



LCR METER

# **ZM2353/ZM2354**

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INSTRUCTION MANUAL

## Errata Table

Page	Old	New
Fifth line of second paragraph of page 12-3	50 $\Omega$	50k $\Omega$
Third line of first paragraph of page 12-4	80%RH	85%RH
First line of "Table of Basic Accuracy" of page 12-5	Frequency	Frequency[Hz]

DA00010403-001

LCR METER

# **ZM2353/ZM2354**

INSTRUCTION MANUAL



## For safe use of the ZM2353/ZM2354 LCR Meter

The ZM2353/ZM2354 LCR Meter is designed and tested taking into consideration safety and protection and shipped after confirmation of safety.

In order to use the ZM2353/ZM2354 safely, the following warnings and instructions must be observed.

NF Corporation shall not be responsible to, nor will compensate, damage caused by usage that violates these instructions.

### Observe information given in this instruction manual

This instruction manual contains information to ensure safe operation and use of the ZM2353/ZM2354.

Before using the ZM2353/ZM2354, be sure to read this instruction manual first. After reading, store the manual carefully so that it will be referenced later when any uncertainty is encountered.

### Observe information labeled with WARNING and CAUTION

Be sure to observe the information given by the "WARNING" and "CAUTION" indications contained in this instruction manual and affixed to the ZM2353/ZM2354, which are intended to prevent danger leading to serious accidents.

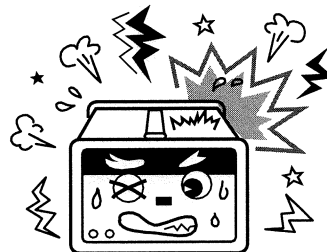
#### WARNING

This indication on the ZM2353/ZM2354 or in the text herein describes information to avoid the hazard to which user's life and body may be exposed when the user is handling the ZM2353/ZM2354.



#### CAUTION

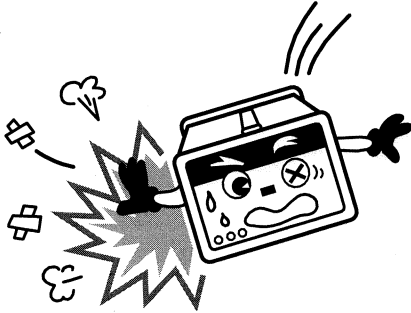
This indication on the ZM2353/ZM2354 or in the manual herein describes information to avoid the damage to which the ZM2353/ZM2354 is exposed.



This indication on the ZM2353/ZM2354 indicates the part or function before using which the user has to refer to this manual.

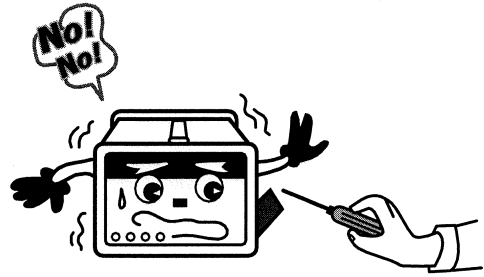
### Damage during transport and storage

- If the ZM2353/ZM2354 is damaged by excessive vibration or impact, its functions for safety protection may have been lost. Leave the ZM2353/ZM2354 as it is, and immediately contact the NF Corporation or the sales representative.

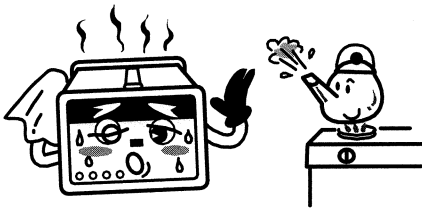


### Forbidden cover removal and modification

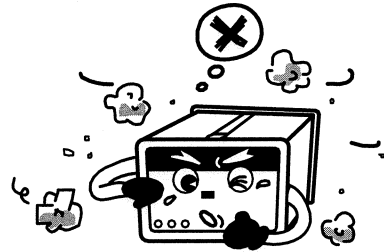
- Never remove the cover. Never carry out internal repair, inspection, or adjustment.
- Never modify internal ZM2353/ZM2354. It may cause failure or accidents.



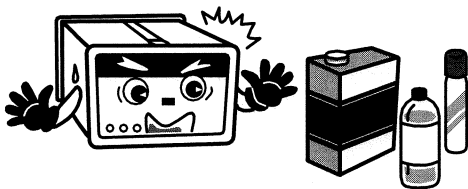
### Never install the ZM2353/ZM2354 in the following locations



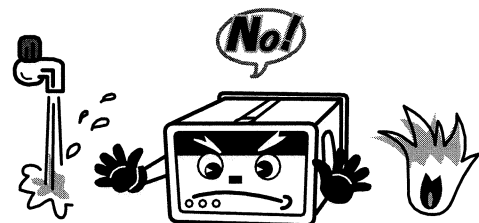
- A humid place where condensation is likely to occur.



