

MLSS Meter

MODEL ML-54

INSTRUCTION MANUAL



CENTRAL KAGAKU CORP.

Introduction

Thank you for purchasing the ML-54 MLSS Meter.

The ML-54 MLSS Meter is a portable sludge concentration meter that performs measurements of transmitted light to make simple on-site measurements of the concentration of activated sludge in sewage, waste, purification tanks and plant wastewater treatment systems and of sludge zone in nitrification and sedimentation tanks. Please read this Instruction Manual carefully before use.

Before Use

- Read this Instruction Manual carefully before using this product.
- Store this Instruction Manual carefully in a convenient place, readily accessible whenever it becomes necessary.
- Use this product as intended and as described in the Instruction Manual. Do not use this product for any purpose other than measuring sludge concentration and sludge zone.
- Understand the instructions given in this Instruction Manual with respect to safety and always follow those instructions when using the product.

About the Instruction Manual

- The content of this Instruction Manual is subject to change without notice for reason of improvements in product performance or function.
- Unauthorized reproduction or copying of this Instruction Manual, in whole or in part, is strictly prohibited.
- If you lose this Instruction Manual, please contact Central Kagaku Corporation.
- Though due care has been taken in production of this Instruction Manual, should you encounter any instances of ambiguity, error or omission, please contact Central Kagaku Corporation for clarification.

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1 Principle of Measurement

The ML-54 MLSS Meter employs light absorption as its principle of measurement. This measurement method is grounded in the principle that “the absorbance of light in a solution is proportional to its concentration when the optical path length is uniform”.

Light given off by the light-emitting unit is absorbed and attenuated by MLSS (suspended solids in activated sludge) at the sensor placed in a measurement tank (an aeration tank). The ML-54 MLSS Meter finds MLSS concentration from the light absorption (the amount of light absorbed by material, expressed as a logarithm of the reciprocal of transmission) with little interference from the color of the sample and provides a digital readout.

Water depth is found from the signal from the pressure sensor of the sensor placed in a measurement tank and provided in a digital readout. SZ (Sludge Zone) may also be measured by setting the parameters.

2 Specifications and Features

2-1 Specifications

Measurement method	Transmitted light
Measurement range	Sludge density 0-15000 mg/L
	Water depth 0-20 m (10 m standard cable)
	Sludge zone 10000mg/L or more
	SZ alarm (0.0-99.9% transmissivity)
Reproducibility	Sludge density Readout $\pm 3\%$
	Water depth ± 0.1 m
Readouts	Concentration LCD, 5 digits, 1 mg/L minimum
	Water depth LCD, 3 digits, 0.1 m minimum
Light source	LED
Sensor	Silicon photocell
Calculations	1) JIS conversion $Y=aX+b$
	2) Sludge volume index $SVI=SV\%/MLSS\%$
	3) Sludge return rate $r=SVI \times MLSS\% / [100-(SVI \times MLSS\%)]$
	4) Span $X=A \times C/B$
	5) Auto-zero
Specimen memory	1-99 specimens
Error messages	1) Zero alignment failure 2) Print failure
	3) Low battery voltage 4) EEPROM error
Power source	Nickel-hydrogen batteries (4 cells)
	Automatic shutdown functionality
Uptime	20 hours continuous use
Dimensions	Main unit 210 (W) x 85 (D) x 78 (H) mm
	Sensor 59 (diameter) x 153 (length) mm, 10-meter cable
Weight	Main unit 1.5 kg
	Sensor 2.5 kg
External output (Option)	RS232C, one port
	Transmission rate: 9600 bps

2-2 Features

1. Sludge concentration and water depth can be measured simultaneously.
2. Automatic zero calibration functionality.
3. Extensive calculation functionality.

- JIS conversion (The JIS method referred to here is that of manual analysis by weight.)

Internal $Y=aX+b$ calculation.

Sludge concentration in an aeration tank with large fluctuations in concentration can be read directly from the manual analysis (weight method) correlation correction. JIS conversion values can be read directly by performing measurements on multiple sludge samples of different concentrations with both manual analysis (weight method, Y value) and the MLSS Meter (ML-54, X value), finding the values of coefficients a and b, and using these values as inputs.

- Sludge volume index (SVI) and sludge return rate (r) calculation.

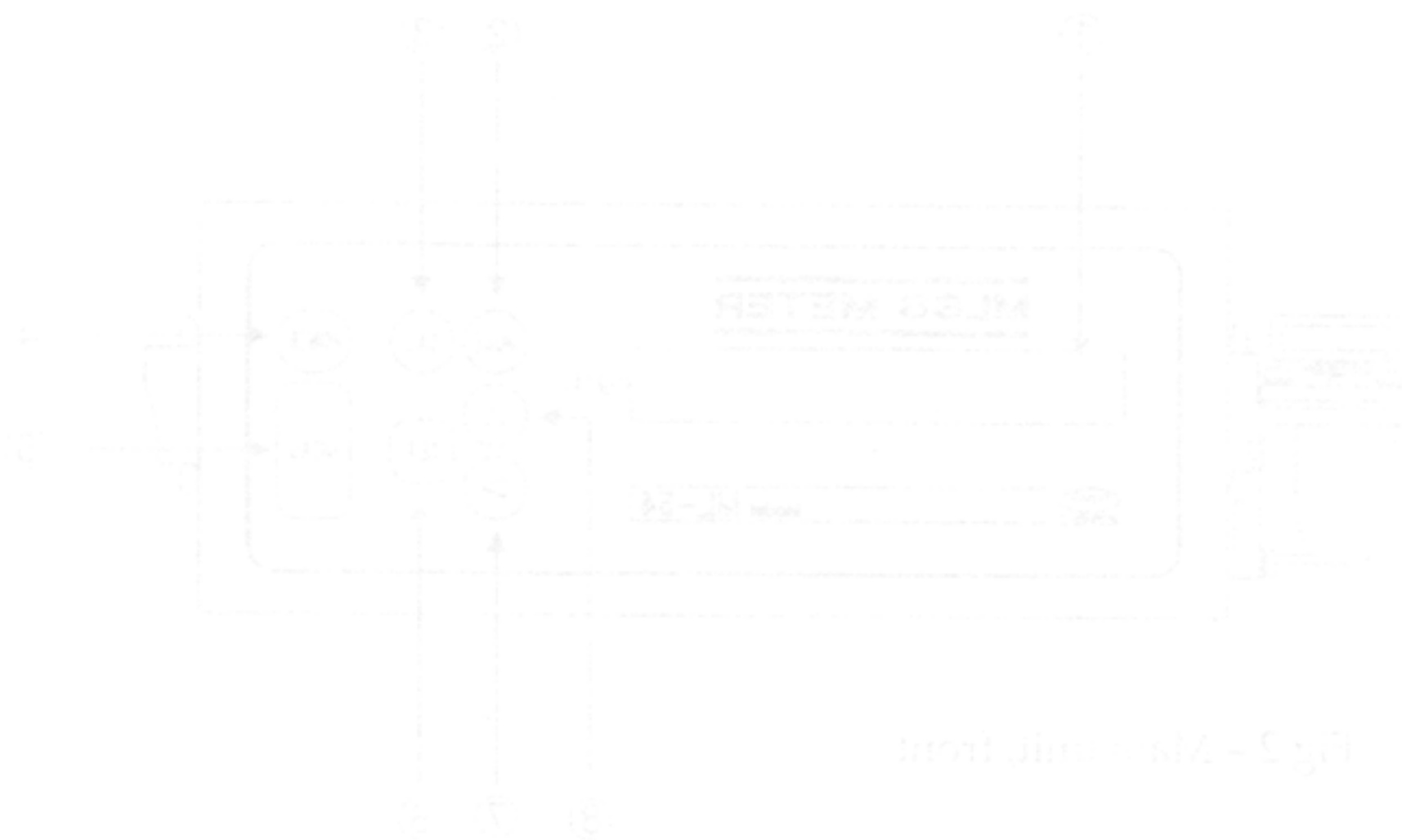
Input SV (sludge sedimentation rate) to find SVI (sludge volume index) and r (sludge return rate).

