BST106-B60S[L]

Weighing / Force Measuring Controller

Weight/Force Display, Peak Value Detection / Display Holding
Setpoint DO Output, AO/Digit Transmission

Operation Manual V5.0

Changsha Supmeter Technological Co.,Ltd.

Preface

Thank you very much for your purchase!

This manual covers safety precaution, technical specification, operation interface, installation& connection, function&operation and so on. In order to make the product running at its best, please read this manual in advance, and reserve it for the future reading.

The technology update, function enhancement and quality improvement may lead to some differences between this manual and the physical product, please understand.

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Main Features:

- ✧ Applications: Weight/Force Display, Peak Value Detection&Display Holding, Setpoint DO Output and AO/Digit Transmission.
- ✧ 4 Optional Setpoint DO Output Modes: Weight Limit DO Alarm Mode, Weight Increment DO Output Mode, Weight Decrement DO Output Mode and Weight Section DO Output Mode.
- ✧ EMC design with high anti-jamming capability, suitable for industrial environment.
- ✧ 32-bit ARM CPU with 48MHz clock & higher arithmetic speed.
- ✧ 5 Red LED digital tubes for English character and digit display.
- ✧ Menu&Shortcut mode operation.
- ✧ 24-bit High-precision and high-speed ∑-△A/D conversion module with 1/1,000,000 internal resolution and sampling frequency 1280Hz.
- ✧ Special anti-vibration digital filtering algorithm for ensuring the weighing stability and accuracy when there is strong vibration on the load receptor, and the rapid response capability when the weight signal changes.
- ✧ Optional weighing input signal mV, V and mA for connecting '【mV】Output Type Loadcell', '【V】Voltage Output Type Weighing Transmitter' and '【mA】Current Output Type Weighing Transmitter'.
- ✧ Auto Zero Initial Calibration after Power-on, Auto Zero Tracking, Zero Fine Adjustment, Zero Calibration and Load Calibration functions available.
- ✧ Optional Data Calibration, Segmenting Span Correction and Segmenting Weight Calculation functions.
- ✧ Auto-locking, Key-locking, Key-unlocking, Digital Setting&Calibration and I/O Testing functions available.
- ✧ 1 Definable normally open switch input [DI].
- ✧ 2 Relay switches with normally open and normally closed contacts for outputting upper limit and lower limit alarm signals.
- ✧ 1 Optional and definable analog signal output [AO: 4~20mA / 0~20mA / 0~5V / 0~10V / …].
- ✧ Optional RS232 and RS485 communication ports for connecting Host IPC/PLC and LED Remote Display.
- ✧ With the multitasking mode, the processes of weighing, alarm output and signal transmission will not be interrupted by parameter setting and the other operations.

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1. Safety Precaution

- **Application environment**

  Make sure that this product works under the environment where is accord with the technical specifications.

  Do not open the shell before power-off.

- **Controller Protection**

  For avoiding bodily injury from electric shock accident and separating the controller from strong interference, the metal shell of the controller should be grounded directly with the ground resistance being less than 4Ω.

- **Scale Frame Protection**

  For avoiding bodily injury from electric shock accident and separating the loadcells from strong interference, the scale frame should be grounded directly with the ground resistance being less than 4Ω.

- **Cable Laying**

  Weighing signal, analog signal and communication signal cables should be laid in pipes, and do not lay them together with power cables.

- **Power Supply**

  The power supply of the controller should be separated from the power supply of the driving devices.

  Please make sure that the inputted voltage is correct before power-on.

- **Environmental Protection**

  While being discarded as worthless, the product should be processed lawfully as leady industrial waste for environment protection.

- **Other Notes**

  The installation, wiring and maintenance should be operated by the engineers with the relevant professional knowledge and safety operation ability.

  Although being not described in this manual, the relevant safety operating procedures and standards should be followed.