- A dusty or linty place



- A place exposed to explosive or flammable gases.



- A place involving fire or water

## ⚠ WARNING

### Caution to electric shock

- Do not touch directly the power supply part or the circuit board of the ZM2353/ZM2354. They involve high voltage.
- Be sure to connect the ZM2353/ZM2354 to the ground before connection for measurement.



## ⚠ CAUTION

### Instructions on installation

- Use the ZM2353/ZM2354 within the rated range of ambient temperature and humidity.  
 Performance rating: +5 to +40°C, 5 to 85% RH  
 (Absolute humidity: 1 to 25 g/m<sup>3</sup>, no condensation)  
  
 Storage conditions: -10 to +50°C, 5 to 95% RH  
 (Absolute humidity: 1 to 29 g/m<sup>3</sup>, no condensation)
- The ZM2353/ZM2354 unit has an exhaust vent on the side and inlet port on the rear. Place the ZM2353/ZM2354 10 cm away from walls to secure air circulation.
- Avoid using the ZM2353/ZM2354 in the vicinity of any device that emits pulsating noise, a strong magnetic field, or a strong electric field such as an SCR-controlled large power supply or a CRT display, which would cause malfunction or reduced measurement precision.

### Instructions on use

- Before turning on the power switch, confirm that the voltage of your power outlet fits the ZM2353/ZM2354 rating voltage.
- Clean the air filter of the inlet port regularly. Dust deposited on the air filter would impede the air circulation.

# Expressions used in this manual



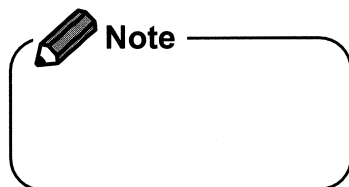
This indication on the ZM2353/ZM2354 or in the manual herein describes information to avoid the hazard to which user's life and body may be exposed when the user is handling the ZM2353/ZM2354.



This indication on the ZM2353/ZM2354 or in the manual herein describes information to avoid the damage to which ZM2353/ZM2354 is exposed.



This describes mistakable operation.



This provides the user with useful information.

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# Contents

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	Page
For safe use of the ZM2353/ZM2354 LCR Meter.....	0-1
Expressions used in this manual.....	0-4
<b>1. Introduction</b>	
Introduction Outline of the ZM2353/ZM2354.....	1-1
First check the contents of main unit and accessories!.....	1-3
<b>2. Names of Parts</b>	
Front panel.....	2-1
Rear panel.....	2-2
<b>3. Before Starting Operation</b>	
Instructions on installation.....	3-1
Power supply and grounding.....	3-2
Power cord set and grounding.....	3-2
Power fuse.....	3-2
Power supply voltage.....	3-3
Line filter.....	3-3
Fan.....	3-4
<b>4. How to Measure</b>	
Measurement in AUTO Mode.....	4-1
Selecting measurement parameter.....	4-3
Automatic selection of parameter.....	4-3
Arbitrary selection of parameter.....	4-3
Setting the measurement frequency.....	4-4
Use of direct buttons.....	4-4
Using the numerical pad.....	4-4
Use of Modify button.....	4-5
Setting the measurement voltage.....	4-6
Use of direct buttons.....	4-6
Using the numerical pad.....	4-6
Use of Modify button.....	4-7
Selecting an equivalent circuit.....	4-8
Automatic selection of an equivalent circuit.....	4-8
Arbitrary selection of equivalent circuit.....	4-8
Selecting the measuring speed.....	4-9
Use of direct buttons.....	4-9

	Page
Trigger mode .....	4-10
Selection of Mode .....	4-10
Automatic mode (AUTO TRIG).....	4-10
Manual mode (MANUAL TRIG).....	4-10
Application of internal DC bias .....	4-11
Setting of DC bias voltage .....	4-11
Application of internal DC bias.....	4-12
Setting the measurement range.....	4-13
Selection of mode .....	4-13
Selection of measurement range (fixed).....	4-13

## 5. Operation of Comparator Functions

Comparator mode .....	5-1
Viewing deviation data .....	5-2
Setting the reference value .....	5-2
Display of deviation data.....	5-3
Setting the comparator mode.....	5-4
Entry to BIN SETUP mode .....	5-4
Exit from BIN SETUP mode.....	5-4
Upper and lower limit setting .....	5-5
Display in comparator mode (measurement) .....	5-7