4. Sludge zone level detection (alarm on detection)
Input the sludge zone concentration as a transmissivity percentage to obtain an alarm on reaching the sludge interface.
5. Low-battery-voltage warning display.
6. Automatic shutdown functionality for neglect to turn power off.
Power turns off automatically ten minutes after end of use (time to shutdown may be set by user).
7. Connect to printer (optional) to print measurement readings.

3 Configuration

Please confirm the following products and components are included.

Unit	Part/Set	
Measurement unit	ML-54 main unit	1 unit
Sensor unit	ML-54 sensor	1 unit
Accessories	Calibration filter	1
	Washing brush	1
	Light shield	1
	Bottom sensor lid	1
	Charger	1
	Carrying case	1
	Instruction Manual	1 copy
	Options	Printy3 (ML-54 printer) (Includes main unit, AC adapter, connection cord, RS232C cable)



4 Names and Functions of Components

4-1 Exterior

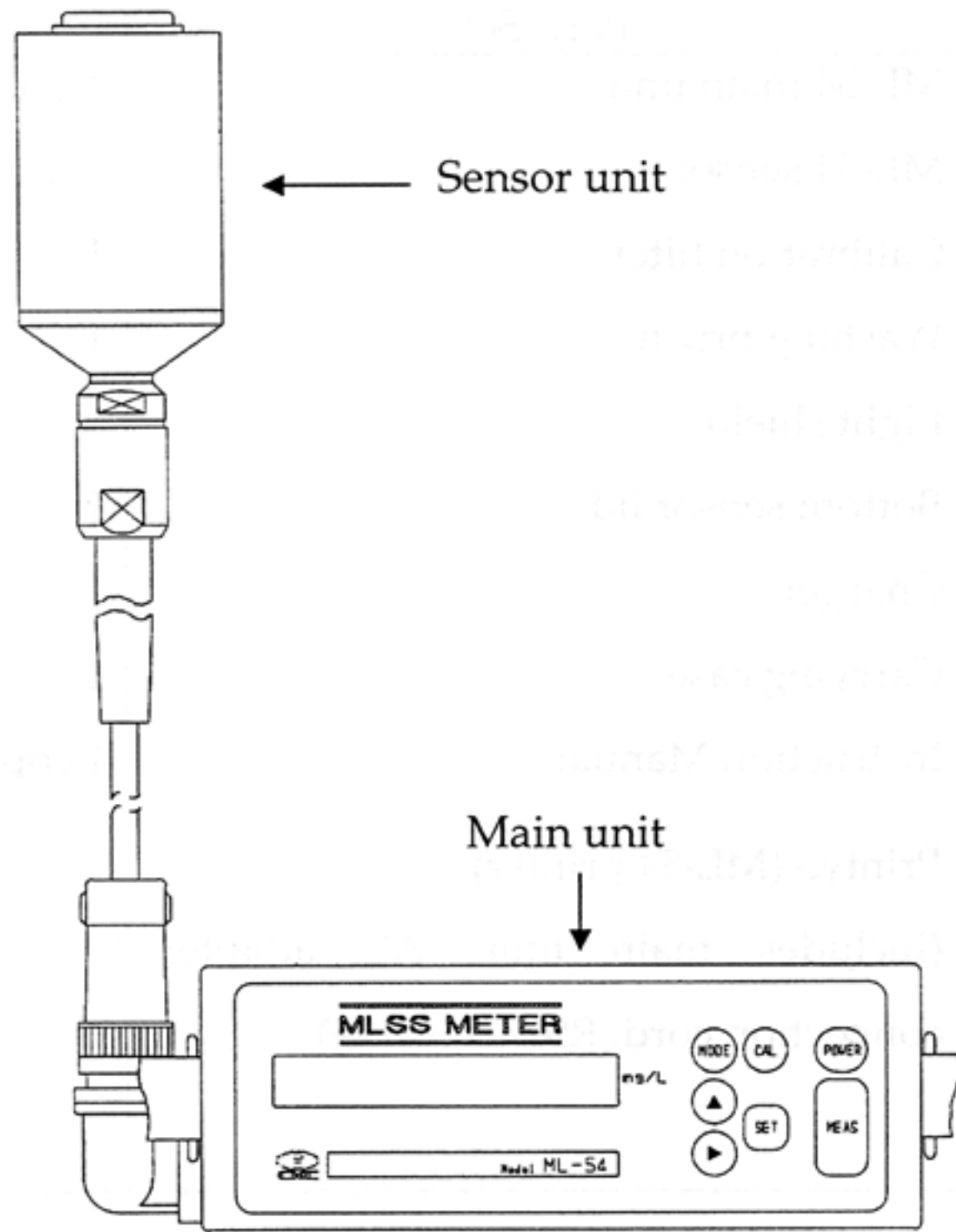


Fig 1 - Exterior

4-2 Main Unit

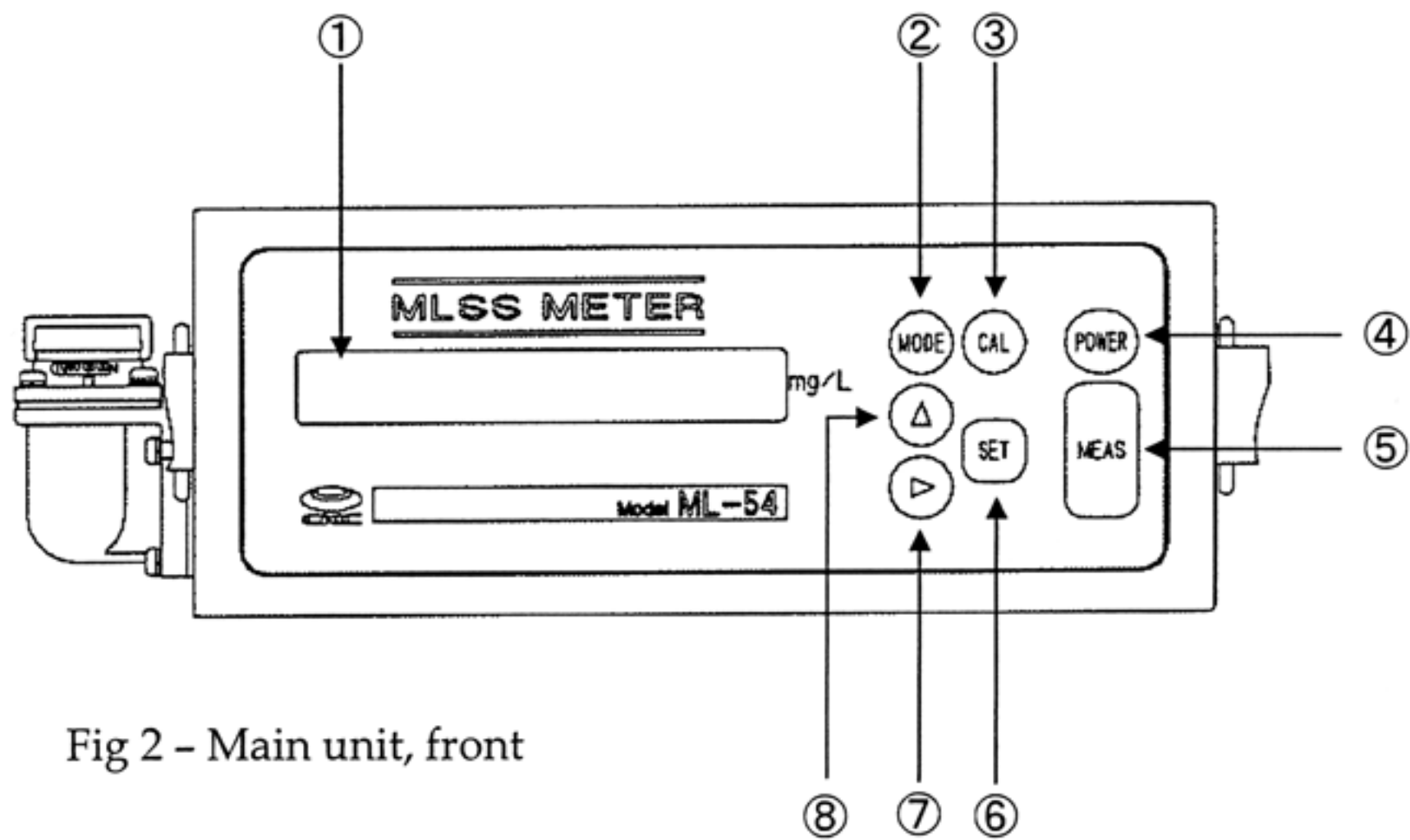


Fig 2 - Main unit, front

4-3 Sensor Unit (ML-54 Sensor)

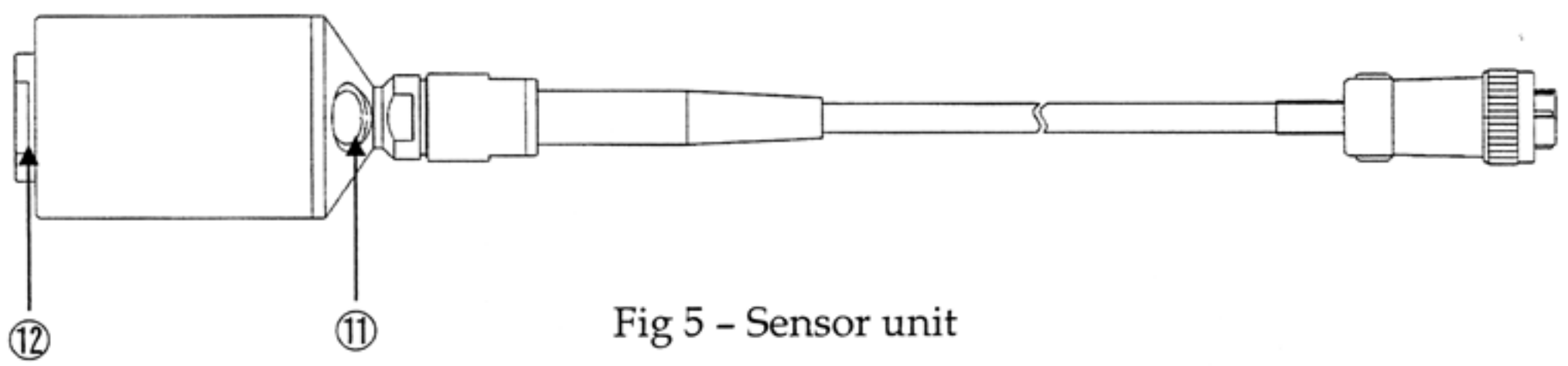


Fig 5 - Sensor unit

- ⑪ Light shield attachment
- ⑫ Bottom lid attachment

5 Preparation

5-1 Setup

Connect the main unit and the sensor unit.

- 1) Check for soiling on the sensor's light source and light receptor.
- 2) Remove the cap from the sensor connector on the left side of the main unit and connect the sensor.

Note: Insert fully until engagement audibly clicks.

- 3) Press the POWER key to turn on the power.
The startup screen comes up.

ML-54 Ver 0.0120

Startup screen

5-2 Selection of Measurement Mode

