WE503D

Dynamic Integrator for Belt Scales, Screw Weighers, Bulkslide Flowmeters and Impact Flowmeters

Program Version: v3.07

Operator Manual

RICE LAKE®
WEIGHING SYSTEMS

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PN 203018 Rev B

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Revision History

This section tracks and describes manual revisions for awareness of major updates.

Revision	Date	Description
B	June 20, 2023	Established revision history; Updates to Calibration and Direct Function Codes; firmware version 3.07

Table i. Revision Letter History

Contents

1.0 Introduction

This manual describes in short form the essential functions of the WE503D weighing terminal.

For technical details on calibration and configuration please refer to WE503 Installation Manual.

Ensure the WE503D Dynamic Integrator is fully installed by following the instructions of the WE503D Dynamic Integrator Installation Manual (PN 200479).

Manuals are available from Rice Lake Weighing Systems at www.ricelake.com/manuals

Warranty information is available at www.ricelake.com/warranties

1.1 Additional Resources

For additional resources, see:

- PN 200479 WE503D Dynamic Integrator Installation Manual (provides an overview of the installation instructions for the WE503D Dynamic Integrator)
- PN 203227 WE503D Fieldbus Communication Protocol Manual (provides an overview of the Fieldbus communication protocol)

1.2 Safety

Electric shock risk. Disconnect all power to the instrument before opening the enclosure.

Work inside the enclosure must be performed by qualified service personnel only.

Do not operate without the enclosure completely assembled.

Do not allow minors (children) or inexperienced persons to operate this unit.

Exercise the utmost care when performing tests and making adjustments that can actuate movable parts such as feeding devices, gates, flaps, conveyors, etc. Make absolutely sure that nobody is within reach of movable parts.

This unit must not be operated in a potentially explosive atmosphere. It is the sole responsibility of the user to classify the area of installation and make sure that absolutely no potentially explosive atmosphere can be present at any time.

For the storage of key data the terminal contains a battery on the CPU board. Risk of explosion if battery is replaced improperly. Replace only with a battery of the same type or with compatible type recommended by manufacturer. Only dispose of used batteries as indicated by the manufacturer.

The device uses short-circuit/over-current protection for the main supply.

Do not use for purposes other than weight taking.

Do not make alterations or modifications to the unit.

Do not exceed the rated specification of the unit.

Do not use this product if any of the components are cracked.

Do not remove or obscure warning labels.

Disconnect all power to this instrument before cleaning.

Do not use solvents or aggressive substances to clean the unit.

Do not submerge.

CAUTION: Failure to heed could result in minor or moderate injury.

If this device is used in an automatic or manual filling cycle, all users must provide a hard wired emergency stop circuit outside the device circuitry.

When this unit is a component of a system, the resulting system design must be reviewed by qualified personnel who are familiar with the construction and operation of all individual components in the system and the potential hazards involved.

This unit must be installed, serviced, and operated in strict compliance with all locally applicable safety regulations.

The power supply unit provides SELV voltage in accordance with EN 60950. Make sure that any peripheral device connected to the weighing terminal containing its own power supply also uses SELV voltage.

Input voltage of the instrument must comply with the local main power supply.

If the line cord with connector is used as the means to separate the instrument from the power supply, the wall outlet must be installed close to the instrument and must be easily accessible. If a permanently connected power cable is used, an easily accessible separator must be included in the power supply circuit.

Compliance with the following safety instruction is mandatory for UL approved units: For power supply of the WE503D use LPS and/or NEC class 2 power supply units only.

IMPORTANT: Failure to heed could result could result in damage to equipment or corruption to and loss of data.

Keep this manual for future reference.

The unit does not have a power switch and is operational immediately after connection to the main power supply.

All switch gear connected to the unit and/or installed close to it, such as relays and connectors, must be fitted with appropriate components (RC-modules, diodes) to suppress interference.

In order to avoid static discharge, all metallic parts of a system must be thoroughly grounded. Movable parts, such as portable scales on plastic wheels, must be grounded with earth clamps or earth leads of appropriate diameter.

1.3 Technical Features

Belt Weigher

Connection to one understructure or force transducer with 1 or several analog load cells.
Digital input for pulse encoder to measure the belt speed. Optionally operation without pulse wheel possible (fixed speed).