## 6. Handler Interface (ZM2354 only)

Handler interface .....	6-1
Connecting handler interface I/O .....	6-1
Connector .....	6-1
Cable.....	6-3
Processing of ground.....	6-3
Setup before starting .....	6-4
Confirmation of connection cable .....	6-4
Panel LOCK.....	6-4
Starting .....	6-4
Turning power on.....	6-4
Starting the handler interface.....	6-5
Setting the measurement conditions.....	6-5
Setting from panel.....	6-5
Operation through GPIB .....	6-5
Setting of beeper .....	6-5
Setting of indications.....	6-6
Setting of width of strobe signal.....	6-6
Selection of output signal polarity.....	6-6

	Page
Signal output .....	6-7
Types of signals .....	6-7
Signal level .....	6-8
Output circuit of handler interface .....	6-8
Exemplary reception circuit .....	6-9
Input signal .....	6-10
Triger .....	6-10
Signal level .....	6-10
Selection of memory .....	6-11
Input circuit of handler interface .....	6-11
Trigger .....	6-12
Trigger .....	6-12
TRIG button .....	6-12
GPIB command .....	6-12
TRIG input .....	6-12
Sequence of operation .....	6-13

## 7. System menu

System menu .....	7-1
Entry to system menu mode .....	7-1
Exit from system menu mode .....	7-1
Items of system menu .....	7-2
GPIB address [GP Ad] .....	7-2
GPIB terminator [GP tr] .....	7-2
Selection of internal/external for DC bias voltage [ biAS] .....	7-3
Store memory [StorE] .....	7-4
Recall memory [rEcAL] .....	7-4
Trigger delay [dELAY] .....	7-5
Resume function [ rESU] .....	7-5
Selection of indication when comparator is used [ diSP] .....	7-6
Selection of beep when comparator is used [ bEEP] .....	7-6
Specification of strobe signal width [Strob] .....	7-7
Selection of output signal polarity of handler interface [HAndL] .....	7-7
Selection of connection cable length [CABLE] .....	7-8
Gain correction [ CAL] .....	7-8
Initial settings [ Init] .....	7-9

## 8. Measurement

Connection of test piece .....	8-1
Measurement terminal .....	8-1
Extension cable .....	8-2
Test fixture and test lead (optional) .....	8-2
Scanner .....	8-3

	Page
Operations on power energizing .....	8-4
Power turning-on .....	8-4
Indication of measurements .....	8-6
Selection of measurement parameter .....	8-6
Indication format for parameter and range for indication .....	8-6
Measurement conditions .....	8-8
Measurement frequency .....	8-8
Measurement signal level .....	8-8
Equivalent circuit .....	8-8
Measuring speed .....	8-10
Trigger .....	8-10
DC bias .....	8-11
Measurement range .....	8-12
Zero correction .....	8-13
Correction and abortion of correction .....	8-13
Equivalent circuit of measurement system .....	8-14
Range for possible correction .....	8-15
Comparator functions .....	8-16
Judgment of bin .....	8-16
Method of measurement (judgment) .....	8-18
Gain correction .....	8-19

## 9. Maintenance and Calibration

Outline .....	9-1
Operation check and performance test .....	9-2
Confirmation of operation environment .....	9-2
Check of driving signal source .....	9-2
Check of measurement accuracy .....	9-4

## 10. GPIB Interface

GPIB .....	10-1
Connection of GPIB cable .....	10-2
Instructions on use of GPIB .....	10-2
Setting of GPIB address and terminator (system menu) .....	10-3
GPIB address [GP Ad] .....	10-3
GPIB terminator [GP tr] .....	10-3
Remote status and remote state releasing .....	10-5
Making a device remote .....	10-5
Making a device local .....	10-5
Bring the system into local lockout .....	10-5

	Page
Service request (SRQ).....	10-6
Sending SRQ .....	10-6
Canceling SRQ.....	10-6
Status byte .....	10-7
Program message.....	10-8
Setting message.....	10-9
Query message .....	10-10
Program messages.....	10-12
Setting message.....	10-12
Query message .....	10-15
To read measurement data.....	10-19
Standard resolution data format (query message ?DT).....	10-20
High-resolution data format (query message ?PA, ?PB, and ?PZ) .....	10-21
Bin judgment result data format (query message ?CM) .....	10-22
Response to interface messages.....	10-23
Sample Program.....	10-24
Settings.....	10-25
Query (measurement voltage level) .....	10-27
Query (bin setting).....	10-29
Measurement (TG and serial polling).....	10-31
Measurement (GET and serial polling) .....	10-33
Measurement (TG and SRQ).....	10-35
Measurement (TG only) .....	10-37