2. Technical Specification

□ Executing Standard

- ✧ CMC GB/T 7724-2008《Electronic Weighing Meter》PRC National Standard.
- ✧ OMIL R76: 2006《Non-automatic Weighing Instruments》International Recommendation.
- ✧ Accuracy Grade: III.
- ✧ Verification Accuracy: 0.03%.
- ✧ Static Weighing Accuracy: 0.2%~0.5%.

□ Display

- ✧ 5 Red LED digital tubes for English character and digit display.
- ✧ Weight Display Range: -9,999~+99,999.
- ✧ Scale Capacity: Setting Range 1~99,999.
- ✧ Scale Division: Optional 1, 2, 5, 10, 20, 50, 100, 200, 500.
- ✧ Display Resolution: 1/50,000.
- ✧ Decimal Point: Optional 0, 0.0, 0.00, 0.000, 0.0000.
- ✧ Display Refreshing Time: Setting Range 0.01~1.00s.

□ Keypad

- ✧ 4-key keypad for Menu&Shortcut mode operation.

□ Weighing Signal Interface

- ✧ Excitation Voltage / Max. Current 1: DC5V/120mA for 8-350Ω loadcells.
- ✧ Excitation Voltage / Max. Current 2: DC12V/100mA for weighing transmitter.
- ✧ Optional weighing input signal mV, V and mA for connecting '【mV】Output Type Loadcell', '【V】Voltage Output Type Weighing Transmitter' and '【mA】 Current Output Type Weighing Transmitter'.
- ✧ 【mV】Signal Input Range: 0~19.5mV [Output Sensitivity of Loadcell: 1.0~3.5mV/V].
- ✧ 【V】Signal Input Range: 0~2.5V, 0~5V, 0~10V.
- ✧ 【mA】Signal Input Range: 0~20mA.
- ✧ 24-bit ∑-△ADC with internal resolution 1/1,000,000.
- ✧ Sampling Frequency: 1280Hz.
- ✧ Special Anti-vibration Digital Filtering Algorithm for precise weighing, stable display and rapid response.
- ✧ Zero Drift: ±0.1μV/℃ RTI (Relative to Input).
- ✧ Gain Drift: ±5ppm/℃.
- ✧ Non-linearity: 0.005%FS.

□ Switch&Analog Signal Interface

- ✧ 1 Definable normally open switch input [DI].
- ✧ 2 Relay switches with normally open and normally closed contacts for outputting upper limit and lower limit alarm signals.
- ✧ Contact Capacity of Relay Switch: AC250V/DC24V, 1A.

✧ 1 Optional&Definable Analog Signal Output [AO: 4~20mA / 0~20mA / 0~5V / 0~10V / …], Non-linearity: 0.05%FS.

□ Digital Communication Interface

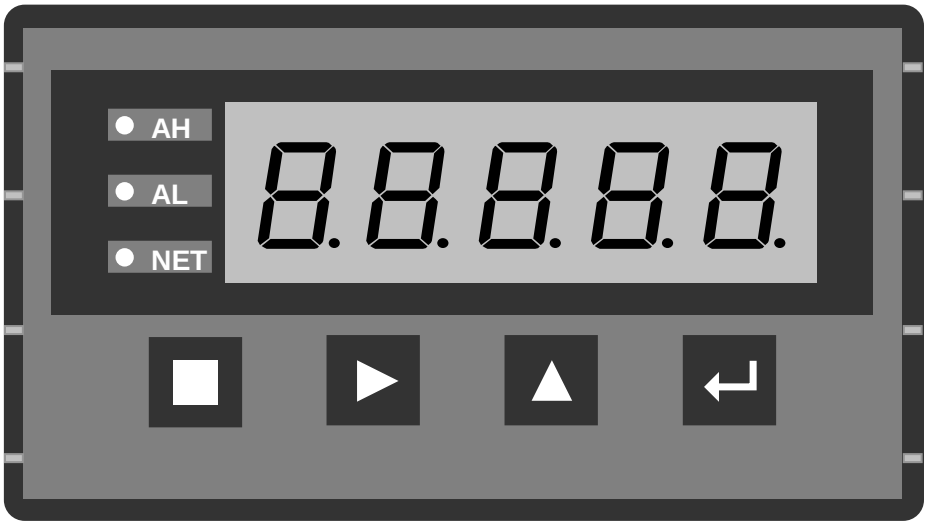
✧ COM1: Optional RS232.
✧ COM2: Optional RS485.
✧ Connectable: Host IPC/PLC and LED Remote Display.