When the power has come on, select a measurement mode.

The ML-54 MLSS Meter provides the following measurement modes.

1. MLSS measurement mode (pp. 10-16)
Performs MLSS measurement and displays SVI and r values.
Allows direct reading of manual analysis values with correction by single-point calibration in measurement of sludge concentration in aeration tanks with little fluctuation in concentration. Recommended as a more convenient, general measurement method.
2. JIS measurement mode (pp. 17-18)
Performs JIS-converted MLSS measurement. The JIS method referred to here is that of manual analysis by weight.
Sludge concentration in an aeration tank with large fluctuations in concentration may be read directly from the manual analysis (weight method) conversion correction. JIS conversion values may be read directly by performing measurements on multiple sludge samples of different concentrations with both manual analysis (weight method, Y value) and the MLSS Meter (ML-54, X value), finding the values of coefficients a and b, and using these values as inputs. Also used when measurement readings fail to match with the weight method even after MLSS span calibration and to perform more accurate measurements.
3. SZ measurement mode (pp. 19-26)
Performs SZ measurements.
4. Parameter settings (pp.27-30)
Parameter settings.

Selection of measurement mode

*MLSS JIS

1) Press the **MODE** key to call up the mode selection screen.

2) Press the **▶** key to move the * (asterisk) cursor and select a measurement mode. Selection cycles among MLSS, JIS, TB, SZ and PARAM.

1 0. 0m 56

3) Press the **MEAS** key to begin measurement.

Note: Perform calibration before beginning measurement.