## 11. Error Messages

Error messages.....	11-1
Error during self-check.....	11-2
ROM/RAM check error.....	11-2
Errors due to anomaly in hardware excepting the memory .....	11-2
Errors on setting from panel and setting through GPIB.....	11-3
When setting .....	11-3
When Executing .....	11-3
Errors in GPIB.....	11-5
Releasing errors.....	11-5
Errors during self-check .....	11-5
Releasing errors during panel setting and errors in GPIB .....	11-5
Errors during measurement .....	11-6

## 12. Rating

Indication parameters .....	12-1
Types of parameters .....	12-1
Resolution of indication .....	12-3
Measurement (indication) range .....	12-3

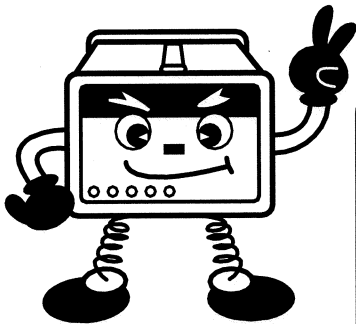
	Page
Accuracy .....	12-4
Accuracy for $ Z  - \theta$ .....	12-4
Additional error due to measurement conditions .....	12-6
Accuracy of R, ESR and G .....	12-8
Accuracy of L, C and X .....	12-8
Accuracy of Q and D .....	12-8
Accuracy of V and I .....	12-8
Accuracy of other items .....	12-9
How to determine actual accuracy .....	12-10
Measurement signal .....	12-12
Frequency .....	12-12
Signal level (the voltage when drive terminal H <sub>cur</sub> is open) .....	12-12
DC bias .....	12-12
Measurement range .....	12-12
Measuring speed (for reference) .....	12-13
Measurement time (fixed range, automatic trigger) .....	12-13
Automatic range selection time (per range) .....	12-13
Level-change stabilizing time .....	12-13
DC bias stabilizing time .....	12-13
Frequency-change stabilization time .....	12-13
Trigger .....	12-14
Measurement terminal .....	12-14
Residual charge protection (for reference) .....	12-14
Comparator function .....	12-14
Setting memory (Battery backup) .....	12-14
Handler interface (ZM2354 only) .....	12-15
Connector .....	12-15
Output signal .....	12-15
Input signal .....	12-15
Signal level .....	12-15
Signal ground .....	12-15
Beeper .....	12-15
Strobe signal width .....	12-15
GPIB .....	12-16
General matters .....	12-16
Power supply .....	12-16
Range of temperature and humidity to guarantee the performance .....	12-16
Range of temperature and humidity for storage .....	12-16
Outside dimensions .....	12-16
Mass .....	12-16

## WARRANTY

# ***Introduction***

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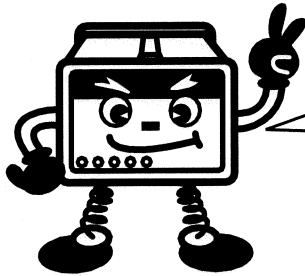
# 1



Those who would like to use the ZM2353/ZM2354 right away should first read Chapter 4. "How to Measure!"



# Introduction Outline of the ZM2353/ZM2354



Hi, there!  
My name is "LCR Meter, ZM2353/ZM2354".  
You may call me "ZM".  
Let me introduce my features before giving you a close explanation.

## Wide range of frequency

The user can specify the frequency in a range as wide as 40 Hz to 200 kHz with fine resolution level of two or three digits.

## Quick measurement

Measurement time is as short as 25 ms or less (typically), which is half or less than conventional equipment.  
(Comparison with our existing product model 2345)

## High precision

Basic accuracy of 0.1%  
Resolution of 4 and 1/2 digits (Resolution of D is 0.0001)

## Clear LED display and easy button operation

7-segment LEDs are adopted to facilitate monitoring the measurement.  
Both a numerical keypad and modifier buttons are adopted in order to enhance ease of operation.

## Wide range of measurement signal level

The user can set a signal level in the range of 10 mVrms to 5 Vrms (with resolution of 1 mV or 10 mV).

## High DC bias level

A 2.5 V DC biasing power supply incorporated in the ZM2353/ZM2354 allows C-measurement of polarity components such as electrolytic capacitor and semiconductors. Further, voltage of maximum  $\pm 35$  V can be applied from outside.

