oil extraction by solvent

This section describes examples of extraction performed outside the product.

■ Oil content in water

● Checking layer separation

If a sample potentially contains emulsifying substances, check in advance, if the solvent layer and water layer are separated.

Tip

The following examples typically contain emulsifying substances.

- **Miscellaneous domestic gray water**
- **Industrial wastewater**
- **Activated sludge water (when the killed bacteria in the activated sludge is introduced, the content of the bacteria dissolves and acts in the same way as emulsifying substances.)**

● Items required

- Glass container with a lid (screw-top bottle is recommended) (50 mL)
- Sample water
- Solvent S-316 (optional)

● Checking procedure

1. **Dispense 10 mL of solvent and 10 mL of sample water into the glass container with a lid.**
2. **Screw the lid closed and shake for 1 minute by hand.**

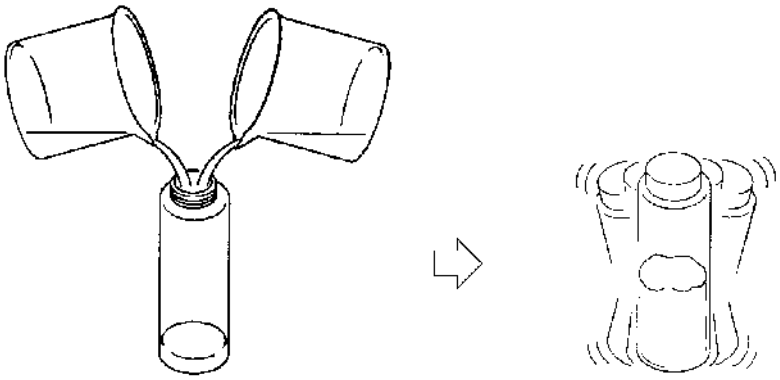


Fig. 38 Mixing solvent and sample water by shaking

3. **Place on a flat surface, and check if the mixture completely separates into two layers after 20 to 30 seconds.**

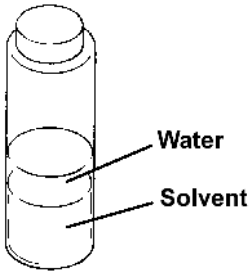


Fig. 39 Checking layer separation

If a boundary surface has formed between the solvent layer and water layer, it can be concluded that the layers "have separated".
The following cases show that the layers have not been separated.
- Separation into two layers takes more than 40 seconds
- A cloudy layer forms between the two layers
- Bubbles with a diameter greater than 10 mm get formed in multiple places throughout the liquid and a boundary surface cannot be identified

If almost no suspended material is visible and the water and solvent have separated, collect the solvent layer (lower layer) and use that as the measurement liquid. If there is suspended material, or the water and solvent have not sufficiently separated and the solvent layer is cloudy, proceed to the "Removal of suspended material" (page 45) and "Removing water from the solvent layer" (page 45) procedures.

● Extraction

● Items required

- Separating funnel (300 mL)*1: 2 (for sample extraction and for zero point checking)
- Measuring cylinder (200 mL)*1: 3 (for sample, for solvent, and for clean water)
- Dropper (accessory): 1 (for hydrochloric acid)
- pH meter
- Filter paper (if suspended material will be removed and as needed)*2
- Glass container (if suspended material will be removed or water will be removed from solvent layer)*1
- Teflon membrane filter (mesh diameter 20 μm to 40 μm) (if water will be removed from solvent layer)
- Glass funnel*1 (if water will be removed from solvent layer)
- Measuring utensil (if water will be removed from solvent layer)
- Sample water
- Clean water*3
- Hydrochloric acid (refer to "Hydrochloric acid" (page 18))
- Solvent S-316 (optional)
- Anhydrous sodium sulfate (Na_2SO_4) (if water will be removed from solvent layer)

Note

***1: Clean the glass utensils with solvent S-316 in advance and let air dry.**
***2: Use solvent to elute and clean organic material from the filter paper in advance, and let air dry.**
***3: Use the same clean water for the sequence of tasks from zero calibration to measurement.**
- **Normally pure water should be used.**
- **If the sample to contains large amounts of water-soluble substances, such as urea or NaCl, and the concentration is known, perform zero calibration using this oil-free aqueous solution.**

● Extraction procedure

1. **Measure 120 mL of clean water into the measuring cylinder for clean water, measure 100 mL of clean solvent into the measuring cylinder for solvent, and dispense these into the separating funnel for zero point checking.**
2. **Measure 100 mL to 200 mL of sample water into the measuring cylinder for sample, and dispense into the separating funnel for sample extraction.**

Tip

If the sample contains emulsifying substances, it is recommended that you use a smaller amount of sample water (approx. 100 mL).

3. **Measure an amount of clean solvent equal to 1/2 the amount of sample water in the measuring cylinder for solvent, and transfer this to the measuring cylinder for sample.**
4. **Rinse the inside of the measuring cylinder for sample with the solvent, and add this solvent to the separating funnel for sample extraction.**
5. **Use the dropper to add 0.2 mL to 0.5 mL (5 to 10 drops) of hydrochloric acid to each separating funnel (for sample extraction and for zero point checking).**

Tip

If the sample contains emulsifying substances, there is no need to add hydrochloric acid.

6. **Use the pH meter to check the pH value (pH 2 to pH 3) of each separating funnel (for sample extraction and for zero point checking).**
7. **Insert the stopper in each separating funnel (for sample extraction and for zero point checking) and shake for approx. 5 minutes.**

Tip

If the sample contains emulsifying substances, it is recommended that you shake for a shorter time (approx. 1 minute).

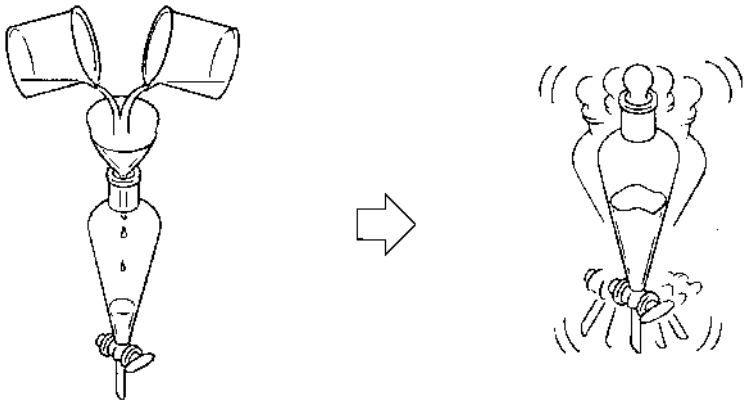


Fig. 40 Extraction

Note

The internal pressure will increase as you shake. Open the cock from time to time to reduce the internal pressure.

8. **After shaking, wait until the water and solvent get separated, and check the status of the sample water.**
   If almost no suspended material is visible and the water and solvent have separated, collect the solvent layer (lower layer) and use that as the measurement liquid. If there is suspended material, or the water and solvent have not sufficiently separated and the solvent layer is cloudy, proceed to the "Removal of suspended material" (page 45) and "Removing water from the solvent layer" (page 45) procedures.

● **Removal of suspended material**

1. **Filter the solvent layer through the filter paper into the glass container and use this as the measurement liquid.**

● **Removing water from the solvent layer**

1. **Collect only parts that can be recognized as solvent in the glass container, and check the status of the liquid.**
If no water particles are visible and the liquid is clear, use it as measurement liquid. If you can see water particles with a diameter of 0.1 mm or larger or the liquid appears whitish overall, follow the steps below to remove water from the solvent layer.

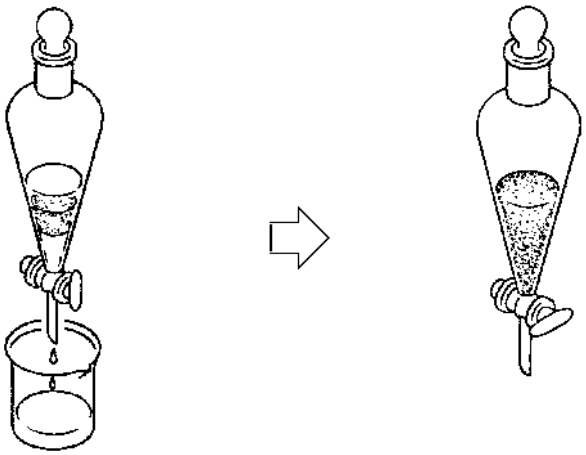


Fig. 41 Separating the solvent layer

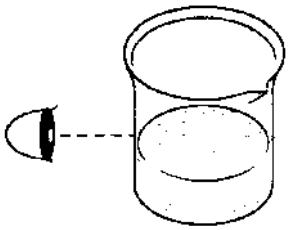


Fig. 42 Visually checking the solvent layer

2. **Filter the liquid through the Teflon membrane filter.**

3. **Gradually add the anhydrous sodium sulfate and shake well to mix.**

Tip

If the sample contains emulsifying substances, place filter paper in the funnel and filter the solvent layer into a container containing 10 g of anhydrous sodium sulfate.

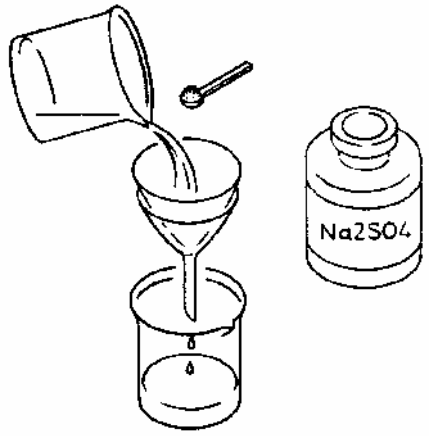


Fig. 43 Removing water from the solvent layer

4. **Continue performing step until the solvent layer is clear.**

5. **If anhydrous sodium sulfate crystals remain, filter with filter paper.**

6. **After waiting, collect the supernatant liquid using a measuring utensil and use this as the measurement liquid.**

Oil content in or on solids

Directly immerse the part in the solvent to extract the oil content.

Although an ultrasonic cleaner can be used for extraction, the solvent volatilization volume and changes in water content will be larger and may have a greater effect on the measured value. In addition, elution and peeling of the part may occur. Extraction by the immersion method is recommended.

To obtain a correct measurement result, it is important that the solvent conditions are the same for calibration and measurement. Observe the precautions below.

- Solvent volatilization during extraction will affect measurement results.
  In parallel with extraction from the metal part, process only the solvent in the same way. By performing zero and span calibration using this solvent, the effect of solvent volatilization can be reduced. In particular, if an ultrasonic cleaner is used for extraction, always process the solvent to be used for zero calibration and span calibration with the ultrasonic cleaner as well.