Bulkslide

Connection to a Bulkslide with 1 or several analog load cells.

Operating Modes

Totalizing with two counters, which can be reset.
PID control for flow regulation.
Batching mode with preset target and adjustable preact (inflight compensation).

Display

2 Display lines with switchable information like dosage state, partial total (resettable), general total (resettable), current load on belt, belt speed, flow rate (kg/h or t/h).
With PID enabled additionally the flow target and the PID output percentage.
In batching mode additionally the batch target and the remaining batch total.

IO Connections (Standard or Optional)

Pulse output for totalizer, quantity per pulse selectable.
Analog output for current flow rate or PID output.
Analog input for PID setpoint, correction or inclinometer.
Serial communication (RS232/485, USB, ethernet, WiFi).
Fieldbus communication.

Construction

Stainless steel desk-top, wall-mount, panel-mount housing, IP68.

2.0 Display and Keyboard

In the following section, the functioning of the keys is described, in accordance to factory default settings.
It is possible to customize the key functionality.

2.1 Display

Figure 2-1. Front Panel Display

The display can consist of either:

Figure 2-2. Large Indication with a Line Below

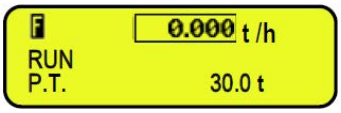

Figure 2-3. Small Indication with Two Lines Below

The larger indication is called the zoom window and can be enabled or disabled in the technical menu. It will show automatically after not pressing any key for 5-seconds.

Readings in the zoom window and in the bottom-lines can be selected through:

- While zoom window is shown, one bottom-line, select with **F7**
- While standard window is shown, two bottom-lines, select with **F6** or **F7**

2.2 Keyboard

Key	Function
CLR / PWR	If pressed for 3-seconds, it will power off and restart; Step back in menus, delete characters or clear an entry field
ALT / SCALE	Second alternative function, see function keys; Switch scale, if application allows
ENTER / FN	Enter, confirm, next step in menus; First alternative function
ZERO / TARE	If pressed for 3-seconds, it will start the ***BELT ZERO*** procedure; Pressing During restart enters the diagnostics menu or the technical menu
HELP	If pressed for 3-seconds, it will call the ***Help*** menu
Numeric Keys	Enter digits or characters
F1	Start batch / dosage (only used when PID or Batch function is enabled); If pressed for 3-seconds, it will lock / unlock the keyboard
F2	Pause batch / dosage (only used when PID or Batch function is enabled); If pressed for 3-seconds, the weight reading will be X10 resolution
F3	Stop batch / dosage (only used when PID or Batch function is enabled); If pressed for 3-seconds, adjust date and time
F4	Flow rate target or percentage of ingredient (only used when PID function is enabled); If pressed for 3-seconds, enter the diagnostics menu
F5	Print or data transmission to the printer serial port, see paragraph 3.8
F6	Change the 2nd display line; Arrow down, next step; At entering data, decrease the blinking digit
F7	Change the 1st display line; Arrow up, previous step; At entering data, increase the blinking digit
F8	Reset PT (Partial Total); At entering data, select digit to modify from right to left; After the **ALT** key, switch the reading Flow and Total in the zoom window
F9	Reset GT (General Total); At entering data, select digit to modify from left to right; After the **FN** key, switch the display to the Custom display
F10	Correction factor; At entering data, enter a space in the middle of two characters

Table 2-1. Keyboard Functions

2.3 Display

2.3.1 Instrument Status

In the top left corner a character indicates the instrument status.

Status	Description
R	***RUN*** mode
Z	Belt zero procedure active
S	Stop, wait for ***Run*** input to start
W	Ready, wait for ***Start*** input to start
P	Pause, wait for ***Start*** input to start
B	Batch active
F	Batch finished
T	Test weigh calibration active

Table 2-2. Status Descriptions

2.3.2 Instrument Action

In the bottom left or right corner a symbol indicates the instrument action.

Annunciator	Description
FN	The **FN** (**Enter**) key was pressed to follow with a function key
2^F	The **ALT** key was pressed to follow with a function key
Key	Keyboard locked
Printer	Data transmission to PC or printer is active

Table 2-3. Annunciator Descriptions

3.0 Operation

3.1 Startup

The WE503 is automatically turned on as soon as it is powered.