□ Operating Specification

✧ Operating Voltage: DC24V ±20%.
✧ Max. Power Consumption: 5W.
✧ Outline Size: 107×60×100mm [W×H×D].
✧ Panel Cut-out Size: 94×47mm [W×H].
✧ Operating Temperature: -25℃ to +45℃.
✧ Storage Temperature: -30℃ to +60℃.
✧ Relative Humidity: Max. 85%RH.
✧ Protection Level of Front Panel: IP65.
✧ Weight: Approx. 0.3kg.

3. Operation Interface

3.1 Operation Interface Diagram



3.2 Keypad Operation

If there is not any keypad operation in one minute and it's not in the processes of 'F2 System Calibration' & 'F6 Factory Adjustment', the controller will return to 'Main Display Interface' automatically.

Menu Operation	
Key Name	Description
【■】	Enter Main Menu / Exit.
【↵】	Enter / Save / Alarm Acknowledge.
【►】	Cursor shifts right. Display the previous option.
【▲】	Display the next interface or option. Digit input: +1 (0~9 loop).

Quick Operation Mode A Parameter [904]= '0. dE' [Default Set]	
Key Name	Description
【■】*	✧ Key-locking. ✧ Key-unlocking.
【►】 (【SET】)	Setpoint parameters setting.
【►】* (【ZERO】) (【→0←】)	✧ [-ZEro]: Zero Calibration with Power-down Protection and Clearing Tare Weight. ✧ [≡ZEro]: Zero Fine Adjustment without Power-down Protection and without Clearing Tare Weight. ✧ The controller will switch to Gross Weight display.
【▲】* (【TARE】) (【→T←】)	✧ [≡tArE]: Manual Tare without Power-down Protection. ✧ [-PStr]: Preset Tare Weight with Power-down Protection. ✧ [-rStr]: Clear Tare Weight with Power-down Protection. ✧ The controller will switch to Net Weight display.
【↵】 (【G/N】)	Gross Weight / Net Weight / Net Weight Peak Value display switch.
【↵】* (【CLS】)	✧ [-CLS] : Clear Screen [Clear the display value of Peak Value].

*: Keep the key pressed for 2 seconds.

Quick Operation Mode B Parameter [904]= ‘1. Au’	
Key Name	Description
【■】*	✧ Key-locking (Excluding Key【ZERO】&【TARE】). ✧ Key-unlocking.
【►】 (【ZERO】) (【→0←】)	✧ Zero Calibration with Power-down Protection and Clearing Tare Weight. ✧ The controller will switch to Gross Weight display.
【▲】 (【TARE】) (【→T←】)	✧ Manual Tare with Power-down Protection. ✧ The controller will switch to Net Weight display.
【↵】 (【G/N】)	Gross Weight / Net Weight / Net Weight Peak Value display switch.
【↵】* (【CLS】)	✧ [-CLS] : Clear Screen [Clear the display value of Peak Value].

*: Keep the key pressed for 2 seconds.