● Extraction

● Items required

- Measuring cylinder (select a size appropriate for the amount of solvent)*1
- Wide-mouthed glass container with lid (select a size appropriate for the size of the sample and the amount of solvent)*1
- Ashless cellulose quantitative filter paper (particle retention: 8 μm)*2
- Glass funnel*1
- Glass container*1
- Ultrasonic cleaner (if used)
- Part to be measured (referred to as sample in the rest of this section)
- Solvent S-316 (optional)

Note

***1: Clean the glass utensils with solvent S-316 in advance and let air dry.**
***2: Use solvent to elute and to clean organic material from the filter paper in advance, and let air dry.**

● Extraction procedure

1. **Place the sample in the wide-mouthed glass container with a lid.**
2. **Fill an amount of solvent into the measuring cylinder sufficient to immerse the entire sample.**
3. **Pour the measured solvent into the wide-mouthed container and immediately close the lid.**
4. **Wait with the lid closed, shaking from time to time, for 1 hour. If needed, the time can be extended. It is also possible to apply the sonic cleaner with the lid closed (shorter than 3 minutes).**

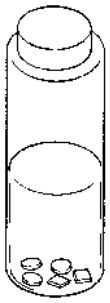


Fig. 44 Oil content extraction from part (immersion)

Note

- **Do not shake the container with the solvent and with closed lid shake. If it is shaken hard, the internal pressure will increase due to vaporization of the solvent and the solvent may spray out from gaps under the lid.**
- **After shaking, open the lid briefly to lower the internal pressure and then promptly close the lid.**
- **Do not apply the ultrasonic cleaner longer than 3 minutes.**

5. **Filter the liquid through the filter paper to remove foreign matter (particles, peeled fragments and so on.), and use it as the measurement liquid.**

Oil content in soil

As for the measurement of oil content in soil, the following example shows the extraction methods which are referred to the Method 8440,418.1 specified by the United States Environmental Protection Agency (EPA).
The method shown here is one example. Depending on the types of samples, it cannot be said that the method shown here is considered to be optimal conditions. Therefore, extract an oil content in a method that is suitable for the customer's sample conditions.
Refer to "Frequently asked questions" (page 94).

Items required

- Solvent S-316 (optional)
- Screw bottle (100 mL, transparent)*1
- Filter paper (particle retention: 8 μm)*2
- Silica gel (60 mesh to 200 mesh, Activity I)
- Anhydrous sodium sulfate (heat-treated at 400°C for 4 hours, or cleaned with methylene chloride)

Note

***1: Clean the glass utensils with solvent S-316 in advance and let air dry.**
***2: Use solvent to elute and to clean organic material from the filter paper in advance, and let air dry.**

Procedure

1. **Spread collected soil samples in a shallow pan, and agitate them adequately.**
2. **Remove large stones and debris.**
3. **Put 30 grams of soil samples, 2 grams of anhydrous sodium sulfate, 5 grams of silica gel, and 50 mL of solvent in a screw bottle. Close the lid of the bottle tightly.**
4. **Shake the bottle by hand strongly for five minutes.**
5. **Place the bottle on a flat place and leave it until solvent are separated (for about one minute).**
6. **Open the lid, and collect the solvent layer in the lower part carefully with a pipet, etc.**
7. **Filter the collected solvent with a filter.**
8. **In the setting mode of the OCMA-550, make settings for the amount of solvent used and the amount of samples used, and switch the unit of measure to “mg/kg". "Setting" (page 64)**
9. **Measure the filtered solvent with the OCMA-550. "Measurement" (page 38)**

Note

- **If anhydrous sodium sulfate being not treated is used, it may be affected by moistures and impurities, thus causing a measurement error.**
- **If an emulsification layer is available, do not collect the emulsification layer. If any solvent that contains an emulsification layer is measured, measurements cannot be made correctly.**
- **Even if soil samples are extracted accurately, reproducibility might not be obtained because uniformity in soils does not exist.**

Data Management

Data Top screen

The Data Top screen appears when the DATA button is pressed while the Hold Measurement Top screen, Calibration Top screen, and Setting Top screen is shown.
The Data Top screen shows a menu for data management.
Select an item while the up/down button and press the ENT button to move to the screen for the selected function.

Fig. 45 Data Top screen

Table 5 Menu on the Data Top screen

Item	Description	Page
Current Alarm	Shows the current alarm.	page 50
Measurement History	Shows the measurement history.	page 51
Calibration History	Shows the calibration history.	page 52
USB Memory	Shows the save items.	page 53
Memory Clear	Shows the memory clear items.	page 60

The buttons and button functions, which can be used while the Data Top screen is shown, are described in the table below.

Table 6 Button functions with the Data Top screen

Button		Function	Page
CAL button		Switches between the zero calibration mode and span calibration mode.	page 20
MEAS button		Opens the Hold Measurement Top screen.	page 9
SET button		Opens the Setting Top screen.	page 64
ENT button		Enters the selected item.	-
Up button		Selects the next item up.	-

Button		Function	Page
Down button		Selects the next item down.	-
ESC button		Returns to the Hold Measurement Top screen or Calibration Top screen.	page 9

Current Alarm screen

If [Current Alarm] is selected on the Data Top screen, the Current Alarm screen opens. The Current Alarm screen shows a list of the current alarms.

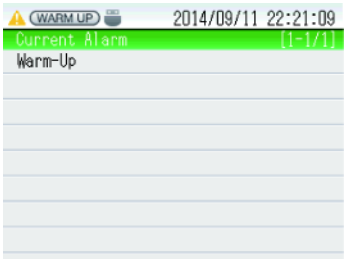


Fig. 46 Current Alarm screen

Note

For the alarms and their descriptions, refer to "Alarm displays and actions" (page 84).

The buttons and button functions, which can be used while the Current Alarm screen is shown, are described in the table below.

Table 7 Button functions with the Current Alarm screen

Button		Function	Page
Left button		Shows the previous page.	-
Right button		Shows the next page.	-
ESC button		Returns to the Data Top screen.	page 49

Measurement History screen

If [Measurement History] is selected on the Data Top screen, the Measurement History screen opens.
The Measurement History screen shows a list of the measurement history.
Up to 300 items of the measurement histories can be saved. When the number of the items exceeds 300, the oldest item is overwritten.

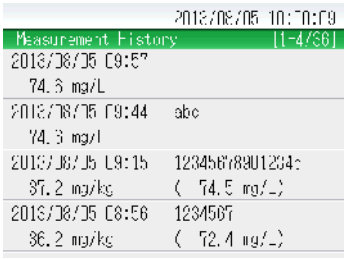


Fig. 47 Measurement History screen

The buttons and button functions, which can be used while the Measurement History screen is shown, are described in the table below.

Table 8 Button functions with the Measurement History screen

Button		Function	Page
Up button		Selects the next item up.	-
Down button		Selects the next item down.	-
Left button		Shows the previous page.	-
Right button		Shows the next page.	-
ESC button		Returns to the Data Top screen	page 49

Calibration History screen

If [Calibration History] is selected on the Data Top screen, the Calibration History screen opens.
The Calibration History screen shows a list of the calibration history.
Up to 100 items of the calibration histories can be saved. When the number of the items exceed 100, the oldest item is overwritten.

Fig. 48 Calibration History screen

Tip

When "5point" is selected in Calib. Point screen, 0 #, 1 #, 2 #, 3 #, 4 #, 5 # are added in front of the span point value.

The buttons and button functions, which can be used with the Calibration History screen appearing, are described in the table below.

Table 9 Button functions with the Calibration History screen

Button		Function	Page
Up button		Selects the next item up.	-
Down button		Selects the next item down.	-
Left button		Shows the previous page.	-
Right button		Shows the next page.	-
ESC button		Returns to the Data Top screen	page 49

USB Memory screen

If [USB Memory] is selected on the Data Top screen, the USB Memory screen opens.
The USB Memory screen shows a menu for USB memory operations.
If an operation is selected with the up/down button and the ENT button is pressed, an execution confirmation message for the selected operation appears. To execute the selected operation, press the ENT button while the execution confirmation is shown.

Note

- **Some USB memory stick may not work with the OCMA.**
  Use a FAT/FAT32 formatted USB memory stick. Other formats may not be available with this product.
  Even FAT/FAT32 formatted, some USB memory sticks may not work. In this case, try other type.
  If you need the USB memory stick manufactured and verified by HORIBA Advanced Techno, contact your local dealer.
- **To execute the operations while the USB Memory screen is shown, a USB memory stick must be connected to this product.**
- **If any of the operations are attempted without inserting a USB memory stick into the USB memory port or state in which there is no capacity in the USB memory a message of "Process has failed" will appear.**
- **To connect a USB memory stick, refer to "Connecting a USB memory stick" (page 11).**

Fig. 49 USB Memory screen

Table 10 Menu on the USB Memory screen

Item	Description	Page
Save Measurement History	Shows an execution confirmation for [Save Measurement History].	page 54
Save Calibration History	Shows an execution confirmation for [Save Calibration History].	page 55
Save Settings	Shows an execution confirmation for [Save Settings].	page 57

The buttons and button functions, which can be used while the USB Memory screen is shown, are described in the table below.

Table 11 Button functions with the USB Memory screen

Button		Function	Page
ENT button		Shows an execution confirmation for the selected item.	-
Up button		Selects the next item up.	-
Down button		Selects the next item down.	-

Button		Function	Page
ESC button		Returns to the Data Top screen	page 49

Execution confirmation for [Save Measurement History]

This is a confirmation message for saving the measurement history to a USB memory stick. When executed, a message of "Process has completed!" appears. Press the ESC button to return to the USB Memory screen.

Fig. 50 Execution confirmation for [Save Measurement History]

The buttons and button functions, which can be used while the execution confirmation for [Save Measurement History] is shown, are described in the table below.

Table 12 Button functions with execution confirmation for [Save Measurement History]

Button		Function	Page
ENT button		Saves the measurement history to a USB memory stick.	-
ESC button		Closes the message.	-

If the ENT button is pressed, the [Measurement History] is saved to a USB memory stick as a file in CSV format.
Each line describes one set of data. The values are separated by commas (",").
Saved items and formats are as shown in the table below.

Item (1st line is the title)	Format	Remarks
Date	yyyy/mm/dd hh:MM:ss	Date and time of measurement (year, month, day, hour, minute, second)
Value	ddddd	Concentration after display conversion
Unit	uuuuu	Concentration units after display conversion (mg/L, mg/kg, mg/g, mg/PC, Abs.)
Value (Raw)	ddddd	Raw concentration value
Units (Raw)	uuuuu	Units of raw concentration unit (fixed at mg/L)
Status	sssss	Error flag 0: No error 2: Warming up
Memo	mmmmmmmmmmmmmm	Entered memo

Output example:
Date,Value,Unit,Value(Raw),Unit(Raw),Status,Memo
2001/01/01 12:34:56,123,mg/g,123,mg/L,0,sample01
2001/01/02 12:34:56,123,mg/g,123,mg/L,2,sample02

Execution confirmation for [Save Calibration History]

This is a confirmation message for saving the calibration history to a USB memory stick.
When executed, a message of "Process has completed!" appears. Press the ESC button to return to the USB Memory screen.