ML-54 Ver. 0.0120

6 MLSS Concentration Measurement

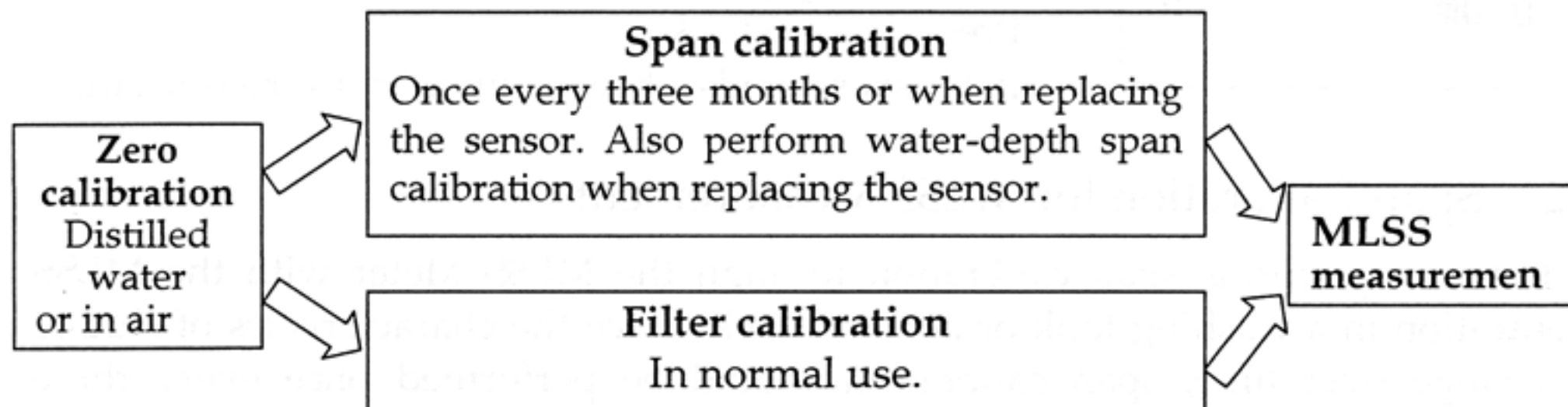
6-1 Calibration

Before performing measurements, perform zero calibration and span calibration or filter calibration.

For daily measurements, perform only zero calibration and filter calibration.

Span calibration requires MLSS concentrations found by manual analysis (cf. weight method and sewerage test method).

Calibration steps



6-1-1 Zero Calibration

This function performs zero calibration for MLSS and water depth.

Zero calibration may be performed two ways: 1) in air or 2) with distilled water.

Distilled water is recommended for zero calibration in order to perform more accurate measurements and when performing low-concentration measurements of sludge concentrations of 2000 mg/L and less.

1) Procedures for zero calibration in air

* ZERO FILTER

1) Press the **CAL** key to bring up the calibration screen.

2) Press the **▶** key to move the * (asterisk) cursor and select ZERO.

0. 0m 56

3) Place the sensor on a level surface and block off the hole in the top of the sensor with the light shield.

Press the **MEAS** key. After two seconds the current measurement reading appears.

0. 0m 0

4) Press the **SET** key.

After six seconds a beep sounds and zero is input.

2) Procedures for zero calibration using distilled water

* ZERO FILTER

1) Press the **CAL** key to bring up the calibration screen. Press the **▶** key to move the * (asterisk) cursor and select ZERO.

0. 0m 56

2) Put the bottom lid on the sensor. Pour the distilled water in through the hole on the top of the sensor and block off the hole with the light shield. Press the **MEAS** key. After two seconds the current measurement reading appears.

0. 0m 0

3) Press the **SET** key. After six seconds a beep sounds and zero is input.

6-1-2 Span Calibration for MLSS Measurement

This function performs span calibration to align the MLSS Meter with the MLSS concentration in a washing tank or aeration tank. Since the characteristics of sludge may change over time, span calibration should be performed once every three months or when replacing the sensor. Span calibration requires MLSS concentrations found from the weight method.

Procedures for span calibration for MLSS measurement

* SPAN ZERO

1) Press the **CAL** key to bring up the calibration screen. Press the **▶** key to move the * (asterisk) cursor and select SPAN.

S MEAS (B) 8900

2) Press the **▲** key to bring up the MLSS span value (B value) definition screen at left.

5. 0m B: 3170

3) Place the sensor in the measurement tank and lower it to the prescribed position. Press the **MEAS** key. After two seconds the current measurement reading appears.

4) Press the **SET** key. After six seconds a beep sounds and the MLSS span value (B value) is input. (After input, the current measurement reading appears.)

Next, input the MLSS concentration found from the weight method.


J INPUT (C) 2000

5) Press the **▲** key to display the weight-method MLSS concentration (C value) definition screen at left.

J INPUT (C) 3000

6) Press the **▶** key to display the cursor. Input the weight-method MLSS concentration found in

advance.


Use the  key to move the cursor and use the ^ key to define the value.

J	INPUT (C)	3000
---	-----------	------

7) Press the  key to end input.


Next, input the calibration filter value.

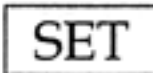
FL	MEAS (A)	3300
----	----------	------

8) Press the  key to bring up the calibration filter (A value) definition screen at left.

A:	3200
----	------

9) Insert the calibration filter into the sensor. (Use the light shield to block off the hole in the top of the sensor.)

Press the  key. After two seconds the current measurement reading appears.

10) Press the  key. After six seconds a beep sounds and the calibration-filter value (A value) is input. (After input, the current measurement reading appears.)

This filter value is required for daily calibration and so should be stored in memory.

6-1-3 Filter Calibration


In daily calibration, this function performs filter calibration after zero calibration.


This operation requires the filter value (A value) found in step (10) of section 6-1-2.

Procedures for filter calibration


*FILTER	SPAN
---------	------


1) After completing zero calibration, insert the calibration filter into the sensor. (Block off the hole in the top of the sensor with the light shield.)

2) Press the  key to bring up the calibration screen.

Use the  key to move the cursor and select FILTER.


FL	MEAS (A)	3300
----	----------	------

3) Press the  key to bring up the calibration filter value (A value) measurement screen at left.

4) Press the  key to perform a measurement of the calibration filter.

A:	3200
----	------

5) If the measurement reading in step 4) has changed from the calibration filter value (A value)*, proceed to step 6).

6) Press the  key. After two seconds a beep sounds and the measurement reading is stored in

FL INPUT (A) 3300

FL INPUT (A) 3300

FL INPUT (A) 3200

- memory.
- 7) Press the key to bring up the calibration filter value (A value) input screen at left.
 - 8) Press the key to display the cursor. Input the calibration filter value (A value).
Use the key to move the cursor and press the key to define the value.
 - 9) Press the SET key to end input.

* If the measurement reading differs from the calibration filter value (A value) by $\pm 3\%$ or more, it requires revision. (A discrepancy within the range of $\pm 3\%$ does not present a problem for regular measurement.)
One reason that the calibration-filter measurement value may change from the filter value (A value) is soiling of the sensor's light receptor. Check the light receptor for soiling before performing filter calibration.