3.3 State Indication

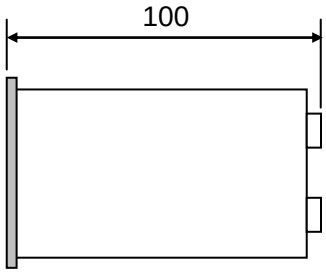
LED light	Description	Note
[AH]	Upper Limit Alarm.	Refer to Parameters [200]~[203].
[AL]	Lower Limit Alarm.	
[NET]	✧ OFF: Gross Weight display. ✧ ON: Net Weight display. ✧ Fast Blinking: In Peak Value detection process. ✧ Slow Blinking: Detection result of Peak Value display.	Initial display value after power-on: ✧ [203]=0: Net Weight. ✧ [203]=1: Gross Weight. ✧ [203]=2: Net Weight Peak Value.

3.4 Alarm Sign

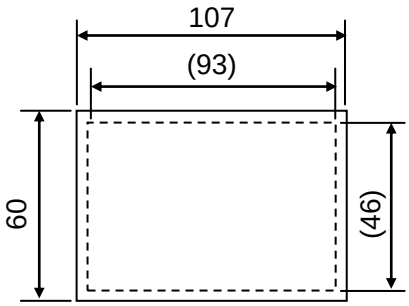
Sign	Alarm Cause	Solution
Err0	Weighing Signal Type Error.	Power-on again after making sure that the set value of parameter [111] 'Weighing Signal Type' and the switch position of DIP1/DIP2 are matched with the actual weighing input signal.
Err1	RAM Failure.	Replace the chip RAM.
Err2.1/Err2.2	EEPROM Failure.	Replace the chip EEPROM.
Err3	Unused.	
Err4	ADC Failure.	Replace the ADC module.
oV-Ad	Over ADC Range.	Weighing signal exceeds A/D conversion range. 1. Check if the loadcell is connected. 2. Check if the capacity of loadcell is too small. 3. Check if the loading weight is too big.
oL	Overload Alarm.	Gross Weight > (Scale Capacity + 9 × Scale Division). 1. Check if the loadcell is connected. 2. Check if the capacity of loadcell is too small. 3. Check if the loading weight is too big.
oV-tr	Not meet the condition of Maunal Tare.	When Gross Weight is at the state with negative value display, overload alarm or dynamic variation, 'Manual Tare' will be invalid.
oV-nZ	Over 'Zero Fine Adjusting Range'.	Refer to parameter [123] 'Zero Fine Adjusting Range'.
tXX.XX	Preheating Time Countdown [min.sec].	Refer to parameter [128] 'Initial Zero Adjustment after Power-on', [129] 'Initial Zero Adjusting Time' and [130] 'Initial Zero Adjusting Range'. Wait for the preheating time over or press any key to exit.
oV-Zr	Over 'Initial Zero Adjusting Range'.	