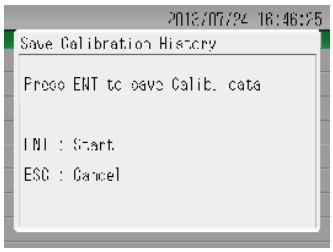


Fig. 51 Execution confirmation for [Save Calibration History]

The buttons and button functions which can be used while the execution confirmation for [Save Calibration History] is shown, are described in the table below.

Table 13 Button functions with execution confirmation for [Save Calibration History]

Button		Function	Page
ENT button		Saves the calibration history to a USB memory stick.	-
ESC button		Closes the message.	-

If the ENT button is pressed, the [Calibration History] is saved to a USB memory stick as a file in CSV format.
Each line describes one set of data. The values are separated by commas (",").
Saved items and formats are as shown in the table below.

Item (1st line is the title)	Format	Remarks
Date	yyyy/mm/dd hh:MM:ss	Date and time of calibration (year, month, day, hour, minute, second)
# of Span Calib. Point	nnnnn	Calib. Point 1 : 1point Calib. Point 5 : 5point
Span Point	ppppp	Calib. Point 1 : In case of 5 span calibration point, 1st span point Calib. Point 2 : In case of 5 span calibration point, 2nd span point Calib. Point 3 : In case of 5 span calibration point, 3rd span point Calib. Point 4 : In case of 5 span calibration point, 4th span point Calib. Point 5 : In case of 5 span calibration point, 5th span point
Standard	ddddd	Calibration concentration value (0 for zero calibration, set span value for span calibration)
Unit	uuuuu	Units of calibration concentration (fixed at mg/L)
Status	sssss	Error flag 0: No error 2: Warming up
SD	mmmmm	Standard deviation of calibration coefficient of span calibration points 1 to 5 (Display when complying with ASTM D7066-4)
RSD[%]	rrrrr	Coefficient of variation of calibration coefficient of span calibration points 1 to 5 (Display when complying with ASTM D7066-4)

Output example:
Date,# of Span Calib.point,Span point,Standard,Unit,Status,SD,RSD[%]
2001/01/01 12:34:56,0.0,mg/L,0
2001/01/02 12:34:56,200,mg/L,2
2001/01/02 12:34:56,5,5,200 mg/L,0,0.1,1.5

Execution confirmation for [Save Settings]

This is a confirmation message for saving the settings of the main unit to a USB memory stick. When executed, a message of "Process has completed!" appears. Press the ESC button to return to the USB Memory screen.

Fig. 52 Execution confirmation for [Save Settings]

The buttons and button functions, which can be used while the execution confirmation for [Save Settings] is shown, are described in the table below.

Table 14 Button functions with execution confirmation for [Save Settings]

Button		Function	Page
ENT button		Saves the settings of the main unit to a USB memory stick.	-
ESC button		Closes the message.	-

If the ENT button is pressed, the settings of the main unit are saved to a USB memory stick as a .cfg file.
The data ID and data value are indicated as text for each setting item category in the file.
Saved items are shown in the table below.

Setting item category	Item (data ID)	Description	Page
MeasureSetting	ExtractTime	Not used on this product.	-
	LayerSeparationTime	Not used on this product.	-
	FillSampleTime	Not used on this product.	-
	MeasureLimitTime	Measurement limit time	page 66
	DrainTime	Not used on this product.	-
	PurgeNum	Not used on this product.	-
	StabWaitTime	Stability wait time	page 67
	MeasMode	Not used on this product.	-
	ConvertionType	Measurement unit	page 68
	SolventVolume	Solvent volume	page 69
	SampleVolume	Sample volume	page 70
	Conc. Correction	Concentration correction	page 71
	ZeroShift	Zero shift value	page 72
	fl_ExtractLight	Not used on this product.	-
	MeasTrig	Not used on this product.	-
	DataLog	Save confirmation setting	page 72
	fl_Memo	Memo Saving setting	page 73
	fl_Minus	Display setting for negative value	page 73
	fl_RawData	Display setting for raw data	page 74
CalibrationSetting	SpanValue	Set span value	page 76
	ExtractTime	Not used on this product.	-
	LayerSeparationTime	Not used on this product.	-
	PurgeNum	Not used on this product.	-
	CalMode	Not used on this product.	-
	Calib.Point	Span calibration point	page 76
	Calib.Curve	Calibration curve	page 76
SystemSetting	Language	Language	page 78

An example of a setting file is shown in Fig. 53.

```
;-------------------------------------------------------------------------------------------------------------
; OCMA-550
;  Program No      : P2001239G
;  Software Version : 1.17
;=============================================================================================================
;
[MeasureSetting]
;-------------------------------------------------------------------------------------------------------------
; Measurement setting
;-------------------------------------------------------------------------------------------------------------
:ExtractTime              extract time                0, 10 - 600
:LayerSeparationTime      layer separation time         0, 10 - 600
:FillSampleTime           inflow time                 30 - 3600
:MeasureLimitTime         measure limit time            60 - 3600
:DrainTime                drain time                  30 - 3600
:PurgeNum                 purge num                    0 - 9
:StabWaitTime             stability wait time          0 - 300
:MeasMode                 measure mode                  0:Auto, 1:Semi-Auto, 2:Manual
:ConvertionType           display unit                 0:mg/L, 1:mg/kg, 2:mg/g, 3:mg/PC, 4:Abs.
:SolventVolume            solvent volume               1.0 - 20000.0
:SampleVolume             sample volume                0.001 - 10000.0
Conc. Correction          concentration correction     0.1 - 9.9
:ZeroShift                zero shift coef.            -100.0 - 100.0
:fl_ExtractLight          flag of extract light        0:OFF, 1:ON
:MeasTrig                 measure start trigger         1:Manual
:DataLog                  data logging type            0:Auto, 1:Manual
:fl_Memo                  flag of save memo.           0:OFF, 1:ON
:fl_Minus                 flag of display negative     0:OFF, 1:ON
:fl_RawData               flag of display raw value     0:OFF, 1:ON
;-------------------------------------------------------------------------------------------------------------
#ExtractTime : 40
#LayerSeparationTime : 30
#FillSampleTime : 60
#MeasureLimitTime : 300
#DrainTime : 30
#PurgeNum : 2
#StabWaitTime : 180
#MeasMode : 0
#ConvertionType : 0
#SolventVolume : 0.000000E+00
#SampleVolume : 1.600000E+01
#Conc. Correction : 1.0
#ZeroShift : 0.000000E+00
#fl_ExtractLight : 1
#MeasTrig : 1
#DataLog : 0
#fl_Memo : 0
#fl_Minus : 1
#fl_RawData : 0
;
[CalibrationSetting]
;-------------------------------------------------------------------------------------------------------------
; Calibration setting
;-------------------------------------------------------------------------------------------------------------
:SpanValue                span calibration point       1 - 200

:SpanValue1               span calibration point       1 - 200
:SpanValue2               span calibration point       1 - 200
:SpanValue3               span calibration point       1 - 200
:SpanValue4               span calibration point       1 - 200
:SpanValue5               span calibration point       1 - 200
:ExtractTime              extract time                0, 10 - 600
:LayerSeparationTime      layer separation time         0, 10 - 600
:PurgeNum                 purge num                    0 - 9
:CalMode                  calibration mode             0:Auto, 1:Manual
:Calib. Point.            calibration point.             0:1Point, 1:5Point
:Calib.Curve              calibration curve            RSD[%], --- :Invalid
;-------------------------------------------------------------------------------------------------------------
#SpanValue : 2.000000E+02

#SpanValue1 : 4.000000E+01
#SpanValue2 : 8.000000E+01
#SpanValue3 : 1.200000E+02
#SpanValue4 : 1.600000E+02
#SpanValue5 : 2.000000E+02
#ExtractTime : 30
#LayerSeparationTime : 10
#PurgeNum : 0
#CalMode : 0
#Calib. Point : 1
#Calib.Curve : XX.X
;
[SystemSetting]
;=============================================================================================================
; System setting
;
:Language                 Language setting             0:English, 1:Japanese, 2:Russian
:BackLightOffTime         Back Light OFF Time setting  0:OFF, 1:10min, 2:30min, 3:60min
;-------------------------------------------------------------------------------------------------------------
#Language : 1
#BackLightOffTime : 3
```

Fig. 53 Setting file example

Memory Clear screen

If [Memory Clear] is selected on the Data Top screen, the Memory Clear screen opens.
The Memory Clear screen shows a menu for selection of data to be deleted from internal memory.
If an item is selected with the up/down button and the ENT button is pressed, an execution confirmation message for deletion of the selected data appears. To delete the selected data, press the ENT button while the execution confirmation appears.

Fig. 54 Memory Clear screen

Table 15 Menu on the Memory Clear screen

Item	Description	Page
Clear Measurement History	Shows an execution confirmation for [Clear Measurement History].	page 61
Clear Calibration History	Shows an execution confirmation for [Clear Calibration History].	page 61
Initialize Setting	Shows an execution confirmation for [Initialize Setting].	page 62
Initialize Calibration value	Shows an execution confirmation for [Initialize Calibration Value].	page 63

The buttons and button functions, which can be used while the Memory Clear screen is shown, are described in the table below.

Table 16 Button functions with the Memory Clear screen

Button		Function	Page
ENT button		Shows an execution confirmation for the selected item.	-
Up button		Selects the next item up.	-
Down button		Selects the next item down.	-
ESC button		Returns to the Data Top screen.	page 49

Execution confirmation for [Clear Measurement History]

This is a confirmation message for clearing the measurement history.
When executed, a message of "Process has completed!" appears. Press the ESC button to return to the Memory Clear screen.

Fig. 55 Execution confirmation for [Clear Measurement History]

The buttons and button functions, which can be used while the execution confirmation for [Clear Measurement History] is shown, are described in the table below.

Table 17 Button functions with execution confirmation for [Clear Measurement History]

Button		Function	Page
ENT button		Clears the measurement history.	-
ESC button		Closes the message.	-

Execution confirmation for [Clear Calibration History]

This is a confirmation message for clearing the calibration history.
When executed, a message of "Process has completed!" appears. Press the ESC button to return to the Memory Clear screen.

Fig. 56 Execution confirmation for [Clear Calibration History]

The buttons and button functions, which can be used while the execution confirmation for [Clear Calibration History] is shown, are described in the table below.