6-1-4 Span Calibration for Water Depth Measurement

This function is performed only when replacing the sensor.

(Product purchased as main unit together with sensor has been calibrated prior to shipment from the factory and does not require this procedure.)

Procedures for span calibration for water depth measurement

* PARAM MLSS

D-SPAN IN 1.0m

D-SPAN IN 0.0m

DEPTH SPAN IN m

- 1) Press the key to bring up the measurement mode settings screen. Use the key to move the cursor and select PARAM.
- 2) Press the key to bring up the water-depth span value (D value) definition screen at left.
- 3) Press the key to display the cursor. Input the desired water depth.
Use the key to move the cursor to the value displayed and press the key to define the value.
The value defined is taken as the water-depth span value (D value).
Parameter range = 1.0-20.0 m
- 4) Press the key to end definition.
- 5) Use duct tape or the like to mark the sensor cable at the length from the sensor defined as the water-depth span value in step 3).
- 6) Place the sensor in calm water lacking a current and lower it to the depth defined as the water-depth span value in step 3).
Press the key. After two seconds the

DEPTH SPAN IN 1.0m

current measurement reading appears.

- 7) Press the **SET** key. After six seconds a beep sounds and the water-depth span value (D value) is input. (After input, the current measurement reading appears.)

6-2 MLSS Concentration Measurement

6-2-1 MLSS Concentration Measurement

The ML-54 allows measurements to be performed both 1) by immersing the sensor in a tank and 2) in indoor batch measurements of pumped sludge. Calibrate the instrument before performing measurements.

1) Immersion

*MLSS JIS

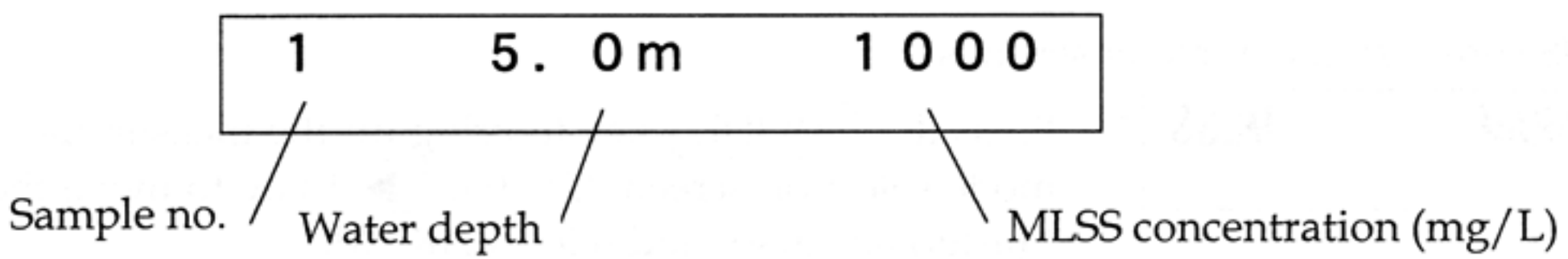
- 1) Press the **MODE** key to bring up the measurement mode selection screen. Use the **▶** key to move the * (asterisk) cursor and select MLSS.

1 10.0m 3500

- 2) Lower the sensor to the desired depth in the tank.
- 3) Press the **MEAS** key to initiate measurement and display the current measurement reading.
- 4) Press the **SET** key and after six seconds a beep sounds and the measurement reading is stored in memory. After storage, the sample number is updated and the current measurement reading appears.

Note: Measurement cannot be performed correctly when the sensor's light receptor is soiled. Wash the sensor thoroughly after use.

Measurement screen



2) Batch measurements

Note: Customers should provide their own rubber plugs or silicon plugs for use in performing measurements.

*MLSS JIS

1) Press the **MODE** key to bring up the measurement mode selection screen. Use the **▶** key to move the * (asterisk) cursor and select MLSS.

2) Attach the bottom lid to the sensor. Pour the pumped sludge into the sensor and plug the hole in the top of the sensor with a rubber plug (no. 2) or silicon plug (no. 3).

1 0.0m 3500

3) Slowly rotating the sensor up and down, press the **MEAS** key. Measurement is initiated and the current measurement reading appears.

4) Press the **SET** key and after six seconds a beep sounds and the measurement reading is stored in memory. After storage, the sample number is updated and the current measurement reading appears.

Note: Measurement cannot be performed correctly when the sensor's light receptor is soiled. Wash the sensor thoroughly after use.

6-2-2 MLSS Concentration Measurement by JIS Conversion

The JIS method referred to here is that of manual analysis by weight.

Performance of this measurement requires first obtaining the correlation with the JIS method.

Take the correlation between a measurement reading from a span-calibrated ML-54 MLSS Meter and a JIS-method measurement reading, and find the values of a and b.

The formula input is $Y=aX+b$

where: Y is the weight-method conversion value (mg/L)

X is the value indicated by the span-calibrated ML-54 MLSS Meter

a is the slope (regression coefficient)

b is the segment

Default values: a=1.00, b=0

Value ranges: a=0.00-100.00, b=0-99999

1) JIS conversion parameter settings

*PARAM MLSS

1) Press the **MODE** key to bring up the measurement mode selection screen. Use the **▶** key to move the * (asterisk) cursor and select PARAM.

JIS a: 1.00

2) Press the **▲** key to bring up the JIS parameter a value definition screen at left.

JIS a: 1.00

3) Press the **▶** key to show the cursor. Input the a value found in advance.

Use the **▶** key to move the cursor and press the **▲** key to define the value.

JIS a: 2.00

JIS b: 0

JIS b: 0

JIS b: 10

- 4) Press the **SET** key to end definition.
- 5) Press the **▲** key to bring up the JIS parameter b value definition screen at left.
- 6) Press the **▶** key to show the cursor. Input the b value found in advance. Use the **▶** key to move the cursor and press the **▲** key to define the value.
- 7) Press the **SET** key to end definition.