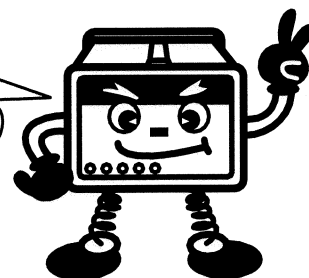
## Variety of parameters

The equivalent series resistor ESR, parallel conductance G, serial reactance X, and impedance expressed in polar coordinates  $|Z|-\theta$ , are available in addition to common components of L, C, R, D and Q.

## Standard components

The ZM2353/ZM2354 is provided as standard with a GPIB, which is a standard interface for measurement instruments. The ZM2354 is equipped with a handler interface that is used on parts production lines.

You can adopt me in a wide range of applications from research and development to production and inspection lines.



#### Measurement in R&D division and production field

The automatic setting function enables even a beginner to execute measurement just by turning on the power.

Further, changing parameters manually can display various sort of parameters.

#### For evaluation of frequency characteristics of parts (L, C and R)

Since frequency can be set in the range from 40 Hz to 200 kHz in two-digit resolution (three-digit resolution for 100 kHz or higher), the user can see the frequency characteristics of parts.

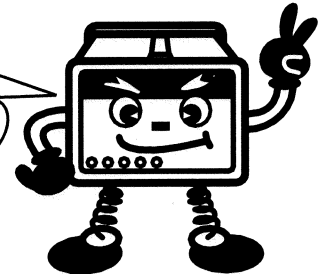
#### For screening of parts (L, C and R)

The basic precision of 0.1% and 21-classification comparator function as well as 10 sets of setting memory make the ZM2353/ZM2354 suitable for component screening.

Combined with a handler interface, the ZM2354 can be used in automatic screening lines for electronic parts.

# First check the contents of main unit and accessories!

The following accessories are supplied with your ZM2353/ZM2354.  
Please check for any missing item in the first place.



A main unit of ZM2353/ZM2354 LCR Meter

A copy of manual for "ZM2353/ZM2354" (this manual) 1

"Guide to Test Fixtures and Test Leads" 1

A power cord set (2 meter long with three pins) 1

A power fuse of 0.8 A 250 V, time-lag type, 5.2 $\phi$  x 20 mm 1

If any of the above is missing, contact NF Corporation or NF representatives.

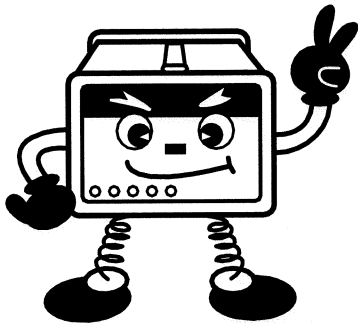
Replace the power cord set and power fuse before using this product outside of Japan. Contact NF Corporation or NF representatives.

The provided power cord set is customized for this product and is for use in Japan only. Do not use this power cord set with other products or for other purposes.

# ***Names of Parts***

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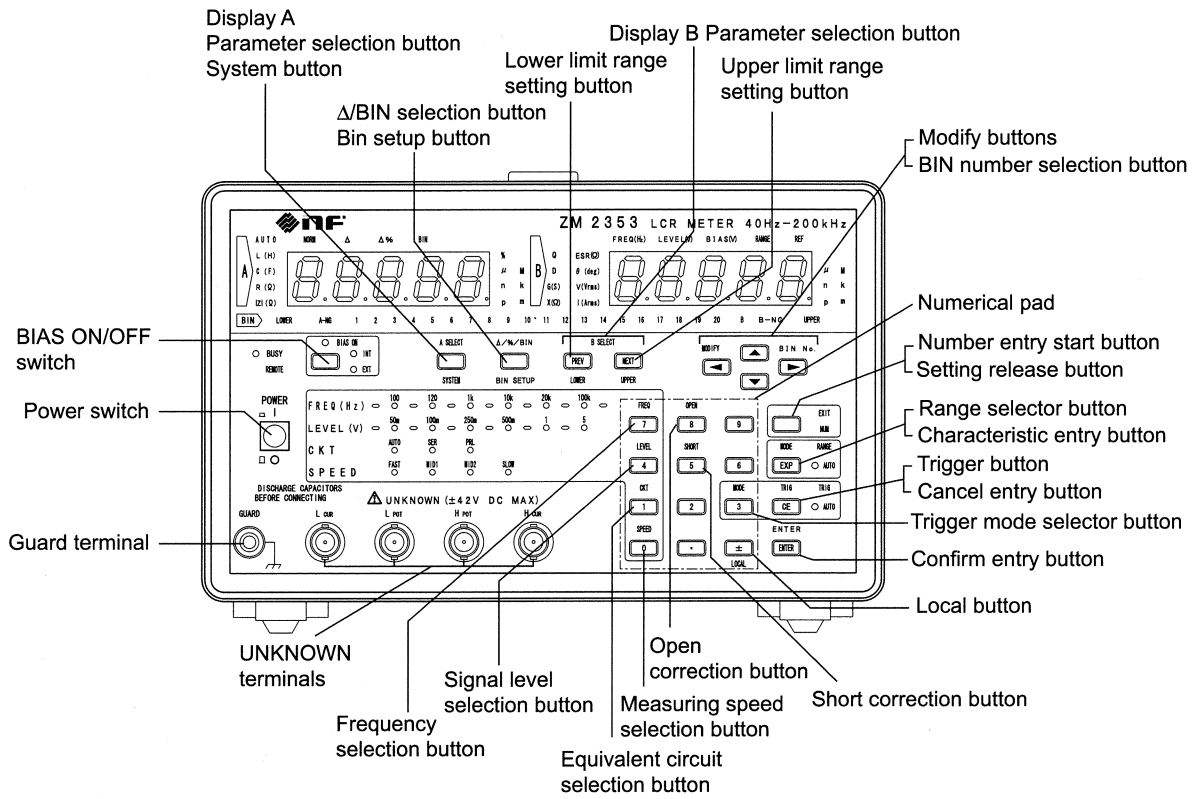
# 2