Table 18 Button functions with execution confirmation for [Clear Calibration History]

Button		Function	Page
ENT button		Clears the calibration history.	-
ESC button		Closes the message.	-

Execution confirmation for [Initialize Setting]

This is a confirmation message for initializing the settings.
When executed, a message of "Process has completed!" appears. Press the ESC button to return to the Memory Clear screen.

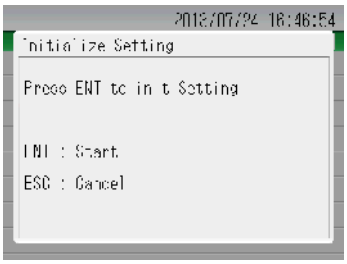


Fig. 57 Execution confirmation for [Initialize Setting]

The buttons and button functions, which can be used while the execution confirmation for [Initialize Setting] is shown, are described in the table below.0

Table 19 Button functions with execution confirmation for [Initialize Setting]

Button		Function	Page
ENT button		Initializes the settings.	-
ESC button		Closes the message.	-

■ Execution confirmation for [Initialize Calibration Value]

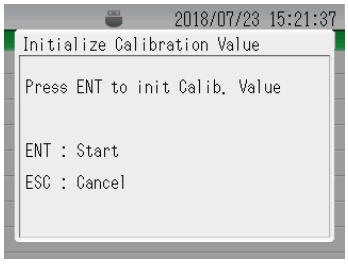


Fig. 58 Execution confirmation for [Initialize Calibration Value]

The buttons and button functions, which can be used with the execution confirmation for [Initialize Calibration Value] appearing, are described in the table below.

Table 20 Button functions with execution confirmation for [Initialize Calibration Value]

Button		Function	Page
ENT button		Initializes the settings.	-
ESC button		Closes the message.	-

Setting

Setting Top screen

The Setting Top screen appears when the SET button is pressed on the Hold Measurement Top screen, Calibration Top screen, or the Data Top screen.
The Setting Top screen shows a menu for setting.
Select an item with the up/down button and press the ENT button to move to the screen for the selected function.

Fig. 59 Setting Top screen

Table 21 Menu on the Setting Top screen

Item	Description	Page
Measurement Setting	Opens the Measurement Setting screen.	page 64
Calibration Setting	Opens the Calibration Setting screen.	page 75
System Setting	Opens the System Setting screen.	page 77

The buttons and button functions, which can be used while the Setting Top screen is shown, are described in the table below.

Table 22 Button functions with the Setting Top screen

Button		Function	Page
DATA button		Opens the Data Top screen.	page 49
CAL button		Select the zero mode or span mode	page 9
MEAS button		Opens the Hold Measurement Top screen.	page 9
ENT button		Enters the selected item.	-
Up button		Selects the next item up.	-

Button		Function	Page
Down button		Selects the next item down.	-
ESC button		Returns to the Hold Measurement Top screen or Calibration Top screen.	page 9

Measurement Setting screen

If [Measurement Setting] is selected on the Setting Top screen, the Measurement Setting screen opens.
The Measurement Setting screen shows the current measurement settings.
If an item is selected with the up/down button and the ENT button is pressed, a pop-up screen appears to let you change the setting of the selected item.

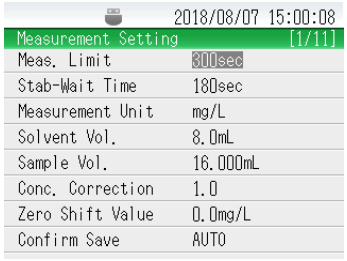


Fig. 60 Measurement Setting screen

The setting items on the Measurement Setting screen are shown in the table below.

Table 23 Items on the Measurement Setting screen

Item	Description	Setting range (unit) or selections	Page
Meas. Limit	Sets the maximum measurement time in hold measurement and calibration. If the measured value does not stabilize, measurement ends when the set time (from the start of measurement or calibration) elapses and the measured value at that point is displayed.	60 to 3600 (sec)	page 66
Stab-Wait Time	Sets the time required to stand by until stability is determined.	0 to 300 (sec)	page 67
Measurement Unit	Sets the unit of measured values.	mg/L, mg/kg, mg/g, mg/PC, Abs.	page 68
Solvent Vol.	Sets the solvent volume used as a coefficient when the measured value is converted to mg/kg, mg/g, or mg/PC.	1.0 to 20000.0 (mL)	page 69
Sample Vol.	Sets the sample volume used as a coefficient when the measured value is converted to mg/kg, mg/g, or mg/PC.	0.001 to 10000.0 or 1.0 to 10000.0 The unit displayed depends on the setting of [Measurement Unit].	page 70
Conc. Correction	Set the correction value for the measured value.	0.1 to 9.9	page 71
Zero Shift Value	Sets the shift correction value for zero liquid.	-100.0 to 100.0 (mg/L)	page 72
Confirm Save	Sets whether measurement data is automatically saved to internal memory after a measured value is settled or a message appears for execution of the data save.	AUTO, MANUAL	page 72

Item	Description	Setting range (unit) or selections	Page
Save Memo	Sets whether a memo indicating the measurement conditions or other information is saved together with the measured values, if measurement data is saved.	OFF, ON	page 73
Display Negative	Sets whether a negative value is displayed or zero is displayed, if the measured value is a negative value.	OFF, ON	page 73
Display Raw Data	Sets whether or not the concentration prior to conversion is displayed together with the converted value, if converted values are displayed.	OFF, ON	page 74

The buttons and button functions, which can be used while the Measurement Setting screen is shown, are described in the table below.

Table 24 Button functions with the Measurement Setting screen

Button		Function	Page
ENT button		Shows the screen for setting the selected item.	-
Up button		Selects the next item up.	-
Down button		Selects the next item down.	-
ESC button		Returns to the Setting Top screen.	page 64

Meas. Limit

Use this screen to set the maximum measurement time in hold measurement mode and calibration mode.
If the measured value does not stabilize, measurement ends when the set time (from the start of measurement or calibration) elapses, and the measured value at that point is displayed.

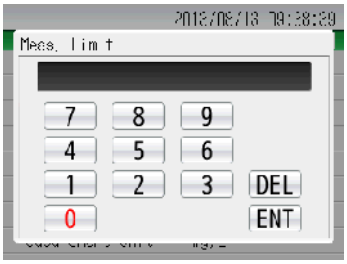


Fig. 61 Meas. Limit screen

The following settings are available. The default setting is 300 (sec).

Setting range	Units
60 to 3600	sec

For the buttons and functions, which can be used while this screen is shown, refer to Table 2 (page 13).

Stab-Wait Time

Use this screen to set the time required to stand by until stability is determined.

Fig. 62 Stab-Wait Time screen

The following settings are available. The default setting is 180 (sec).

Setting range	Units
0 to 300	sec

For the buttons and functions, which can be used while this screen is shown, refer to Table 2 (page 13).

Note

Be sure to set the time longer than the Stab-Wail Time. The stabilization wait time, recommend 180 to 300 seconds.

Measurement Unit

Use this screen to set the units of measured values.

Reference

"Conversion of measurement units" (page 90)

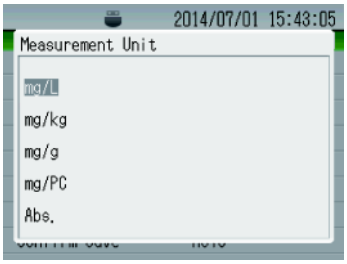


Fig. 63 Measurement Unit screen

The following settings are available. The default setting is "mg/L".

Selection	Description
mg/L	Shows measured concentration values in units of mg/L.
mg/kg	Shows measured concentration values in units of mg/kg.
mg/g	Shows measured concentration values in units of mg/g.
mg/PC	Shows measured concentration values converted to the value of mg/PC units.
Abs.	Shows measured concentration values converted to the value of Abs. units (Use the values only as a guide.)

For the buttons and functions, which can be used while this screen is shown, refer to Table 1 (page 12).

Solvent Vol.

Use this screen to enter the solvent volume to be used as a coefficient for conversion of the measurement unit into mg/kg, mg/g, or mg/PC.

Reference

"Conversion of measurement units" (page 90)

Fig. 64 Solvent Vol. screen

The following settings are available. The default setting is 8.0 (mL).

Setting range	Units
1.0 to 20000.0	mL

For the buttons and functions, which can be used while this screen is shown, refer to Table 2 (page 13).

Sample Vol.

Use this screen to enter the sample volume to be used as a coefficient for conversion of the measurement unit into mg/kg, mg/g, or mg/PC.

Reference

"Conversion of measurement units" (page 90)

Fig. 65 Sample Vol. screen

The following settings are available. The default setting is 16.0 (the units depend on the set [Measurement Unit]).

Setting range	Units
0.001 to 10000.0	The units depend on the set [Measurement Unit] (refer to "Measurement Unit" (page 68)). kg if the [Measurement Unit] is set to mg/kg g if the [Measurement Unit] is set to mg/g
1.0 to 10000.0	PC if the [Measurement Unit] is set to mg/PC

For the buttons and functions, which can be used while this screen is shown, refer to Table 2 (page 13).

Conc. Correction

Enter the coefficient for correcting the measured value.
Correction value = (measured value) × (Conc. correction input value)

Note

It can not be used when the number of span calibration points is 5point. ("Calibration (ASTM D7066-4)" (page 28)

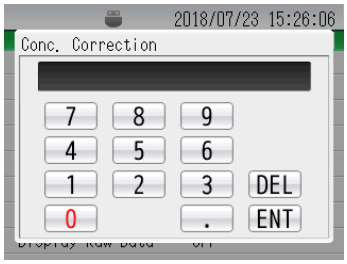


Fig. 66 Conc. Correction screen

The following settings are available. The default setting is 1.0.

Setting range	Description
0.1 to 9.9	Correct measured values.

Zero Shift Value

Use this screen to set the shift correction value for zero liquid.
The sum of this set value and the raw measured value is displayed as the measured value.

Reference

"Conversion of measurement units" (page 90)

Fig. 67 Zero Shift Value screen

The following settings are available. The default setting is 0.0 (mg/L).

Setting range	Units
-100.0 to 100.0	mg/L

For the buttons and functions, which can be used while this screen is shown, refer to Table 2 (page 13).

Confirm Save

Use this screen to set whether saving of settled measured values to internal memory takes place automatically or by manual selection.

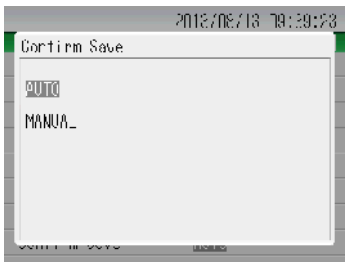


Fig. 68 Confirm Save screen

The following settings are available. The default setting is "AUTO".