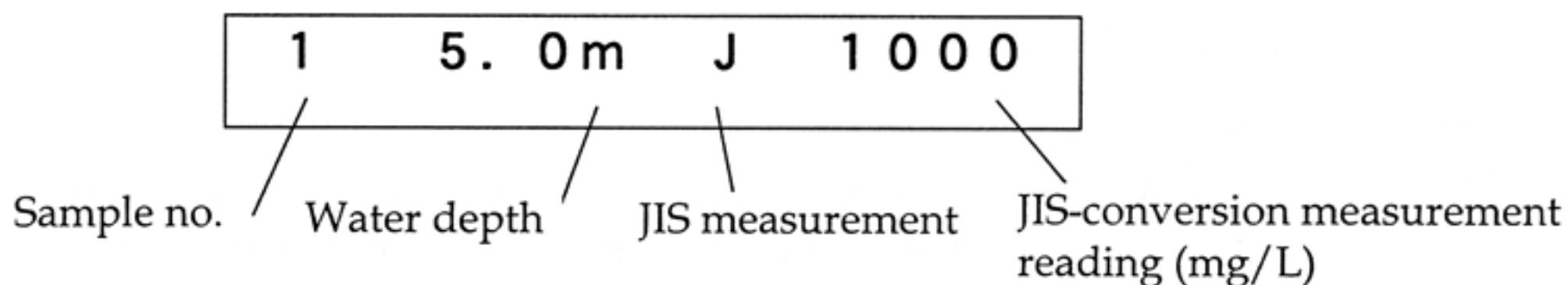
2) Measurement by JIS conversion

* JIS TB

1 10.0m J 3600

- 1) Press the **MODE** key to bring up the measurement mode selection screen. Use the **▶** key to move the * (asterisk) cursor and select JIS.
- 2) Lower the sensor to the desired depth in the tank.
- 3) Press the **MEAS** key to initiate measurement and show the current measurement reading (JIS conversion value).
- 4) Press the **SET** key and after six seconds a beep sounds and the measurement reading is stored in memory. After storage, the sample number is updated and the current measurement reading displayed.

Measurement screen



7 SZ (Sludge Zone) Measurement

7-1 Defining the SZ Level

The ML-54 MLSS Meter allows user definition of the SZ level.

The SZ level is set by the transmissivity (%) measured by the ML-54 MLSS Meter.

Procedures for defining the SZ level

Default value: 0.1

Value range: 0.0-100.0

* PARAM	MLSS
---------	------

- 1) Press the **MODE** key to bring up the measurement mode selection screen. Use the **▶** key to move the * (asterisk) cursor and select PARAM.

SZ LEVEL	0.1
----------	-----

- 2) Press the **▲** key to bring up the SZ level definition screen.

SZ LEVEL	0.1
----------	-----

- 3) Press the **▶** key to show the cursor. Input the transmissivity percentage of the sludge interface. Use the **▶** key to move the cursor and define the value with the **▲** key.

SZ LEVEL	50.0
----------	------

- 4) Press the **SET** key to end input.

Note: The default SZ level is 0.1%.

Define the SZ level to 0.0 for automatic detection.

7-2 SZ Measurement

1) Zero calibration

* ZERO	FILTER
--------	--------

- 1) Press the **CAL** key to bring up the calibration screen. Use the **▶** key to move the * (asterisk) cursor and select ZERO.

0.0m	56
------	----

- 2) Place the sensor on a level surface and block off the hole in the top of the sensor with the light shield.

Press the **MEAS** key. After two seconds the current measurement reading appears.

0.0m	0
------	---

- 3) Press the **SET** key. A beep sounds and zero calibration is completed.

2) SZ measurement mode settings

* SZ	PARAM
------	-------

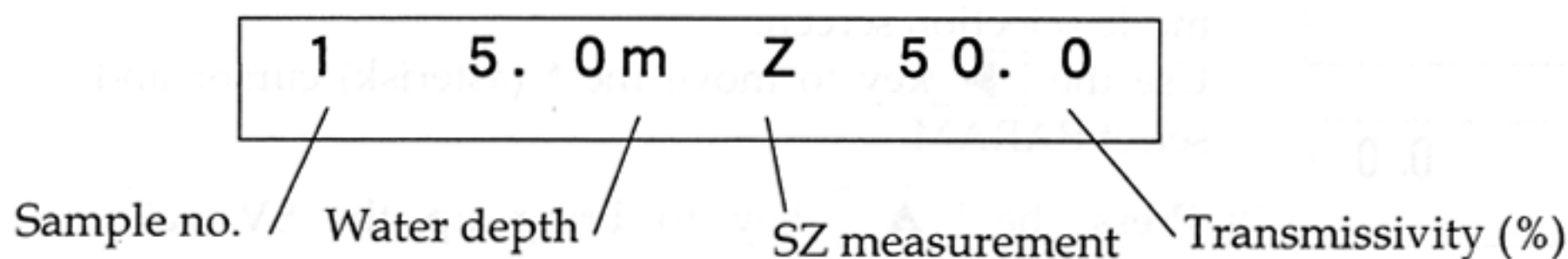
- 4) Press the **MODE** key to bring up the measurement mode selection screen. Use the **▶** key to move the * (asterisk) cursor and select SZ.

3) SZ measurement

1 12.0m Z 45.0

- 5) Lower the sensor to the desired depth in the tank.
- 6) Press the **MEAS** key to initiate measurement and show the current measurement reading.
When the interface is detected, a beep sounds and the measurement reading is stored in memory. After storage, the current measurement reading appears.
- 7) To perform another measurement, press the **▲** key and repeat steps 4) through 6).

Measurement screen



8 Finding SVI and r

The values of SVI (sludge volume index) and r (sludge return rate) may be found by inputting a previously measured SV (sludge sedimentation rate) and measuring MLSS concentration.

8-1 SV Value Definition

Default value: 0.0

Value range: 0.0-100.0

* PARAM	MLSS
---------	------

SV	0.0
----	-----

SV	0.0
----	-----

SV	30.0
----	------

1) Press the **MODE** key to bring up the measurement mode selection screen.

Use the **▶** key to move the * (asterisk) cursor and select PARAM.

2) Press the **▲** key to bring up the SV value definition screen.

3) Press the **▶** key to show the cursor. Input the SV value.

Use the **▶** key to move the cursor and press the **▲** key to define the value.

4) Press the **SET** key to end input.

8-2 Displaying SVI and r Values

SVI and r values are displayed in MLSS measurement mode.

Calibrate the instrument before performing the measurement.

* MLSS	JIS
--------	-----

1	0.0m	3500
---	------	------

1) Press the **MODE** key to bring up the measurement mode selection screen. Use the **▶** key to move the * (asterisk) cursor and select MLSS.

2) Lower the sensor to the desired depth in the tank.

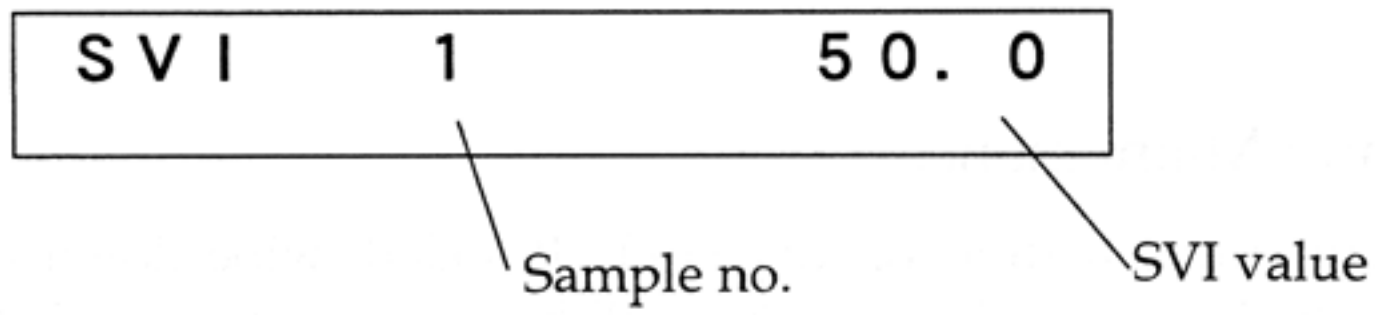
3) Press the **MEAS** key initiate measurement and show the current MLSS concentration.