4. Installation&Connection

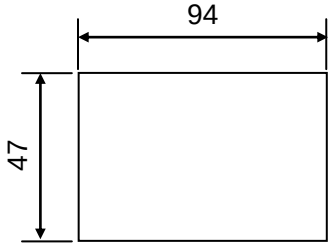
4.1 Installation



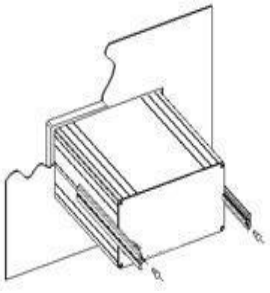
Outline Size



Front Panel Size



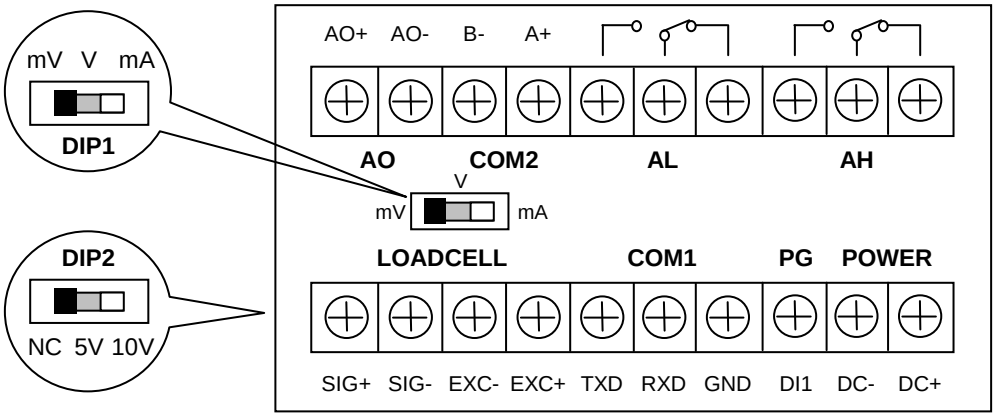
Panel Cut-out Size



Installation Mode

Outline Size W×H×D [mm]	Front Panel Size W×H [mm]	Box Body Size W×H [mm]	Panel Cut-out Size W×H [mm]
107×60×100	107×60	93×46	94×47

4.2 Terminal



Select weighing signal via setting Switch DIP1/DIP2 and Parameter [111] 'Weighing Signal Type'					
Weighing Signal	0~19.5mV	0~20mA	0~2.5V	0~5V	0~10V
DIP1[in rear panel] Set	Left【mV】	Right【mA】	Middle【V】	Middle【V】	Middle【V】
Internal DIP2 Set	Left【NC】	Left【NC】	Left【NC】	Middle【5V】	Right【10V】
Parameter [111] Set	'19.5EV'	'20EA'	'2.5V'	'5V'	'10V'
Default Set	√				

- **The set value of parameter [111] 'Weighing Signal Type' and the switch position of DIP1/DIP2 should be matched with the actual weighing input signal.**
- **To 【V】/ 【mA】 weighing signal, the terminal 'SIG-' and 'EXC-' should be shorted; otherwise, the sampling signal will be unstable.**

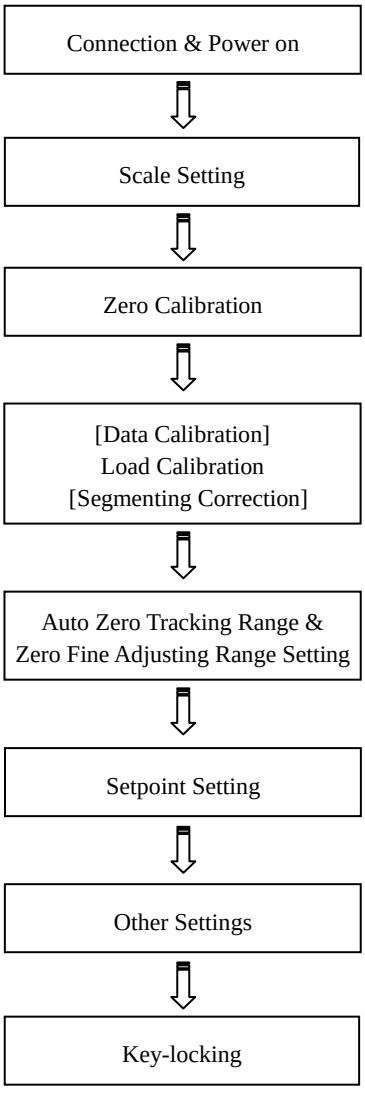
No.	Pin	Description		
LOADCELL		**【mV】Weighing Signal**	**【V】Weighing Signal**	**【mA】Weighing Signal**
1	SIG+	Weighing Signal Input +.	Weighing Signal Input +.	Weighing Signal Input +.
2	SIG-	Weighing Signal Input -.	Weighing Signal Input -. **['SIG-' and 'EXC-' should be shorted]**	Weighing Signal Input -. **['SIG-' and 'EXC-' should be shorted]**
3	EXC-	Excitation Voltage -.	Excitation Voltage -.	Excitation Voltage -.
4	EXC+	Excitation Voltage +. [DC5V]	Excitation Voltage +. [DC12V]	Excitation Voltage +. [DC12V]
COM1		**RS232 Digital Communication Port**		
5	TXD	Transmit Data.		
6	RXD	Receive Data.		
7	GND	Signal Ground / Shield Ground.		
8	DI1	Switch Signal Input 1.		
POWER		**DC24V[±20%] Power Input Port**		
9	DC-	DC Input -.		
10	DC+	DC Input +.		
The metal shell should be grounded directly. For separating the controller from the interference of the driving devices, the DC24V power supply of the controller should not be shared by the DO.				