Selection	Description
AUTO	Saving of settled measured values to internal memory takes place automatically.
MANUAL	After a measured value is settled, a message appears to let you select whether the values are saved to internal memory.

For the buttons and functions, which can be used while this screen is shown, refer to Table 1 (page 12).

Save Memo

Use this screen to set whether or not the measurement conditions or other information will be saved together with the measured values.

Fig. 69 Save Memo screen

The following settings are available. The default setting is "OFF".

Selection	Description
OFF	If measurement data is saved, only measured values are saved.
ON	If measurement data is saved, a memo indicating measurement conditions or other information is saved together with the measured values.

For the buttons and functions, which can be used while this screen is shown, refer to Table 1 (page 12).

Display Negative

Use this screen to set whether a negative value is displayed or zero is displayed when the measured value is a negative value.

Fig. 70 Display Negative screen

The following settings are available. The default setting is "OFF".

Selection	Description
OFF	If the measured value is a negative value, zero is displayed.
ON	If the measured value is a negative value, the negative value is displayed.

For the buttons and functions, which can be used while this screen is shown, refer to Table 1 (page 12).

Display Raw Data

Use this screen to set whether the concentration prior to conversion is displayed or not, if converted values are displayed or not.

Fig. 71 Display Raw Data screen

The following settings are available. The default setting is "OFF".

Selection	Description
OFF	Raw data is not displayed, if converted values are displayed.
ON	Raw data is displayed, if converted values are displayed.

For the buttons and functions, which can be used while this screen is shown, refer to Table 1 (page 12).

Calibration Setting screen

If [Calibration Setting] is selected on the Setting Top screen, the Calibration Setting screen opens.
The Calibration Setting screen shows the current calibration settings.
If an item is selected with the up/down button and the ENT button is pressed, a pop-up screen appears to let you change the setting of the selected item.

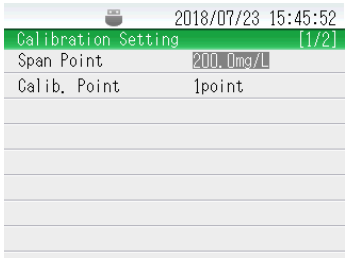


Fig. 72 Calibration Setting screen

The setting items on the Calibration Setting screen are as shown in the table below.

Table 25 Items on the Calibration Setting screen

Item	Description	Setting range (units)	Page
Span Point	Sets the concentration of the span liquid for calibration.	1.0 to 200.0 (mg/L)	page 76
Calib. Point	Sets the span calibration points.	1point, 5point	page 76
Calib. Curve	It is displayed when 5point is selected	-	page 76

The buttons and button functions, which can be used while the Calibration Setting screen is shown, are described in the table below.

Table 26 Button functions with the Calibration Setting screen

Button		Function	Page
ENT button		Shows the screen for setting the selected item.	-
ESC button		Returns to the Setting Top screen.	page 64

Span Point

Use this screen to set the concentration of the span liquid for calibration.

Fig. 73 Span Point screen

The following settings are available. The default setting is 200 (mg/L).

Setting range	Units
1.0 to 200.0	mg/L

For the buttons and functions, which can be used while this screen is shown, refer to Table 2 (page 13).

Calib. Point

Use this screen to set the span calibration points.

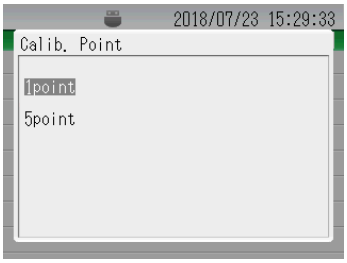


Fig. 74 Calib. Point screen

The following settings are available.The default setting is “1point”.

Selection	Description
1point	Perform span caliblation with 1point.
5point	It’s used when complying with ASTM D7066-4 (page 28). Perform span calibration with 5point.

For the buttons and functions, which can be used with this screen appearing, refer to Table 2 (page 13).

Calib. Curve

It is displayed when 5point is selected (Complying with ASTM D7066-4).

Reference

「Calibration (ASTM D7066-4)」(page 28)

System Setting screen

If [System Setting] is selected on the Setting Top screen, the System Setting screen opens.
The System Setting screen shows the current system settings.
If an item is selected with the up/down button and the ENT button is pressed, a pop-up screen appears to let you change the setting of the selected item.

Fig. 75 System Setting screen

The setting items on the System Setting screen are as shown in the table below.

Table 27 Items on the System Setting screen

Item	Description	Setting range or selections	Page
Language	Sets the language.	English, Japanese, Russian, Korean, Chinese, French, German	page 78
B-Light Off Time	Sets the time of turning OFF the light of the LCD automatically.	OFF, 10 min, 30 min, 60 min	page 78
Date	Sets the date.	2000/01/01 to 2099/12/31	page 79
Time	Sets the current time.	00:00 to 23:59	page 79
Ver.	Shows the software version (fixed value) in the right column.	-	-

The buttons and button functions, which can be used while the System Setting screen is shown, are described in the table below.

Table 28 Button functions with the System Setting screen

Button		Function	Page
ENT button		Shows the screen for setting the selected item.	-
Up button		Selects the next item up.	-
Down button		Selects the next item down.	-
ESC button		Returns to the Setting Top screen	page 64

Note

The screen does not change, if [Ver.] is selected and the ENT button is pressed.

Language

Use this screen to set the system language.

Fig. 76 Language screen

The following settings are available. The default setting is "ENGLISH".

Selection	Description
English	Displays in English.
Japanese	Displays in Japanese.
Russian	Displays in Russian.
Korean	Displays in Korean.
Chinese	Displays in Chinese.
French	Displays in French.
German	Displays in German.

For the buttons and functions, which can be used while this screen is shown, refer to Table 1 (page 12).

B-Light Off Time

Use this screen to set the time of turning OFF the light of the LCD automatically.

Fig. 77 B-Light Off Time screen

The following settings are available. The default setting is "10 min".

Selection	Description
OFF	The light of the LCD is not turned OFF automatically.
10 min	The light of the LCD is turned OFF 10 minutes after the last button operation.
30 min	The light of the LCD is turned OFF 30 minutes after the last button operation.
60 min	The light of the LCD is turned OFF 60 minutes after the last button operation.

For the buttons and functions, which can be used while this screen is shown, refer to Table 1 (page 12).

Date

Use this screen to set the date.

Fig. 78 Date screen

The following settings are available.

Setting range
2000/01/01 to 2099/12/31

For the buttons and functions, which can be used while this screen is shown, refer to Table 2 (page 13).

Time

Use this screen to set the current time.

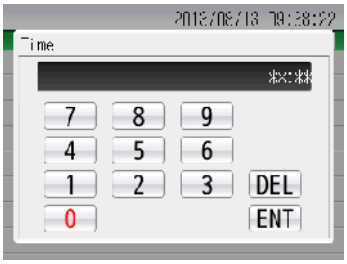


Fig. 79 Time screen

The following settings are available.

Setting range
00:00 to 23:59

For the buttons and functions, which can be used while this screen is shown, refer to Table 2 (page 13).

Maintenance

Contact for maintenance

Manufacturer: HORIBA Advanced Techno Co., Ltd.
2 Miyanohigashi-cho, Kisshoin, Minami-ku, Kyoto, 601-8551, Japan

Maintenance item list

To keep this product in good condition and operating at top performance, perform maintenance regularly.

Table 29 Maintenance items

Item	Maintenance interval/frequency	Page
Cleaning the fan filter	Once a week	page 81
Washing the fan filter	Once a month	page 82
Washing the measurement cell	When measurements of the day are finished.	page 83

Cleaning the fan filter

If the filter, starts to clog and the internal temperature rises, accurate measurement values can no longer be obtained and there is a risk of product failure. Clean the fan filter periodically.

Maintenance interval guideline

Once a week

Items required

- Flathead screwdriver or similar tool

Work procedure

1. **Turn OFF the power.**
2. **Insert the flathead screwdriver into the opening of the retainer and remove the retainer using leverage from the fan vent on the back of the main unit.**

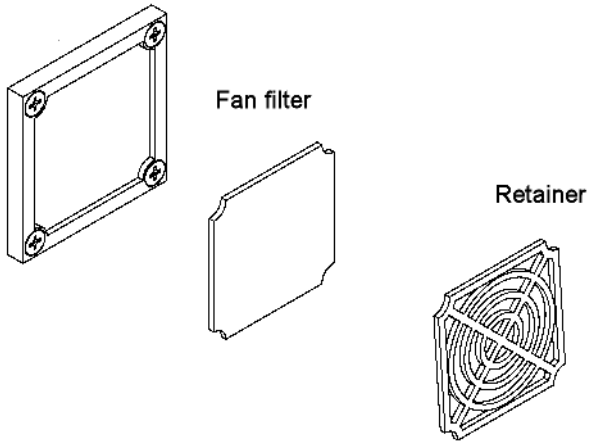


Fig. 80 Removing the fan filter

3. **Remove the fan filter and tap to clean.**

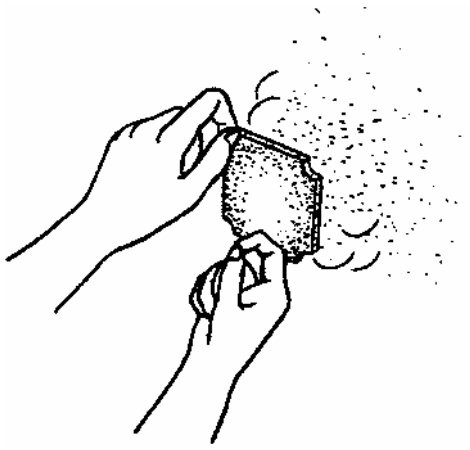


Fig. 81 Cleaning the fan filter

4. **Re-attach the fan filter and retainer.**

Washing the fan filter

If the filter, starts to clog and the internal temperature rises, accurate measurement values can no longer be obtained and there is a risk of product failure. Wash the fan filter periodically.

Maintenance interval guideline

Once a month

Items required

- Flathead screwdriver or similar tool

Work procedure

1. **Turn OFF the power.**
2. **Insert the flathead screwdriver into the opening of the retainer and remove the retainer using leverage from the fan vent on the back of the main unit..**

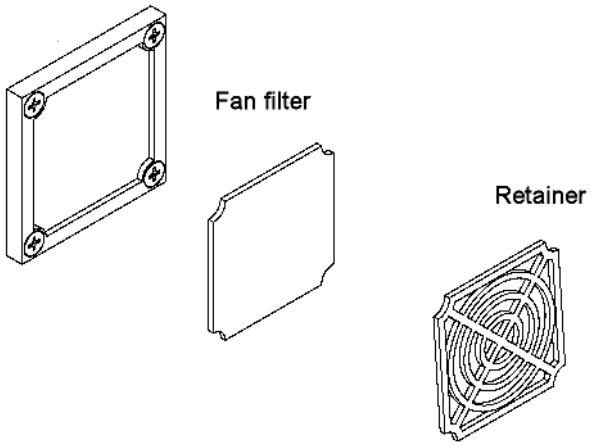


Fig. 82 Removing the fan filter

3. **Remove the fan filter and wash with water to remove dirt.**
4. **Allow the fan filter to dry completely.**
5. **Re-attach the fan filter and retainer.**

Washing the measurement cell

⚠ CAUTION
Chemical hazard (solvent S-316) Inhalation or accidental ingestion of a large amount of solvent S-316 may be harmful. Observe the following rules when handling: • Ventilate the work area sufficiently. • Wear a protective mask and protective gloves. • Wash hands well after handling the solvent.
Take care not to pinch your fingers when opening or closing the measurement cover. During closing the measurement cover, do not release your hand until you hear a click sound.