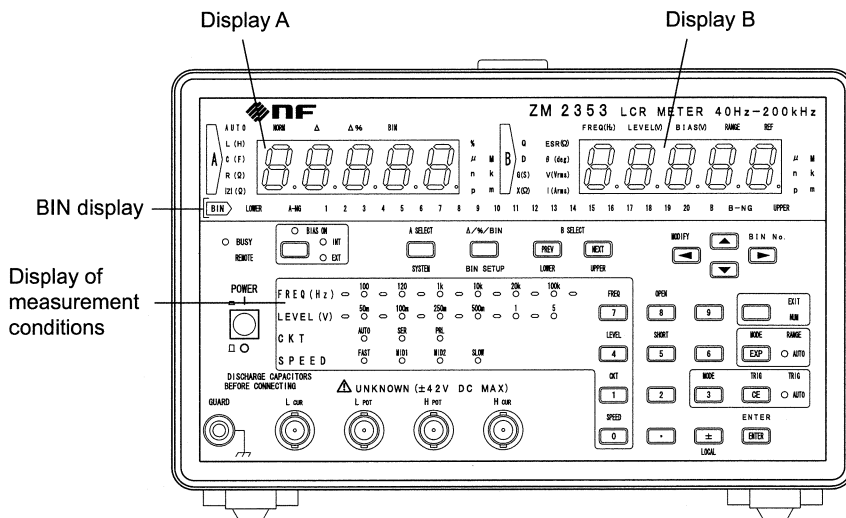
# Front panel

## Controls and terminals

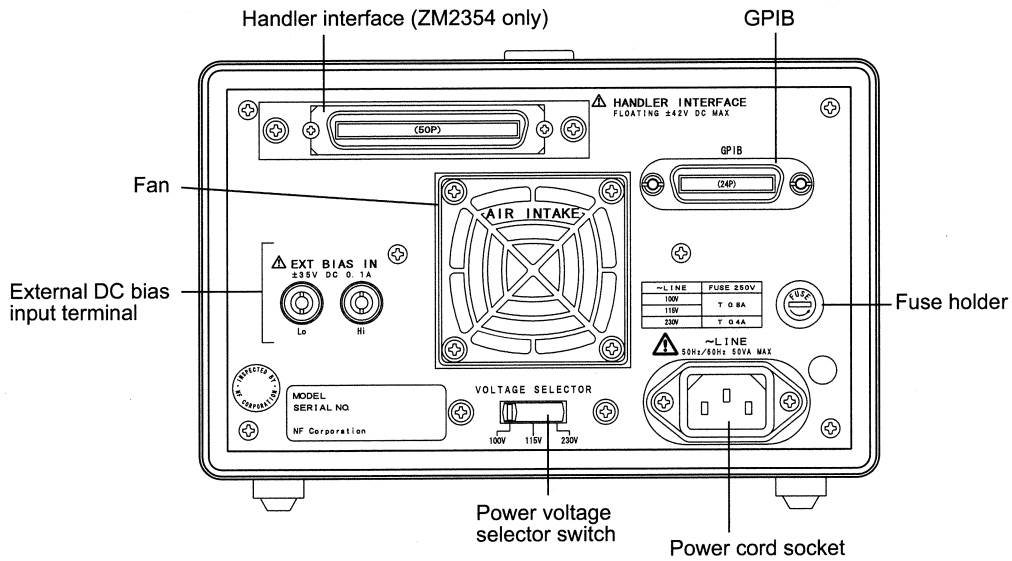
2. Name of Parts



## Displays



## Rear panel



### Note

#### [Button operation]

- If the character(s) are lighting near the button, then the function indicated by the character(s) is available.
- Entry of number  
Press  NUM, and the character(s) lamp will go out on the numerical pad, enabling the user to enter numbers.