The display shows:

- Initially a welcome message (MASTER logo), while the instrument carries out a series of checking and self-tests
- Name, version of the installed software
- BARGRAPH – Pressing the **ALT** key while the version is shown in the display, the indicator shows additional information

3.2 Restart

The WE503 will restart, if the **CLR** key is pressed for 3-seconds.

The message *** POWER OFF *** will be displayed.

3.3 Turning off

The WE503 will power down, if the **CLR** key is pressed for 3-seconds, but only if the internal jumper is set accordingly.

The message *** POWER OFF *** will be displayed.

Or remove the instrument's power supply.

3.4 Totalizer Registers

Two totalizer registers are available.

These count simultaneously, but can be reset independently.

3.4.1 Partial Total

Displayed as **P.T.**, selected in ***Operator Mode*** by **F6** key or by **F7** keys.

The displayed ***Partial total (PT)*** can be reset the to zero, at any time.

PROCEDURE:

- Press the **F8** key
- Display shows: ***PARTIAL TOTAL RESET ?***
- Press **Enter** key to confirm or press **CLR** key to abort
- The display return to previous

3.4.2 General Total

Displayed as **G.T.**, selected in ***Operator Mode*** by **F6** key or by **F7** keys.

The displayed ***General total (GT)*** can be reset the to zero, at any time.

PROCEDURE:

- Press **F9**
- Display shows: ***GENERAL TOTAL RESET ?***
- Press **Enter** to confirm or press **CLR** to abort
- The display return to previous reading showing GT as 0 kg (0 ton)
- The procedure is then ended

3.5 Help Menu

If **HELP** is pressed for 3-seconds, it calls the ***Help*** menu

The ***Help*** menu shows the functions for the F keys:

- Step down with **F6**
- Step up with **F7**
- Exit with **CLR**

3.6 Dynamic Zero Calibration

The belt scale can be set to zero via the **Zero** key.

The result should be a feed rate of 0 kg/h (or 0 t/h).

This procedure will only start when the flow rate is within the zero-setting range.

PROCEDURE:

- Press the **Zero** key (**>0<**) for 3-seconds
- Display shows: ***EXECUTE ZERO BELT ?***
- Press **Enter** key to confirm or press **CLR** key to abort
- The display will show a ***Z*** in the left top corner during the procedure
- The procedure will end automatically after the installed zero time or the installed belt turns
- The display will show a ***R*** in the left top corner after procedure ending

The controller can be configured for automatic zero tracking within a specified range.

3.7 Article / Product Database

The article database can be used when different products with different calibrations or settings are used.

Database Field	Description
Description 1	Article / product name or description
Description 2	Article / product name or description
Description 3	Article / product name or description
Description 4	Article / product name or description
Description 5	Article / product name or description
Init Value PID	PID start value in %, PID output will start with this value for a set time
Dosage Target	Only used when PID or Batch function is enabled
Correction Factor	Correction factor will be used instead of correction factor which is set in the Calibration menu (function code 324)

Table 3-1. Article / Product Database

3.7.1 Update Article Database

To modify or select an article from the database use function code 316. This function code can be used from the main screen in Operator mode or can be assigned to a function key.

Press **F1**: New article, selected index or first free index.

Press **F2**: Edit selected article.

Press **F3**: Delete selected article.

Press **F4**: Search article.

Press **F5**: Print article.

Press **Enter**: Select article.

Press **Alt**: Unselect article.

3.7.2 Select Article

To Select an article from the database function in alphabetical order code 317 can be used.

This function code can be used from the main screen in Operator mode or can be assigned to a function key.

Press **Enter**: Select the selected article.

3.8 Print

On various actions will print automatically a different print format.

Action	Print Format
Print key F5	DOSED 0.00 t (Partial total)
Start Batch	START DOSAGE DD/MM/YY HH:MM
	RESTART DOSAGE DD/MM/YY HH:MM
Batch finished	END DOSAGE DD/MM/YY HH:MM DOSED 0.00 t (Partial total)
Block belt (alarm)	LOCK DD/MM/YY
Stop Batch	DOSAGE DISABLED DD/MM/YY HH:MM DOSED 0.00 t (Partial total)
Pause Batch / Dosage	Pause DD/MM/YY HH:MM
Partial Total Reset	PART.TOT. 0.00 t
General Total	GEN.TOT. 0.00 t
>Handled Article Total	DESCR.1 DESCR.2 ART.TOT
Result of the Calculator	-0.1 0 =
	0
Start Up	

Table 3-2. Print Actions and Format

4.0 Transport, Maintenance, Cleaning

4.1 Transport

Transport and storage of the WE503 terminal shall only be made in the original packing with foam cushion.