■ Maintenance interval guideline

When measurements of the day are finished.

■ Items required

- Solvent S-316 (optional)

■ Work procedure

1. **Empty the measurement cell**
2. **Fill clean S-316 solvent into measurement cell**
3. **Repeat step1. to 2. more than 3 times.**
4. **Empty the measurement cell and let dry.**

Troubleshooting

Alarm displays and actions

If an alarm occurs, the alarm icon at the top of the LCD flashes.
You can check the current alarm on the Current Alarm screen.

Reference

For information on the Current Alarm screen, refer to "Current Alarm screen" (page 50).

List of alarms

Display	Description	Cause	Action
Clock	The clock was reset because power was not supplied to RTC during startup.	The clock battery is dead.	The date and time are initialized to 2001/01/01 00: 00:00. Refer to "System Setting screen" (page 77) to set the date and time. The alarm will be cleared until the power is turned OFF. Contact your local dealer or service station to replace the clock battery.
	Loading RTC failed during startup.	The clock has failed.	
Load (Fact)	Failed to read factory settings.	The internal memory has failed.	Contact your local dealer or service station.
Load (User)	Failed to read general settings.	The internal memory has failed.	Contact your local dealer or service station.
Load (Meas)	Failed to read the measurement history.	The internal memory has failed.	Contact your local dealer or service station.
Load (Calib)	Failed to read the calibration history.	The internal memory has failed.	Contact your local dealer or service station.
Load (Alarm)	Failed to read alarm history.	The internal memory has failed.	Contact your local dealer or service station.
Save (Fact)	Failed to save or delete factory settings.	The internal memory has failed.	Contact your local dealer or service station.
Save (User)	Failed to save or delete general settings.	The internal memory has failed.	Contact your local dealer or service station.
Save (Meas)	Failed to save or delete measured values.	The internal memory has failed.	Contact your local dealer or service station.
Save (Calib)	Failed to save or delete the calibration history.	The internal memory has failed.	Contact your local dealer or service station.
Save (Alarm)	Failed to save or delete Alarm History.	The internal memory has failed.	Contact your local dealer or service station.
Heater Temp	The measurement temperature is different from the target temperature of temperature control.	The heater or the temperature sensor has failed.	Contact your local dealer or service station.
Internal Temp	The measurement temperature is out of specified range.	The internal temperature is too high.	Contact your local dealer or service station.

Display	Description	Cause	Action
Light	Intensity of light source decreased or light source does not working.	The light source has deteriorated or a wire is broken.	Contact your local dealer or service station.
Warm-Up	Warming up.	The power has just been turned ON.	The message will clear 25 minutes after the power is turned ON.
Stability	The range cannot be determined within the specified time, or the measured value does not stabilize within the specified time.	The measurement cover is open.	Close the measurement cover.
		Insufficient sample volume.	Pour a measured liquid into the measurement cell so that a liquid level comes to a specified position.
		Room temperature or sample temperature is too high.	Keep the room temperature or sample temperature constant referring to "Problems related to measured values" (page 86).
Invalid Data	An error occurred during measurement or the value was measured during warm-up.	Measurement was performed during warm-up.	Wait at least 25 minutes after turning ON the power before performing measurement.
Calib. Failure	Zero calibration or span calibration failed.	Abnormal calibration liquid concentration.	Check the concentration of the calibration liquid and perform calibration again using the correct concentration.
		The sensor has deteriorated.	Contact your local dealer or service station.
Meas. Range	The calculated measured value is outside the measurement range.	The concentration of the sample liquid is outside the range from -20 mg/L to 220 mg/L.	Refer to "Problems related to measured values" (page 86). If needed, re-prepare the sample liquid and perform measurement again.
		The sensor has deteriorated.	Contact your local dealer or service station.

Problems not indicated by an alarm

Corrective actions for problems which are not indicated by an alarm are described below.
If a problem other than one of the problems below occurs, or if a problem is not resolved after the corrective action is taken, contact your local dealer or service station.

■ Problems related to product operation

Problem	Cause	Action
Nothing appears on the LCD.	The power cable is not connected.	Connect the product to a power outlet with the power cable.
	The power switch is not switched ON.	Turn ON the power switch.
	A fuse has blown.	Contact your local dealer or service station.
A switch or the LCD does not work normally.	The product is in an unexpected state.	Turn the power OFF and ON. If the problem persists, contact your local dealer or service station.

■ Problems related to measured values

Problem	Cause	Action
The displayed measured value is 0 mg/L to -0.5 mg/L.	The concentration of the measurement liquid is 0 mg/L.	This value is within the repeatability range of the product and is not abnormal.
The measured value is negative.	The lot or repeatability of the solvent in the sample liquid is different from that in the calibration liquid.	Use solvent of the same lot and repeatability in the calibration liquid and sample liquid. If you must use solvents of differing lots or repeatability, use a mixture of the solvents to prepare the calibration liquid and sample liquid, re-calibration, and perform measurement.
	The cell condition differs between during calibration and during measurement.	Perform "Preliminary measurement" (page 22) before calibration. Or perform zero calibration again immediately before sample measurement.
The measured value is too low.	The solvent used for calibration is different from the solvent used for measurement.	Perform zero calibration, span calibration, and measurement again using the same solvent. If you must use solvents of different lots or repeatability, use a mixture of the solvents to prepare the calibration liquid and sample liquid, re-calibrate, and perform measurement (refer to "Solvent S-316" (page 91)).
	The concentration of the calibration span liquid is different from [Span Point] in the calibration settings.	Prepare calibration span liquid of the same concentration as [Span Point] in the calibration settings, and perform calibration again.
	The solvent has insufficient repeatability, and the concentration of the oil content of the solvent itself is too high.	Using new solvent as zero calibration liquid, measure the reprocessed solvent using the product. Discard reclaimed solvent if its concentration is more than 10 mg/L higher than that of new solvent.

Problem	Cause	Action
The measured value is too low.	A sudden change of room temperature, humidity, or liquid temperature occurred.	Use a thermometer to monitor the room temperature and humidity, as well as keep the room temperature and humidity constant during measurement. Measurement of low-concentration samples is particularly susceptible to changes of room temperature, humidity and liquid temperature. The effect of liquid temperature is greater than the effect of room temperature. As humidity increases, the indicated value declines.
The measured value fluctuates.	Air bubbles adhere to the window.	Shake the measurement cell.
	Moisture is included in the measurement cell.	Dry the window adequately at 4°C to 40°C in a constant-temperature bath. Or clean the window with ethanol without any stabilizers, remove water, and then dry ethanol completely by vaporizing.
	The ambient temperature is unstable.	Refer to "Stability of indicated values" (page 91).
"UNDER" is displayed instead of the measured value.	The detected concentration of the measurement liquid is −20 mg/L or less.	Refer to the causes and actions for "The measured value is too low." and "The measured value is negative." above.
	The measurement cell is removed from the measurement part.	Wait for a while in the measurement mode. The indicated value will be stable.
The measured value is too high.	The solvent contains more water than usual due to the effects of emulsifying substances.	Remove water from the solvent layer, and use the result as the measurement liquid (refer to "Examples of oil extraction by solvent" (page 42)).
	Water has entered the measurement cell.	Dry the window adequately at 4°C to 40°C in a constant-temperature bath. Or clean the window with ethanol without any stabilizers, remove water, and then dry ethanol completely by vaporizing.
"OVER" is displayed instead of the measured value.	The detected concentration of the measurement liquid is 220 mg/L or more.	Refer to the causes and actions for "The measured value is too high." above.
	The measurement cell is removed from the measurement part.	Wait for a while in the measurement mode. The indicated value will be stable.
The measured value is different than expected.	The concentration of the calibration liquid is incorrect.	Perform zero calibration and span calibration again using the correct concentration of calibration liquid.
	The solvent used for calibration is different from the solvent used for measurement.	Perform zero calibration, span calibration, and measurement again using the same solvent.
	Insufficient liquid in the measurement cell.	A solvent to the specified level of the measurement cell.
	The ambient temperature is outside the operating temperature range.	Perform measurement in a location where the ambient temperature range is 0°C to 40°C.
	The span liquid concentration is too low.	Use the span liquid of 10 mg/L or higher concentration.

Note

- **Even when the same solvent is used for calibration and measurement, minute water content effects may cause the indicated value to be negative. If needed, remove water from the solvent layer referring to "Examples of oil extraction by solvent" (page 42), and then perform measurement.**
- **If ultrasonic treatment or filtration under low pressure was performed, the characteristics of the solvent may change during measurement (for example of residual oil content). This may cause a negative value. Calibrate using solvent given the same treatment.**
- **If solvents of different lots or repeatability are used for calibration and measurement, you can measure the solvent to be used for measurement and subtract this value from the measured value of the sample liquid to get the concentration of the oil content of the sample.**
  (Concentration of oil content of sample) = (Measured value of sample liquid) - (Measured value of solvent used for measurement)

Reference

About this product

Measurement principle

As indicated in Fig. 83, oils have an absorption band in the vicinity of wavelengths 3.4 μm to 3.5 μm (2941 cm^{-1} to 2857 cm^{-1}) based the expansion and contraction of groups such as (-CH_2-) and (-CH_3) that are particular to hydrocarbons.
This product calculates the concentration of oil content by measuring this infrared absorption.