#### [Special button operation]

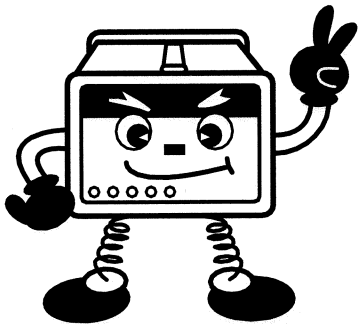
To enter the system mode or bin setup mode, press the two buttons simultaneously.

- To enter the system mode: while pressing  ENTER, press  A SELECT SYSTEM.
- To enter the bin setup mode: while pressing  ENTER, press  Δ/%/BIN BIN SETUP.

# ***Before Starting Operation***

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# 3





# Instructions on installation

- Keep the ZM2353/ZM2354 in allowable ranges of temperature and humidity as follows:

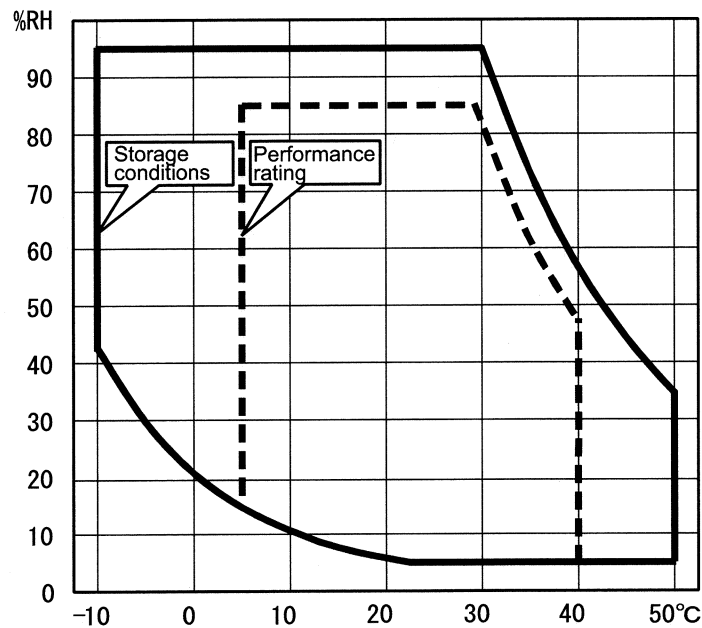
Performance rating: +5 to +40°C, 5 to 85% RH

(Absolute humidity: 1 to 25 g/m<sup>3</sup>, no condensation)

Storage conditions: -10 to +50°C, 5 to 95% RH

(Absolute humidity: 1 to 29 g/m<sup>3</sup>, no condensation)

- For installation of the ZM2353/ZM2354, select a place with little dust and vibration, free of direct sunlight, where the temperature and humidity are within the ranges specified above.



# Power supply and grounding

## Power cord set and grounding

For prevention of electric shock accidents, be sure to connect the ZM2353/ZM2354 to the ground before connection for measurement.

A three-pin power cord set with a grounding terminal is supplied with the ZM2353/ZM2354. Use this cable with the plug connected to a three-pin power receptacle that has a protective ground contact, and the ZM2353/ZM2354 will be grounded.

The provided power cord set, which is for use in Japan only, has a rated AC voltage of 125 V, with maximum voltage of 1250 Vrms/minute. The power cord set must be replaced to enable use at higher voltages or outside of Japan. Contact NF Corporation or NF representatives.

The provided power cord set is customized for this product. Do not use this power cord set with other products or for other purposes.

## Power fuse

Use a fuse with capacity of 0.8 A for 100/115 V AC and 0.4 A for 230 V AC. The fuse must be of time lag type and be rated at 250 V with the size of 5.2φx 20 mm. Select adequate one to the user power voltage. The product is supplied with a 0.8 A fuse as standard on shipping. If the user needs a 0.4 A fuse, contact NF corporation or NF representatives.

### **WARNING**

Use only the specified fuse. Use of an otherwise rated fuse, or use of copper or other wires may cause failure or fire.