4) Press the **▲** key to show the SV value, then the SVI value and then the r value.

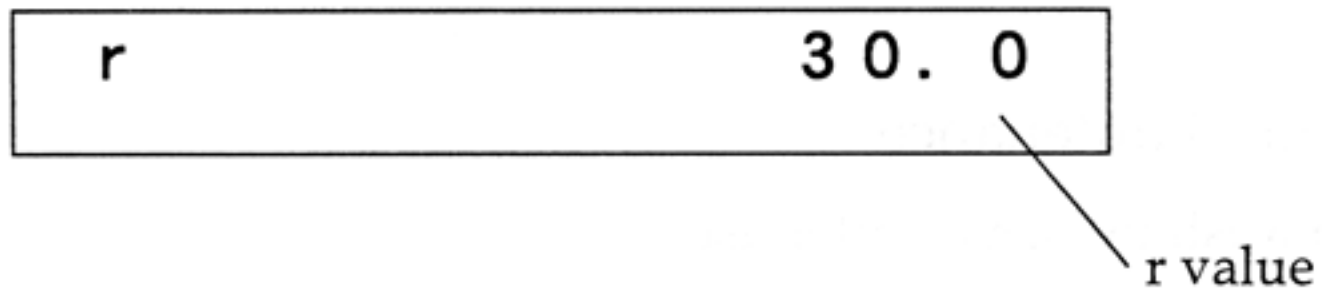
After the r value, press the **▲** key to return to the measurement mode selection screen.

Note: Measurement cannot be performed correctly when the sensor's light receptor is soiled. Wash the sensor thoroughly after use.

SVI value display



r value display



9 Storage and Maintenance

9-1 Meter Storage and Maintenance

Wipe the exterior the apparatus with a soft dry cloth. If soiled, wipe down with a tightly wrung wet cloth. (Solutions such as alcohol will harm the surface and should not be used.) When wiping with a wet cloth, be careful not to let the main unit (especially the sensor connector) get wet.

Avoid scrubbing the display window harshly as it may be scratched.

9-2 Sensor Storage and Maintenance

Use the brush included to wash the sensor after use.

9-3 Charging

When voltage runs low (4.8 V and below), the display reads "Low Battery" and flashes. When it runs still lower (4.2 V and below), it flashes "No Battery". The battery should be charged when the display reads "Low Battery".

Charging

To charge the battery, remove the rubber cap on the right side of the main unit operation panel and plug the DC plug of the battery charger into it. The Charging LED of the battery charger blinks during charging and stays lighted when charging is completed. (Charging completes in around 90 minutes.)

Battery charger LED states

State	Charging LED	Status LED
Charging	△Blinking	× Off
Charging completed	○ On	× Off
Charging completed (60° C detection)	○ On	○ On
Temperature standby	× Off	○ On
Voltage fault stoppage	○ On	△Blinking
No battery	× Off	× Off

Temperature standby Charging temporarily stopped for safety reasons due to battery temperature in excess of control value. Charging resumes when the temperature falls.

Voltage fault stoppage A battery fault was detected. Replace the battery.

No battery Check whether the battery charger and the MLSS Meter are securely connected.

Note: The battery charger cannot be used as an AC adapter.

Do not charge the battery with the power on.

10 Data Storage

10-1 Measurement Records

Press the **SET** key while a reading from MLSS concentration measurement is displayed to store that reading in memory. In SZ measurement a beep sounds when the interface is detected and the measurement reading is stored automatically. At factory settings, measurement readings are automatically stored from no. 1. When readings are recorded through no. 99, measurement readings are then updated from no. 1. These sample numbers may also be defined by the user. (See pp. 27-28 for procedures.) Data remains in memory when the power is turned off.

10-2 Retrieving Data

- 1) Press the **MODE** key to bring up the measurement mode selection screen.
- 2) Use the **▶** key to move the * (asterisk) cursor and select the measurement mode of the data you wish to retrieve.
- 3) Press the **▲** key to show the data, beginning with the most recent reading.

10-3 Deleting Data

Specific data cannot be deleted discretely.

10-3-1 Deleting MLSS Concentration Readings

* PARAM	MLSS
----------------	-------------

MLSS S-No.	10
-------------------	-----------

MLSS S-No.	0
-------------------	----------

SAMPLE DATE CLR.

- 1) Press the **MODE** key to bring up the measurement mode selection screen.
Use the **▶** key to move the * (asterisk) cursor and select PARAM.
- 2) Press the **▲** key to bring up the MLSS sample number definition screen.
- 3) Press the **▶** key to show the cursor.
Set the sample number to zero.
Use the **▶** key to move the cursor and press the **▲** key to define the value.
- 4) Press the SET key. The MLSS measurement readings deletion screen appears and the data is deleted.




10-3-2 Deleting SZ Measurement Readings

* PARAM	MLSS
----------------	-------------


SZ S-No.	10
-----------------	-----------

- 1) Press the **MODE** key to bring up the measurement mode selection screen.
Use the **▶** key to move the * (asterisk) cursor and select PARAM.
- 2) Press the **▲** key to bring up the SZ sample number definition screen at left.

SZ S-No. 0

- 3) Press the  key to show the cursor. Set the sample number to zero. Use the  key to move the cursor and press the  key to define the value.

SZ DATE CLR.


- 4) Press the  key. The SZ measurement readings deletion screen appears and the data is deleted.

10-4 Printing Data


Measurement readings may be printed by connecting the meter to the printer (optional). Two output formats are available: one for printing all stored data and one for printing data from a single measurement alone.

10-4-1 Output Format Settings



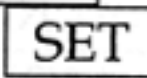
* PARAM MLSS

- 1) Press the MODE key to bring up the measurement mode selection screen. Use the  key to move the * (asterisk) cursor and select PARAM.

PRINT ALL

- 2) Press the  key to bring up the output format settings screen at left.


PRINT ALL

- 3) Press the  key to show the cursor. Use the  key to select ALL or ONE, and then press the  key.

ALL: Prints all measurement readings

ONE: Prints a single measurement reading

10-4-2 Printing Data

Press the  key at the data retrieval screen in either MLSS concentration or SZ measurement mode to print that data.

Sample output

[MLSS measurement readings printout]

		** MLSS Date **			
		(mg/L)			
Sample no.	1	1. 0 m	1 2 3 4		
	2	5. 0 m	5 6 7		
Water depth	3	2. 5 m	1 2 3 4 J		

Measurement reading

JIS method notation

[SZ measurement readings printout]

** S Z Date **			
Sample no.	1	1.0 m	0.5%
	2	5.0 m	10.0%
Water depth	3	2.5 m	0.3%
			Transmissivity %

11 Parameter Settings

The following may be defined in their specific parameter settings modes.