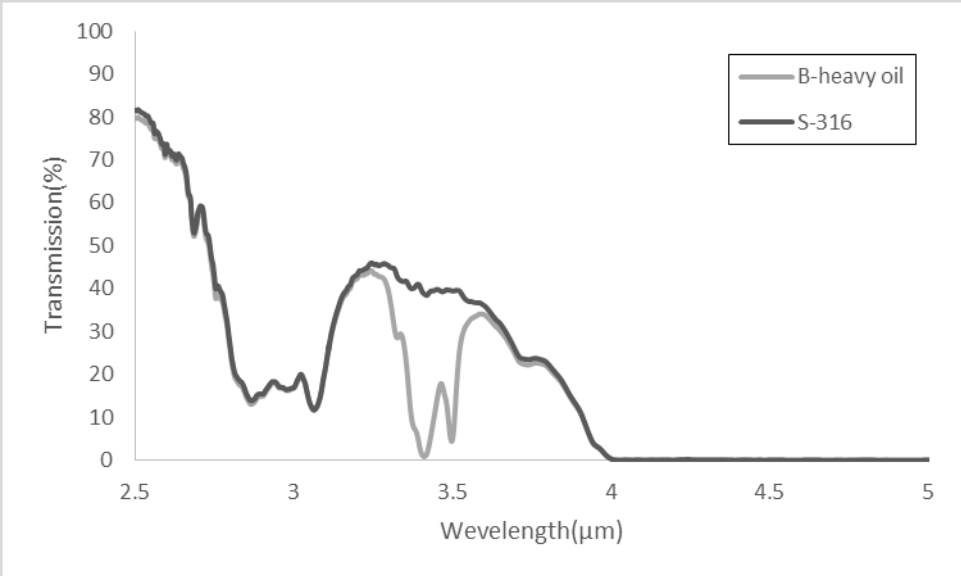


Fig. 83 Infrared absorption spectrums of solvent S-316 and oil

The solvent S-316 that is used for extraction has the following characteristics.

- Less absorption in the vicinity of wavelengths 3.4 μm to 3.5 μm (2941 cm^{-1} to 2857 cm^{-1})
- Does not blend with water
- Large difference in specific gravity with water
- Easily dissolves oil

These properties can be used to extract (dissolve) oil dispersed in water into solvent S-316 and then measure the concentration of the oil content of the sample water by means of the changes in the amount of absorption of infrared light in the vicinity of wavelengths 3.4 μm to 3.5 μm of the extracted liquid.

Measurement time

This product automatically determines the stability of the measured value. For this reason, at least 20 seconds are required from the start of measurement until display of the measurement results (When "Stab-Wait Time" (page 67) is set to 0 seconds.).
The flow of measurement is as follows:

1. **The 10-second moving average is obtained for the measured value of 1-second sampling.**
2. **If the change of moving average over 10 seconds is less than 0.1 mg/L, the measured value has stabilized.**
3. **The moving average at this point is displayed as the measurement result.**

Conversion of measurement units

If the measurement units are set to mg/kg, mg/g, or mg/PC, the value, which is converted from the value measured in mg/L, is displayed. The conversion equations are shown below.

mg/kg

$$\text{RESULT (mg/kg)} = \text{RESULT} \times \frac{\text{SOLVENT}}{\text{SAMPLE}}$$

RESULT (mg/kg):	mg/kg converted value (mg/kg)
RESULT:	mg/L measured value (mg/L)
SOLVENT:	Solvent volume setting/1000 (L) (Refer to "Solvent Vol." (page 69).)
SAMPLE:	Sample volume setting (kg) (Refer to "Sample Vol." (page 70).)

mg/g

$$\text{RESULT (mg/g)} = \text{RESULT} \times \frac{\text{SOLVENT}}{\text{SAMPLE}}$$

RESULT (mg/g):	mg/g converted value (mg/g)
RESULT:	mg/L measured value (mg/L)
SOLVENT:	Solvent volume setting/1000 (L) (Refer to "Solvent Vol." (page 69).)
SAMPLE:	Sample volume setting (g) (Refer to "Sample Vol." (page 70).)

mg/PC

$$\text{RESULT (mg/PC)} = \text{RESULT} \times \frac{\text{SOLVENT}}{\text{SAMPLE}}$$

RESULT (mg/PC):	mg/PC converted value (mg/PC)
RESULT:	mg/L measured value (mg/L)
SOLVENT:	Solvent volume setting/1000 (L) (Refer to "Solvent Vol." (page 69).)
SAMPLE:	Sample volume setting (PC) (Refer to "Sample Vol." (page 70).)

Solvent S-316

Characteristics

Solvent S-316 has the characteristics shown below, and satisfies the conditions required of a solvent for oil content extraction.

- Although there is absorption near the 3000 cm^{-1} absorption wavelength of the hydrocarbon group, this absorption can be clearly distinguished from that of oil.
- Available for measurement in wide range of temperature due to the boiling point of 134°C and the melting point of −143°C.
- Chemically stable in acid, alkali, oil and water.
- Little solubility in water.
- Involatile, with a low vapor pressure.
- Non-flammable, no danger of explosion
- Low toxicity for the human body, very safe.

Properties of S-316

Chemical formula	$Cl(CF_2\text{-}CFCl)_2Cl$
Molecular weight	304
Boiling point	134°C
Melting point	−143°C
Density	1.75 g/mL (25°C)
Vapor pressure	0.0015 MPa (25°C)
Saturated solubility in water	0.0048 g/100 g (25°C)
Acute oral toxicity (LD50)	52.5 g/kg or more

Cautions

Stability of indicated values

To improve the stability of indicated values, observe the precautions below.

- Perform measurement in the temperature- and humidity-stabilized environment. Also use calibration liquid and measurement liquid after being kept at constant temperature because solvent S-316 causes density change through temperature change.
- It is recommended to perform measurement in the stable condition that the temperatures of the main unit, the measurement liquid, the solvent, the room are from 5°C to 30°C, and the room humidity is less than 80%. If the temperature of the measurement liquid or the solvent is lower than the internal temperature of the main unit, dew condensation may occur inside the main unit and the measurement cell, and the indicated value may fluctuate or shift.
  If the room temperature is less than 5°C, the viscosity of solvent S-316 will increase and the indicated value may be low. In this case, raise the room temperature over 5°C.
- Equalize liquid temperature between during calibration and during measurement. For example, if liquid temperature during measurement is 2°C higher than during calibration, the measurement value will decrease by approx. 1.0 mg/L.

● Extracting oil from a part sample

When washing a part sample with S-316 to extract oil, consideration must be given to volatilization of the S-316. If the S-316 volatilizes during washing, accurate measurement will not be possible. Either wash under conditions in which S-316 will not volatilize, or calculate the oil content amount based on the amount of S-316 collected after washing.
A method that involves blowing S-316 onto the part using a pipette or other utensil causes S-316 volatilization and creates a likelihood that oil will remain on the part surface, and thus cannot be recommended. If this type of method is used, verify in advance the conditions required for sufficient extraction, such as increasing the amount of S-316.
If volatilization of solvent S-316 at the stage of extraction cannot be avoided, you can perform the same extraction procedure on a sample which does not contain oil. Use the measured value of that sample as a blank measurement value.

● When the indicated value is negative

The accuracy of the S-316-specified OCMA is ±0.5 mg/L. If the oil concentration is 0 mg/L, a measured value of 0 mg/L to -0.5 mg/L may be displayed. This accuracy is obtained in strictly controlled measurement conditions, and may become worse in other measurement environments and with some sample types.
In particular, the effects of ambient temperature may cause a negative indicated value which is lower than -0.5 mg/L. In measurement with S-316, it is important to prevent changes in ambient temperature as much as possible.
This product can be set to show negative values as 0 (refer to "Display Negative" (page 73)).

■ Reclamation of solvent

To reduce running costs and help protect the global environment, it is recommended to reclaim S-316, using the optional SR-305 solvent reclamation unit.

Tip

Solvent reclamation unit (SR-305) uses activated carbon and alumina layers to efficiently reclaim the solvent.

For the solvent reclamation procedure, refer to the manual for the SR-305 solvent reclamation unit.
This section describes handling methods and cautionary points for efficient reclamation of solvent.

● Absorbents

The following 2 types of absorbents are used in the solvent reclamation unit.

- Activated carbon
  Removes oils, fats, and other substances that do not dissolve in water.
- Activated alumina
  Removes water content and substances that easily dissolve in water.

Note

Store absorbents in a dry location. If an absorbent becomes damp, its performance will drop noticeably.

● Separation of solvent

Processing time can be reduced by separating solvent with a high oil concentration from solvent with a low oil concentration before reclamation.
Keep solvent, which has been used for calibration and measurement in containers separate from unused solvent, and further separate by use and/or oil concentration. For example, it is recommended that zero calibration liquid, span calibration liquid, low concentration sample liquid, and high concentration sample liquid are reclaimed separately.

● Checking the oil concentration of reclaimed solvent

After performing calibration using new solvent as calibration zero liquid, measure the oil concentration of the reclaimed solvent on the product. If the difference between the oil concentrations of the reclaimed solvent and the new solvent is 5 mg/L or less, the reclaimed solvent can be used.

■ Storing solvent

- Always store solvent, calibration liquid, and extracted liquid in clean glass containers with the lids closed (screw-top bottles are recommended) in a cool and dark location.
- Use a glass container to store the solvent. Do not keep it in a plastic or metal container.
  If a plastic container is used, there is a risk that plastic components from the container will dissolve into the solvent. If a metal container is used, rusting may occur due to the minute water content of the solvent and the rust will mix into the solvent.
- Mix the reclaimed solvents and store them in one container.
  The oil concentration of reclaimed solvent will vary with each reclamation process. Accurate measurement will not be possible if solvent conditions are changed during the course of measurement. If a large amount of solvent is necessary, because you are measuring a large number of samples for example, mix reclaimed solvent in one large container to obtain the necessary amount of solvent with a uniform oil concentration.

■ Disposing of solvent

The solvent itself is a very safe chemical substance, however, dispose of solvent properly in accordance with your local and national laws.

Frequently asked questions

Solvents

Question	Answer
What are the main differences between analyzing using S-316 and analyzing using the normal hexane method (JIS K0102)?	In addition to a different extraction solvent, the principle of measurement used for the extracted oil content is different. The OCMA detects oil content by infrared absorption, whereas the normal hexane method measures the weight of the oil content. For this reason, the extraction efficiency and types of oil detected are different. In particular, the normal hexane method cannot be used to measure oil types that have a low boiling point, and thus the measured values are occasionally less well regarded.

OCMA-550

Question	Answer
Although water samples for extraction are analyzed with OCMA-550, the indication value has no repeatability.	This is probably because the water dissolved in the solvent is isolated due to the heat (infrared absorption) and adheres to the cell due to heat separation. Therefore, the measurement of oil content in water requires to secure repeatability in the extraction process, and to use a water-removing filter or the like to eliminate influence of water. If surfactants or the like are included in samples, the amount of water dissolved in the solvent for extraction may increase, which causes pollution by water in the cell. Accordingly, measurement of oil content in a sample including 1 ppm or more of surfactants is probably very difficult.