## Power supply voltage

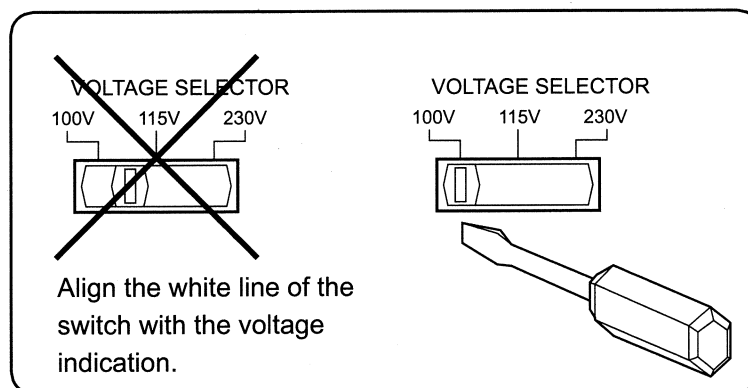
The ZM2353/ZM2354 works under the following power voltage:

100/115/230 V AC  $\pm 10\%$

50/60 Hz  $\pm 2$  Hz

Power consumption of 50 VA or less

The power voltage is set to 100 V AC as standard on shipping. Check the selector switch on the rear panel. To use the ZM2353/ZM2354 under other voltage than 100 V AC, unplug the power cord and set the power voltage selector switch to the given voltage.



Changing the Power Voltage

### CAUTION

Do not change the power voltage with the power cord plugged in the connector.

This may damage the ZM2353/ZM2354.

## Line filter

ZM2353/ZM2354 uses a line filter.

The leakage current is maximum 1 mA rms at 250 V AC and 60 Hz. Therefore, electric shock may be caused if the user touches a metallic part of the ZM2353/ZM2354 enclosure.

### WARNING

The ZM2353/ZM2354 enclosure must be grounded. Otherwise, electric shock may be caused.

## Fan

The ZM2353/ZM2354 is forcibly air-cooled by a fan. Obstructions to the air circulation may cause failure.

### ⚠ Caution

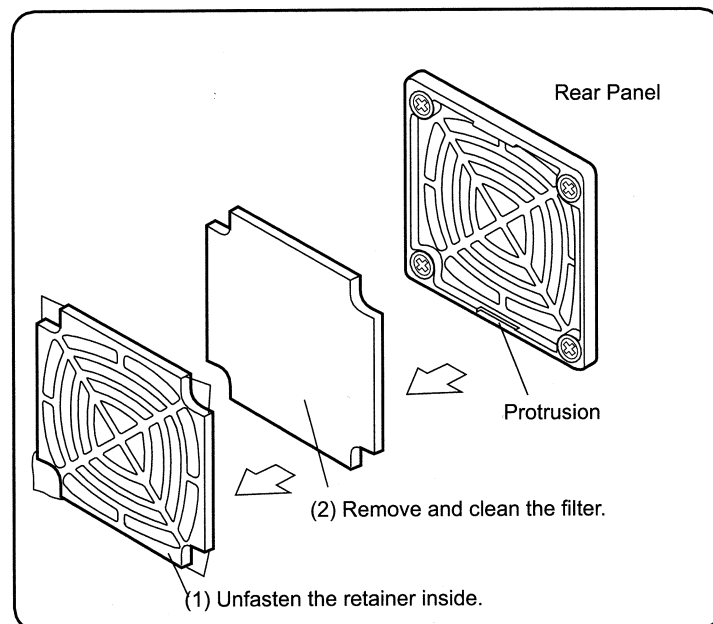
- Keep the ZM2353/ZM2354 10 cm or more away from the wall when installing the ZM2353/ZM2354, which has an air intake port on the rear side.

If the ZM2353/ZM2354 is used in a sealed rack or in other closed space, the ambient temperature will rise, resulting in insufficient cooling. Keep a clear space at the rear of the ZM2353/ZM2354.

- ZM2353/ZM2354 has an air exhaust port on the side, which must not be blocked during usage.

Deposited dust on the air filter at the air intake port will impede air circulation. Regularly clean the air filter every three months as a normal guideline. If the unit is used in a dusty environment, the guideline should be reduced to one month. Remove the air filter retainer of the fan, and the user can take out the air filter.

- Should the user notice the fan not running, immediately turn off the power, and contact NF corporation or NF representatives. Use of the ZM2353/ZM2354 with the fan not working would expand the damage, resulting in an unreparable condition.



Cleaning the Air Filter

### ⚠ WARNING

Turn off the power switch before removal and reinstatement of the air filter for prevention of danger.