1. MLSS (JIS) sample number settings . . . p. 25, section 11-1
2. JIS conversion formula parameter settings . . . p. 15, section 6-2-2
 Defines the parameters (a value and b value) for the JIS (weight method) conversion formula.
3. SV (sludge sedimentation rate) value settings . . . p. 19, section 8-1
 Defines the SV value required for display of the SVI value and r value.
4. SZ sample number settings . . . p. 26, section 11-2
5. SZ level settings . . . p. 17, section 7-1
 Defines the SZ level as a transmissivity percentage.
6. Reading display retention time settings . . . p. 26, section 11-3
 Defines the length of time to retain stored measurement readings on the screen.
7. Automatic shutdown time settings . . . p. 26, section 11-4
 Defines the length of time until power turns off automatically.
8. Keypress buzzer setting . . . p. 27, section 11-5
 Turns the keypress buzzer on and off.
9. Output format settings . . . p. 23, section 10-4-1
10. Water-depth span calibration . . . p. 13, section 6-1-4

11-1 MLSS (JIS) Sample Number Settings

Default: 1

Value range: 0-99

* PARAM	MLSS
---------	------

1) Press the **MODE** key to bring up the measurement mode selection screen.
 Use the **▶** key to move the * (asterisk) cursor and select PARAM.

MLSS S-No.	10
------------	----

2) Press the **▲** key to bring up the MLSS sample number definition screen at left.

MLSS S-No.	10
------------	----

3) Press the **▶** key to show the cursor.
 Use the **▶** key to move the cursor and press the **▲** key to define the value.

MLSS S-No.	20
------------	----

4) Press the **SET** key to end definition.

Note: Setting the sample number to zero will delete the data. (See page 22.)

11-2 SZ Sample Number Settings

Default: 1

Value range: 0-99

* PARAM	MLSS
---------	------

SZ	S-No.	10
----	-------	----

SZ	S-No.	<u>10</u>
----	-------	-----------

SZ	S-No.	20
----	-------	----

1) Press the **MODE** key to bring up the measurement mode selection screen.

Use the **▶** key to move the * (asterisk) cursor and select PARAM.

2) Press the **▲** key to bring up the SZ sample number definition screen at left.

3) Press the **▶** key to show the cursor.

Use the **▶** key to move the cursor and press the **▲** key to define the value.

4) Press the **SET** key to end definition.

Note: Setting the sample number to zero will delete the data. (See page 22.)

11-3 Reading Display Retention Time Settings

This parameter defines the time to retain measurement readings after saving.

Default: 5 sec

Value range: 0-99 sec

* PARAM	MLSS
---------	------

DISPLAY TIME	5
--------------	---

DISPLAY TIME	<u>5</u>
--------------	----------

DISPLAY TIME	10
--------------	----

1) Press the MODE key to bring up the measurement mode selection screen.

Use the **▶** key to move the * (asterisk) cursor and select PARAM.

2) Press the **▲** key to bring up the reading display retention time definition screen at left.

3) Press the **▶** key to show the cursor.

Use the **▶** key to move the cursor and press the **▲** key to define the value.

4) Press the SET key to end settings.


11-4 Automatic Shutdown Time Settings

This parameter defines the length of time until power turns off automatically. When the time defined elapses without key input, the power turns off automatically.


Default: 10 min

Value range: 0-99 min




* PARAM	MLSS
---------	------

1) Press the **MODE** key to bring up the measurement mode selection screen.
Use the  key to move the * (asterisk) cursor and select PARAM.

POWER	OFF	10
-------	-----	----

2) Press the  key to bring up the automatic shutdown time definition screen at left.

POWER	OFF	<u>10</u>
-------	-----	-----------

3) Press the  key to show the cursor.
Use the  key to move the cursor and press the  key to define the value.

POWER	OFF	20
-------	-----	----


4) Press the **SET** key to end definition.

Note: If set to zero, the automatic shutdown function does not operate.


11-5 Keypress Buzzer Setting

The buzzer that goes off on key input may be turned off in order to reduce battery consumption. The default factory value is ON.



* PARAM	MLSS
---------	------

1) Press the **MODE** key to bring up the measurement mode selection screen.
Use the  key to move the * (asterisk) cursor and select PARAM.

KEY	BUZZER	ON
-----	--------	----

2) Press the  key to bring up the key press buzzer setting screen.

KEY	BUZZER	<u>ON</u>
-----	--------	-----------

3) Press the  key to show the cursor.
Press the  key to select ON or OFF.

KEY	BUZZER	OFF
-----	--------	-----

4) Press the **SET** key to end setting.

Note: If set to OFF, the buzzer goes off only on SET key input.

12 Troubleshooting



Do not disassemble the ML-54 MLSS Meter. If the procedures recommended below do not resolve a problem or if the product is clearly out of order, please contact Central Kagaku Corporation or your dealer.

12-1 Error Messages

Follow the procedures below for the error messages specified.

Message	Cause	Resolution
No Sample Data (Appears for display of stored data and in printing operations)	-- No measurement data is stored.	→ Store measurement data.
Zero Error (Appears in zero calibration)	-- Transmissivity percentage in zero calibration is outside the allowed range. Zero input disallowed.	→ Wash the sensor's light receptor and light source windows with the included brush. → Attach the light shield and bottom lid to keep light out. (Please contact Central Kagaku or your dealer if these procedures do not resolve the problem.)
*****	-- MLSS concentration in excess of measurement range. -- High span calibration greater than display digits.	→ Perform measurement diluted. → Re-perform span calibration.
Can Not Print (Appears when printing)	-- Printer not connected. -- Printer not turned on. -- Printer out of order.	→ Connect the printer. → Turn the printer on. → Contact Central Kagaku or your dealer.
EEPROM Error (Appears when power turned on)	-- Memory fault in main unit.	→ Contact Central Kagaku or your dealer.
Low Battery	-- Low battery voltage (flashes when remaining use time is one hour [4.8 V].)	→ Charge the battery.
No Battery	-- Lower battery voltage (flashes when remaining use time is 15 minutes [4.2 V].)	→ Charge the battery.
Auto Power Off	-- No key input for the specified period of time (default 10 minutes). Power turns off automatically one minute after the Auto Power Off message appears (to prevent power being left on).	→ Press a key. (The screen immediately prior then reappears.)

12-2 Initialization

Perform initialization operations to restore the equipment to default factory settings. It is recommended to make a record of settings and defined parameter values before performing initialization.

Note: When the sensor is replaced, water-depth span calibration must be performed again after initialization.

SYSYEM INIT.

- 1) Press the **CAL** key five times to bring up the system initialization screen at left.
Press the **SET** key.

Really ?

- 2) A confirmation screen appears. To proceed with initialization, press the **SET** key.
Initialization executes and the default screen appears.