Measurement

Question	Answer
Can seawater be measured?	Yes. However, zero and span calibration must be performed using seawater that does not contain oil. A salting-out effect occurs, and thus there is no problem regarding the seawater and solvent separation conditions. As long as the oil extraction ability of the solvent is the same, a seawater sample is considered to be equivalent to a fresh water sample.
Can I measure a sample water if it contains chelate compounds?	Yes. However, zero and span calibration must be performed using a chelate aqueous solution that does not contain oil. Chelates are water-soluble and thus unlikely to be extracted by the solvent. As long as the concentration is low, accurate measurement is possible.
What if the sample water contains suspended matter?	Remove the suspended matter prior to measurement. If the suspended matter is visible, there is a risk that the joints will become clogged. Before dispensing the sample water into the extraction tank, separate the suspended matter with a separating funnel. If suspended matter remains in the solvent layer, treat as needed by centrifugation or other method, and then carefully collect the supernatant liquid to eliminate the suspended matter. Suspended matter, which cannot be removed by the above method, must be filtered through filter paper; however, pay attention to adherence of the oil content to the filter paper.

Question	Answer
What if the sample water contains emulsifying substances?	If the concentration of the emulsifying substances is 1 mg/L or less, measurement may be possible without further treatment. However, measurement is very difficult when the concentration is higher. Ideally the sample should be pretreated by diluting the sample water, adjusting the pH, adding salt or Ca salt, for example, to eliminate the effects of the emulsifying substances. An emulsifying substance is amphipathic, and thus not only does the emulsifying substance remain in the water tank and impede oil content extraction, but it may also be extracted into the solvent layer. The effects of the emulsifying substances on measurement results may appear in three ways as follows: ● The effect of the emulsifying substances impedes dissolution of the sample water oil content into the solvent, resulting in an indicated value that is lower than the actual oil content concentration. ● The emulsifying substance is itself dissolved into the solvent, resulting in an indicated value that is higher than the actual oil content concentration. ● The effect of the emulsifying substances increases the amount of water content dissolution, resulting in a higher indicated value.
What is the actual procedure for extraction analysis of the oil content of a soil sample?	Soil in a powder form with no water content: ***1.*** **Remove any rocks, grass, etc.** ***2.*** **Weigh out 1 g to 100 g of the soil (the optimum amount depends on the oil content concentration).** ***3.*** **Add solvent to the sample and stir.** ***4.*** **Filter with filter paper or quartz wool.** ***5.*** **Perform measurement.** Soil sample containing water content: ***1.*** **Remove any rocks, grass, etc. Add an equal or greater quantity (as the sample) of saturated saline solution to the sample and stir.** ***2.*** **Add the solvent and extract the oil content.** ***3.*** **Check the condition of the solvent layer. If it is difficult to separate the solvent layer, perform the next steps. If the solvent layer can be separated, go directly to step 7.** ***4.*** **Discard the top saturated saline solution layer (this contains soil particles and thus is in a muddy water state)** ***5.*** **Add new saturated saline solution and stir.** ***6.*** **Repeat steps 2. to 5. until the emulsion layer is reduced and the solvent layer can be collected. If you run out of solvent while repeating the steps, measure more solvent, add, and stir.** ***7.*** **Perform measurement.** ***8.*** **Calculate the concentration from the measurement result based on the total amount of solvent.**

Question	Answer
I want to measure the oil content of water, but the oil is in an emulsified state, or the oil is floating on the surface of the water and is also adhering to the inner sides of the container. What extraction method should I use to analyze sample water like this?	Observe the following 3 points to obtain accurate measurement results. ● Thoroughly wash the inside of the sample container with solvent until no oil adheres. ● Use a separating funnel to wash with solvent until the emulsion layer disappears. ● Sufficiently dilute sample water with floating oil before measurement. An example extraction procedure is described below for reference. ***1.*** **Pour all of the sample water in the sample container into a separating funnel.** ***2.*** **Add 20 mL of saturated saline solution to the sample container and wash the inner sides, and then add this washing liquid to the separating funnel.** ***3.*** **Add 10 mL of solvent to the sample container, and then add that solvent to the separating funnel.** The residual oil content is dissolved. ***4.*** **Repeat steps 2. to 3..** ***5.*** **Shake the separating funnel and perform extraction.** ***6.*** **After letting the liquid sit, check the solvent layer. If the solvent layer cannot be collected or an emulsion layer remains, perform the next steps. If the solvent layer can be collected, collect the solvent layer and go directly to step 12..** ***7.*** **Add an additional 50 mL of solvent to the separating funnel and shake well.** ***8.*** **Let the liquid sit, and then collect the solvent layer while leaving the emulsion layer.** ***9.*** **Repeat steps 7. to 8. until the emulsion layer disappears.** ***10.*** **After the emulsion layer disappears, add an additional 50 mL of solvent to the separating funnel and shake well.** ***11.*** **Let sit, and then collect the solvent layer.** ***12.*** **Measure the total volume (mL) of the collected solvent with a measuring cylinder.** ***13.*** **Dilute if necessary, and then measure the collected solvent on the OCMA.**

■ Solvent reclamation unit SR-305

Question	Answer
When solvent is passed through new activated carbon, heat generation occurs and almost no solvent can be collected. What should I do?	When using new activated carbon, reclaim 300 mL of used solvent in advance. This solvent will almost completely disappear due to adsorption by the activated carbon surface and heat generation. Let the activated carbon tank cool to room temperature. Solvent reclamation will now be possible.
Is the heat generated by activated carbon dangerous?	As long as there is good ventilation, it is not dangerous. However, take care not to directly inhale vaporized solvent. Activated carbon generates heat up to a temperature of 70°C, however, it cools in approx. 30 minutes.
How long does reclamation take?	For example, it may take 30 minutes to 45 minutes to reclaim 500 mL of solvent.
Is it necessary to measure the oil content concentration of reclaimed solvent?	Yes. As a guideline, make sure the concentration is 5 mg/L or less. The removal efficiency of some oil types is poor, and in some cases 5 mg/L or less cannot be attained. In this event, repeat reclamation 2 or 3 times, and make sure the concentration is constant.
A negative value is shown for the oil content concentration of reclaimed solvent. Can this solvent be used?	Yes. Perform calibration using zero liquid and span liquid prepared with that reclaimed solvent, and accurate measurement will be possible. Since the oil content concentration in reclaimed solvent is low, it is indicated at 0 mg/L or less.

Question	Answer
What is the role of activated alumina in the reclamation unit?	It removes high-polarity compounds (hydrophilic compounds). This improves the separation conditions when oil content is extracted from water.
Can activated carbon, which has been used to reclaim H-997, be used to reclaim S-316?	No. Oil content and dirt adsorbed when the H-997 was reclaimed may dissolve into the S-316. Before reclaiming S-316, always replace with new activated carbon and new activated alumina.
How should be the reclamation unit stored?	Remove the activated carbon, move the solvent to a glass container with a lid (a screw-top bottle is recommended) or other airtight container to prevent solvent volatilization, and store in a cool dark location.
After using a reclamation unit, I left it without following the storage procedure. Can I still use it?	Yes. However, if left for more than 1 week, the activated carbon will dry out, and thus the first approx. 200 mL of solvent that is passed through the unit will be adsorbed by the surface of the activated charcoal (heat generation will not occur). The oil content removal ability will remain the same as previously.
If used solvent has been stored, at what point should it be reclaimed?	It is recommended that you collect as much used solvent as possible and reclaim it in one batch. Each time reclamation is performed, the amount of solvent reclaimed decreases due to adsorption by the dried activated carbon, and thus reclaiming in small batches results in a poorer reclamation rate. For example, approx. 2400 mL of reclaimed solvent can be obtained from 3300 mL (approx. 5 bottles) of used solvent (reclamation rate: approx. 73%), whereas approx. 350 mL of reclaimed solvent can be obtained from 645 mL (approx. 1 bottle) of used solvent (reclamation rate: 54%).
What are the guidelines for replacement of activated carbon and activated alumina?	In general, replace both the activated carbon and activated alumina when the aggregate load oil quantity exceeds 1400 mg. However, the critical load oil quantity depends on the oil type. The aggregate load oil quantity can be calculated from the oil content concentration and amount of reclaimed solvent using the equation below. Aggregate load oil quantity = Oil content concentration of reclaimed solvent × Quantity of reclaimed solvent For example, when 70 L of 20 mg/L used solvent is reclaimed, the aggregate load oil quantity is 1400 mg.
How should be used activated carbon and activated alumina disposed of?	Dispose of activated carbon as burnable waste, and activated alumina as non-burnable waste or waste plastic.
How can I increase the amount of solvent reclaimed?	It may be possible to increase the reclamation rate by reducing the amount of activated carbon. However, this will decrease reclamation ability, and should only be done when the used solvent has a low oil content concentration. For example, if the oil content concentration of the used solvent is 10 mg/L or less, it may be possible to increase the amount reclaimed by decreasing the amount of activated carbon by 1/3 to 1/2.

Product Information

Specifications

Model	OCMA-550
Product name	Oil content analyzer
Measurement method	Solvent extraction - non-dispersive infrared absorption analysis method
Measured objects	Substances extracted from sample water into solvent and having infrared absorption near a wavelength from 3.4 μm to 3.5 μm
Measurement range	0 mg/L to 200 mg/L
Resolution	For mg/L 0 to 99.9: 0.1, 100 to 200: 1 For mg/g, mg/kg, mg/PC 0 to 9.99: 0.01, 10.0 to 99.9: 0.1, 100 to 200: 1 Abs.: 0 to 1.000 Abs.: 0.001 Abs.
Repeatability	0 mg/L to 9.9 mg/L: ±0.4 mg/L ±1 dig. 10.0 mg/L to 99.9 mg/L: ±2.0 mg/L ±1 dig. 100 mg/L to 200 mg/L: ±4 mg/L ±1 dig. * For standard liquids
Display method	3.5 inches, 320×240 dots Backlight Color graphic LCD
Calibration method	Select each optionally zero calibration and span calibration
Extraction solvent	S-316
Amount of extraction solvent required	Approx. 6.5 mL
Extraction method	Using the extraction solvent, and extracted manually outside the product
Ambient operating temperature	0°C to 40°C (no condensation)
Power supply	100 V to 240 V AC ±10%, 50/60 Hz
Power consumption	100 V to 240 V AC, Approx. 60 VA
External dimensions	195 (H) × 253 (W) × 293 (D) mm
Mass	Approx. 5 kg
External output	Output to a USB memory stick
Functions	● 300-item data memory (measurement history) ● Stabilized measurement value display ● Self error determination ● Clock ● Conversion of measurement units ● Compliant with ASTM D7066-4

List of optional parts

Name	Part No.	Specifications
Measurement cell	3200044428	Quarts (20 mm)
Cell cap	3200582155	For measurement cell
Microsyringe	3200043748	25 μL
Measuring syringe	3200043783	10 mL
B-heavy oil	3200043747	10 mL
Solvent S-316	3200044490	1.5 kg

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