No.	Pin	Description
AO		**0~20mA Analog Output Port [Definable]**
1	AO+	AO Output +.
2	AO-	AO Output -.
COM2		**RS485 Digital Communication Port**
3	B-	Data -.
4	A+	Data +.
AL [DO1]		**Relay DO1 Output Port**
5	OP_1	DO1 Normally Open Contact.
6	COM_1	DO1 Common Terminal.
7	CL_1	DO1 Normally Closed Contact.
AH [DO2]		**Relay DO2 Output Port**
8	OP_2	DO2 Normally Open Contact.
9	COM_2	DO2 Common Terminal.
10	CL_2	DO2 Normally Closed Contact.
Contact Capacity of Relay Switch: AC250V/DC24V, 1A.		

Relay DO Output Signal				
Port	Application Mode / Parameter [212] AP			
	AP=1.HL	AP=2.HH	AP=3.LL	AP=4.SEC
DO1	[203]≤SET1	[203]≥SET1	[203]≤SET1	SET1≤[203]≤SET2
DO2	[203]≥SET2	[203]≥SET2	[203]≤SET2	[203]<SET1 或[203]>SET2

Note: Parameter [203] ‘Data Compared with Weight Setpoints” can be defined to ‘0: Gross Weight’ / ‘1: Net Weight’ / ‘2: Net Weight Peak Value’.

5. Operation Procedure



6. Function&Operation

6.1 Main Menu

Main Menu		Second Menu	
Sign	Function	Sign	Description
F1.SEt	Parameter Setting	-SCAL	Scale parameters setting.
		-CALP	Calibration parameters setting.
		-SEtP	Setpoint parameters setting.
		-SErP	Communication parameters setting.
		-dISP	Display and operation interface parameters setting.
F2.CAL	System Calibration	-ZEro	Zero Calibration without loading on the weigher to correct Zero Value.
		-dAtA	Data Calibration: Input the specification parameter values of loadcell or weighing transmitter according to the actual configuration of the weighing system to correct Span Coefficient. If there is no access to get the specification parameter values for Data Calibration, then it's necessary to do Load Calibration.
			✧ [19.5EV]:【mV】Data Calibration. Input Parameters: Total Capacity and Output Sensitivity of Loadcell.
			✧ [≡20EA≡]:【mA】Data Calibration. Input Parameters: Capacity, Zero Value and Full Value of Current Output Type Weighing Transmitter.
			✧ [≡2.5V≡]:【2.5V】Data Calibration. ✧ [≡5V≡]:【5V】Data Calibration. ✧ [≡10V≡]:【10V】Data Calibration. Input Parameters: Capacity, Zero Value and Full Value of Voltage Output Type Weighing Transmitter.
		-LoAd	Load Calibration: After doing Data Calibration, if there are conditions for Load Caliration, do Load Caliration with loading standard weight on the weigher to correct Span Coefficient further for higher weighing accuracy.
		-SEgC	Segmenting Span Correction: After doing Zero Calibration and Load Calibration [or Data Calibration], it's allowed to do Segmenting Span Correction with loading standard weight on the weigher by 10 Correction Points to get Span Correction Ratio of 10 linearity segments for higher weighing accuracy.

