

Semi-micro and Analytical Balance

LF Series

Operation Manual

 **WARNING**

- To ensure safe and proper use of the balance, please read this manual carefully.
- After reading this manual, store it in a safe place near the balance, so you can review it as needed.

SHINKO DENSHI CO., LTD

Contents

Preface	i
Important Notice.....	iii
How to Use This Manual.....	iv
Contents	vi
1 How to Begin	1
1-1 Warnings regarding Use.....	1
1-2 For More Precise Measurements.....	4
1-2-1 Precautions on the Measuring Room	4
1-2-2 Precautions on the Samples.....	5
1-3 Checking Supplied Items	6
1-4 Names and Functions of Component Parts	7
1-5 Functions of Operation Keys	8
1-5-1 Operation keys	8
1-5-2 Operation key explanations	8
1-6 How to Read Displayed Signs	10
1-7 Assembling and Installing the Balance.....	12
1-8 Operating the Windshield Doors	13
1-8-1 Opening and closing the windshield doors	13
2 Basic Operation	15
2-1 Powering On/Off and Operation Check	15
2-2 Zero-point Adjustment.....	17
2-3 Weighing a Sample in a Container (Tare).....	18
2-4 Weighing an Added Sample.....	19
2-5 Displaying the Sum of the Container and the Sample	20
2-6 Basics of Function Settings.....	21
2-7 Underfloor Measurement	22
3 Various Measuring Methods	23
3-1 Simple Weight Measurement.....	23
3-2 Counting the Number of Parts	24
3-2-1 Displaying the average sample weight	25
3-3 Measuring Percentage.....	27
3-3-1 Setting a reference weight by weighing an actual sample	27
3-3-2 Setting a reference weight by entering a value.....	28

3-4 Obtaining Weight Multiplied by a Coefficient.....	30
3-5 Measuring Specific Gravity	32
3-5-1 Specific gravity measurement procedure.....	32
3-5-2 Preparing measurement tools.....	32
3-5-3 Measurement	33
3-5-4 When using a liquid other than water	35
3-5-5 Printing the specific gravity data	36
3-6 Adding Multiple Measurements	37
3-6-1 Addition function settings.....	37
3-6-2 Weighing with the addition function	38
3-7 Judging between Too Heavy and Too Light (Limit Function).....	40
3-7-1 Limit function settings	44
3-7-2 Judgment using definite values	45
3-7-3 Judgment using deviation values	47
3-8 Statistical Operation Function	49
3-8-1 Calculation items	49
3-8-2 Operation method.....	50
3-8-3 Output of statistical operation results.....	52
3-8-4 Cancellation of last collected data	53
3-8-5 Clearing statistical operation results	54
4 Adjusting the Balance	55
4-1 Adjusting (Calibrating) the Balance.....	55
4-1-1 Span adjustment with internal weight	55
4-1-2 Span test with internal weight	56
4-1-3 Span adjustment with external weight	57
4-1-4 Span test with external weight	58
4-2 Calibrating the Internal Weight.....	59
4-3 Entering the Instrumental Error of a Weight for Use	62
4-4 Se-CAL (full automatic calibration function)	63
4-5 Repeatability Measurement	64
4-5-1 Automatic Repeatability Measurement (ARM).....	64
4-5-2 Semi-Automatic Repeatability Measurement (SARM).....	65
4-6 Easy RES Function (single-touch response time change).....	67
5 Setting the Functions	69

5-1 Select and Switch of Weighing Units	69
5-2 Readability Setting	70
5-3 Automatic Switching of Scale Intervals	71
5-4 Turning ON/OFF the Automatic Switching of Scale Intervals with a Single Touch	72
5-5 Saving the Container (Tare) Weight	73
5-6 Power Setting	74
5-6-1 Automatic backlight-off function	74
5-7 Date and Time Setting	75
5-7-1 Time setting	75
5-7-2 Date setting	76
5-8 Date View	76
5-9 Time Output	77
5-10 Interval Output Function	78
5-11 ID No. Setting	80
5-12 Improving the Stability of the Balance	81
5-13 α -Check(self-diagnosis function)	83
5-13-1 Display test	83
5-13-2 Key test	84
5-13-3 Motor test	85
5-13-4 Span adjustment history	86
5-13-5 Automatic Repeatability Measurement (ARM)	87
5-13-6 Semi-Automatic Repeatability Measurement (SARM)	88
6 Input/Output to/from External Devices	89
6-1 Output to Printers	89
6-1-1 Connecting a printer	89
6-1-2 Printing span adjustment and span test results	89
6-1-3 Printing measurement results	90
6-2 Connection of interface and the external equipment	91
6-2-1 Connector pin numbers and functions of the D-SUB9P	91
6-2-2 Examples of connection with a PC	92
6-2-3 Connecting a type-B USB connector to a PC	93
6-2-4 Interface specifications	94
6-3 Communication Data and Commands	95
6-4 Output Data	95

6-4-1 Data format.....	96
6-4-2 Meanings of data.....	97
6-4-3 Communication format examples.....	100
6-4-4 Special formats.....	100
6-5 Input Commands.....	104
6-5-1 Procedure for transmission.....	104
6-5-2 Input command examples.....	104
6-5-3 Command format.....	105
6-5-4 Format of each command.....	105
6-6 Response.....	110
7 Troubleshooting.....	111
7-1 Error Messages.....	111
7-2 Troubleshooting.....	114
7-3 Initializing.....	117
7-4 Maintenance.....	118
7-4-1 For heavy dirt.....	118
7-4-2 How to clean the balance.....	119
Appendixes.....	121
Appendix 1 Function Setting List.....	121
Appendix 2 Measurement Mode List.....	130
Appendix 3 ISO/GLP/GMP Compliant Printing.....	131
Appendix 4 Specifications.....	136
Appendix 4-1 Basic Specifications.....	136
Appendix 4-2 Functional Specifications.....	137
Appendix 4-3 Weighing Capacity and Readability by Unit.....	138
Appendix 4-4 Unit Conversion Table.....	139
Appendix 4-5 Outline Drawings.....	140
Index of Terms.....	141

This is a “Table of Contents preview” for quality assurance

The full manual can be purchased from our store:

<https://the-checkout-tech.com/manuals/shinko-denshi/LF-124 LF-135 LF-224 operation manual.pdf>

And our free Online Keysheet maker:

<https://the-checkout-tech.com/Cash-Register-Keysheet-Creator/>

[HTTPS://THE-CHECKOUT-TECH.COM](https://THE-CHECKOUT-TECH.COM)