The device must not be exposed to shock or vibration.

Transport and storage of electronic components such as boards, etc. Must only be made in suitable anti-static ESD bags or cases.

Storage temperature -25°C–70°C at 95% relative humidity without condensation.

4.2 Maintenance

CAUTION: This unit and its associated equipment must be maintained by qualified personnel only, who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. Failure to observe these precautions may result in bodily injuty.

Disconnect all power to this unit before servicing!

The WE503 terminal is designed to require a minimum of maintenance and service, however, depending on the environmental conditions a visual inspection at regular intervals is recommended. The frequency at which normal maintenance (cleaning and inspection) should be performed, when installed in a clean office, should be twice a year However, is the nit is subject to a dusty or dirty environment the frequency should be increased as required. At these inspections it should be made sure that all connected cables are undamaged and that all connectors are tightly fastened.

Maintenance of the scale is required at regular intervals depending on use and environment. The accuracy of scales can be affected by dirt, foreign objects, etc. and appropriate maintenance is strongly recommended. Also recommended is the calibration with certified test weights at regular intervals.

4.3 Cleaning

CAUTION: Disconnect all power to this unit before cleaning!

Do not use any type of industrial solvent or the finish of the unit may be damaged. Do not spray cleaner directly on the unit.

Clean the keyboard and covers with a soft clean cloth that has been dampened with a mild window type cleaner.

5.0 Service

CAUTION: Only permit qualified personnel to service this equipment. Exercise care when making checks, tests, and adjustments!

If any problem arises that has not been explained, verify the following:

- Power supply on and line cord is undamaged (visual inspection)
- All cables connecting to scale and peripheral devices are undamaged (visual inspection)
- Connectors attached correctly and tightly secured at peripheral devices (visual inspection)
- Connected sensors in correct position and are operational

If operational difficulties are encountered that cannot be rectified by means of this manual, obtain as much information as possible regarding the issue.

If possible, try first to determine the conditions under which the problem occurs. Try to find out whether the appearance of the difficulties can be reproduced under the same conditions.

For the systematic analysis of an unknown problem the information as listed below is required:

- Serial number of the unit
- Program version displayed on power-up
- Exact wording of any error message displayed
- Type and model of peripheral components related to the problem (e.g. load cell, remote display, etc.)

To obtain assistance contact customer service station stating the information listed above.

5.1 Error Messages

If an error occurs during calibration or normal operation, error messages are displayed.

Error Message	Description	Solution
- OUT CAPCITY! -	A/D out of range, load cell signal is higher than the load cell sensitivity setting (default 2 mV/V)	Check for improper load cell wiring, configuration, connection or hardware problems
EEEEEEE	Displayed value out of resolution	Check flow or total resolution settings
LOCKED: (Alarm)	Locked due an alarm; See Alarm settings	Check alarm sauce or for improper alarm settings; Restart indicator

Table 5-1. Error Messages and Solutions

6.0 Calibration

Start with a dynamic zero calibration, see paragraph Section 3.6 on page 11.

For calibration, a certain amount of material is discharged and subsequently weighed on a static scale.

Calculate the correction factor: (Measured weight / indicated weight) * current correction factor.

IMPORTANT: Calibration is not possible when the calibration jumper is in the secured position.

6.1 Set Correction Factor Manually

NOTE: The correction factor affects the flow and totalizers result.

1. Input the number **324** and confirm with the **Enter** key or abort with **CLR** key.
2. Enter the new correction factor.
3. ***MODIFY CORRECTION FACTOR ?*** displays.
4. Press **Enter** key to confirm or **CLR** key to abort.
5. The display returns to ***Operating Mode***.

6.2 Material Test Calibration

NOTE: The correction factor affects the flow and totalizer results.

1. Run material over the belt scale.
2. Input number **323** and confirm with the **Enter** key or abort with the **CLR** key.
3. ***PT*** displays.
4. Change and/or accept the value of the totalizer with the **Enter** key.
5. Enter the real dosed weight value (measured on a scale or weighbridge) and confirm with the **Enter** key.
6. The error and the new correction factor is displays.
7. Accept the calibration by pressing the **Enter** key or ignore with the **CLR** key.