Main Menu		Second Menu	
Sign	Function	Sign	Description
F3.rEC			Unused.
F4.CLn			Clear Screen: Clear the display value of Peak Value.
F5.Loc	Key-locker	-oPEn	Key-unlocking.
		-Locc	Key-locking.
		-PASS	Password Set. Exfactory Passwords: ✧ Operator Password: 000. ✧ Administrator Password: 001.
F6.FAC	Factory Adjustment	Special for manufacturer.	
		-SPAn	【mV】Exfactory Span Adjustment: Use standard weighing test equipment to adjust the 【mV】 weighing signal interface for normalizing Span Coefficient to 1.
			【mA】/【V】Exfactory Span Adjustment: Use precision current source to adjust the【mA】/【V】weighing signal interface for normalizing Span Coefficient to 1.
		-AdtS	Weighing Signal Linearity Test. [AD Value / Voltage Value / Current Value]
		-AoZF	AO Zero/Full Adjustment.
		-AotS	AO Linearity Test.
		-dIdo	DI/DO Input&Output Test.
		-dEFU	RAM Reset: Reset to factory defaults.
		-dStS	Display/DO Reliability Test.
F7.InF	Product Information	Only for query.	
		-VEr-	Version No.
		--Sn-	Serial No.
		-dAtE	Exfactory Date.

6.2 F1.SET Parameter Setting

6.2.1 Weighing Parameters (SCAL)

No.	Sign	Range	Default	Description	Set
100	Ut	0~3	1	**Weight Unit** *0: None* *1: kg* *2: t* *3: g*	
101	dt	0~4	ooo.oo	**Decimal Point** *0: ooooo* *1: oooo.o* *2: ooo.oo* *3: oo.ooo* *4: o.oooo*	
102	SL	1~99999	10000	**Scale Capacity** Max. allowed loading weight of the load receptor. Scale Capacity ≤ (Loadcell Capacity × Loadcell Quantity) – Self-weight of Load Receptor.	
103	dV	1~500	1	**Scale Division** *1, 2, 5, 10, 20, 50, 100, 200, 500*	
104	ZE	-99999~ +99999	0 [*]	**Zero Value** Only for query.	
105	SP	>0	1.0000 [*]	**Span Coefficient** Max. display value: 9.9999. Only for query.	
106	Sr	0~5	0	**Stablity Judging Range** [Division] Set value = 0: No 'Stablity Judging'. Set value > 0: Weight Variance per [107] 'Stablity Judging Time' being in [106] 'Stablity Judging Range' means 'Weight is stable'.	
107	St	0.1~9.9	0.5	**Stablity Judging Time** [s]	

[*]: 'RAM Reset' operation has no effect on the parameter.

<table>
<tr><th>No.</th><th>Sign</th><th>Range</th><th>Default</th><th>Description</th><th>Set</th></tr>
<tr><td>108</td><td>Fc</td><td>1280</td><td>1280</td><td>Sampling Frequency [Hz]
1280</td><td></td></tr>
<tr><td rowspan="15">109</td><td rowspan="15">Ft</td><td rowspan="15">0~19</td><td rowspan="15">15</td><td colspan="2">Anti-vibration Digital Filter1</td><td rowspan="15"></td></tr>
<tr><td colspan="2">Filter1’s 10^0 Digit Set</td></tr>
<tr><td>Set Value</td><td>Cutoff Frequency</td></tr>
<tr><td>0</td><td>None</td></tr>
<tr><td>1</td><td>11.2Hz</td></tr>
<tr><td>2</td><td>8.0Hz</td></tr>
<tr><td>3</td><td>5.6Hz</td></tr>
<tr><td>4</td><td>4.0Hz</td></tr>
<tr><td>5</td><td>2.8Hz</td></tr>
<tr><td>6</td><td>2.0Hz</td></tr>
<tr><td>7</td><td>1.4Hz</td></tr>
<tr><td>8</td><td>1.0Hz</td></tr>
<tr><td>9</td><td>0.7Hz</td></tr>
<tr><td colspan="2">Filter1’s 10^1 Digit Set</td></tr>
<tr><td>Set Value</td><td>Anti-Vibration Grade</td></tr>
<tr><td>0</td><td>Medium</td></tr>
<tr><td>1</td><td>High</td></tr>
<tr><td>110</td><td>Sb</td><td>1~128</td><td>1</td><td>Weight Display Smooth Filter2
The bigger set value of Filter2 will make the weight display value more stable with slower response speed.</td><td></td></tr>
<tr><td>111</td><td>LC</td><td>1~5</td><td>1/2/3/4/5
[*]</td><td>Weighing Signal Type
1: 19.5EV [0~19.5mV]
2: 20EA [0~20mA]
3: 2.5V [0~2.5V]
4: 5V [0~5V]
5: 10V [0~10V]
Operating Authorization: Administrator.</td><td></td></tr>
</table>