6.3 Test Weight Calibration

NOTE: The correction factor affects the flow and totalizer results.

The test weight calibration procedure can start by a function code or digital input (configured to MNU.FUN 328 test weight procedure).

Start by function code:

1. Input number **328** and confirm with the **Enter** key or abort with the **CLR** key.
2. The ***Test weight value*** displays.
3. Change and/or accept the value of the weight with the **Enter** key.
4. Digital output ***Test weight*** activates and test starts after ***Test weight delay*** displays.
5. The test completes when the test distance or the test time elapses.
6. The digital output ***Test weight*** deactivates, the error and correction factor display.
7. Accept with the **Enter** key or ignore with the **CLR** key.

Start by digital input:

1. Activate the digital input.
2. Digital output ***Test weight*** activates and test starts after ***Test weight delay*** displays.
3. The test completes when the test distance or the test time elapses.
4. The correction is automatically made.

7.0 Direct Function Codes

By entering below ID code and confirming by Enter, the related function will be called.

ID Code	Function	Default Linked to Key
100		
101		
102		
103	Printer on	
104	Simple print	F5
105	Repeat last print	2nd F + F5
106	Switch main value area data	2nd F + F8
107	Switch 2nd LCD line data	F6
108	Lock keyboard	
109	Display weight x 10	
110	Set date and time	
111	Diagnostic menu	
112		
113	Free texts configuration	
114	Calculator	
115	Print and clear partial total	F8
116	Print and clear general total	F9
117		
118	Digital input/output and analog output diagnostic	
119	Serial communication diagnostic	
120	Custom display switch	Fn + F9
121	Free text 1 configuration	
122	Free text 1 configuration	
123	Free text 1 configuration	
124	Free text 1 configuration	
125	Free text 1 configuration	
126	Free text 1 configuration	
127	Free text 1 configuration	
128	Free text 1 configuration	
129	Free text 1 configuration	
130	Free text 1 configuration	
131	Clear free texts	
132	Send print format	

Table 7-1. Function Codes 100-132

ID Code	Function	Default Linked to Key
Other Functions		
200	Link print format to print function	
201	Direct link 2nd print format to print function	
202	Setpoints values	
203		
204		
205		
206		
207		
208	Switch 1st LCD Line (Zoom Disabled)	F7

Table 7-2. Function Codes 200-208

ID Code	Function	Default Linked to Key
Belt Functions		
300	Dynamic belt zeroing	
301	Static zeroing	
302	Enable/disable flow-rate visualization inside dead band	
303	Run belt	
304	Set target flow-rate (PID enabled)	F4
305	Set target dosage weight (Batch enabled)	
306	Set pulse weight	
307	Set dosage time	
308	Set slow speed weight (Batch enabled)	
309	Set slow speed flow-rate (Batch and PID enabled)	
310	Set flying weight (Batch enabled)	
311	Set flying time (Batch enabled)	
312	Start	F1
313	Pause	F2
314	Stop	F3
315	Flow-rate graphic	
316	Articles database management	
317	Article selection in alphabetical order	
318	Print and clear article total	2nd F + F1
319	Print and clear article totals	
320	PID settings	
321	Controller diagnostics	
322	Jog time (Batch enabled)	
323	Set correction factor inserting real material weight (Analog input not used for correction)	
324	Set correction factor (Analog input not used for correction)	F10
325	Set flow-rate correction factor	
327	Flow-rate sampling interval for graphic	
328	Test weight procedure to set correction factor (analog input not used for correction)	
329	PID P setting	
330	PID I setting	
331	PID D setting	
332	PID interval time setting	
333	Start analog output value (%)	
334	Belt factor	

Table 7-3. Function Codes 300-334

ID Code	Function	Default Linked to Key
Totals		
400	Progressive digits	
401	Ticket counter value	
402		
403	Partial total display	
404	Partial total print	
405	Partial total clear	
406	General total display	
407	General total print	
408	General total clear	
409	Article total display	
410	Article total print	
411	Article total clear	
412	Articles totals clear	
413	Clear all totals	

Table 7-4. Function Codes 400-413

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