[*]: ‘RAM Reset’ operation has no effect on the parameter.

6.2.2 Calibration Parameters (CALP)

No.	Sign	Range	Default	Description	Set
120	ZP	0~1	0	**Auto Zero Tracking Permission** *0: oFF* *1: on* (Only when weight is stable, Auto Zero Tracking will be allowed. Refer to Parameter [106]/[107])	
121	Zt	1~10	1	**Auto Zero Tracking Time T** [s] T = Set value × [107] Stablity Judging Time.	
122	Zr	0.1~50.0	0.2	**Auto Zero Tracking Range** [Division] Zero Tracking Rate = [122] / [121]. Suggestion: Zero Tracking Rate ≤ 0.5[Division/s].	
123	nZ	0~50000	50	**Zero Fine Adjusting Range** If Gross Weight variation caused by Zero Value changing is within this range, 'Zero Fine Adjustment' will be valid. Suggestion: Set value ≤ (Scale Capacity × 4%).	
124	dZ	0~99	5	**Range of Displaying Zero** When the absolute value of weight is within this range, the weight display value will return to zero.	
125	tL	1~99999	12000 [*]	**Total Capacity of Loadcells** Total Capacity of Loadcells = Loadcell Capacity × Loadcell Number. Only for query.	
126	SE	0.500~5.000	2.000 [*]	**Output Sensitivity of Loadcell** [mV/V] Only for query.	
127	Un	0	0	**Unused**	
128	In	0~1	0	**Initial Zero Adjustment after Power-on** *0: oFF* *1: on* [without Power-down Protection]	
129	It	0~1800	10	**Initial Zero Adjusting Time** [s]	
130	Ir	0~5000	50	**Initial Zero Adjusting Range** Suggestion: Set value ≤ (Scale Capacity × 20%).	

[*]: 'RAM Reset' operation has no effect on the parameter.

No.	Sign	Range	Default	Description	Set
131	L1		1000	**Correction Point's Loading Weight 1~10**	
132	L2		2000	Inputted Loading Weight value for Segmenting	
133	L3		3000	Correction.	
134	L4		4000	Demand: L1≤L2≤…≤L10.	
135	L5	1~99999	5000	Only for query.	
136	L6	[*]	6000		
137	L7		7000		
138	L8		8000		
139	L9		9000		
140	LA[L10]		10000		
141	d1		10000	**Correction Point's AD Value 1~10**	
142	d2		20000	AD Value detected via Segmenting Correction.	
143	d3		30000	Demand: d1≤d2≤…≤d10.	
144	d4	-99999~	40000	Only for query.	
145	d5	+99999	50000		
146	d6	[*]	60000		
147	d7		70000		
148	d8		80000		
149	d9		90000		
150	dA[d10]		99999		
151	C1			**Span Correction Ratio 1~10**	
152	C2			Span Correction Ratio of Linearity Segment got by	
153	C3			Segmenting Correction.	
154	C4	0.0100~		✧ Linearity Segment 1：[Zero Value]~d1.	
155	C5	99.9999	1.0000	✧ Linearity Segment 2：d1~d2.	
156	C6	[*]		✧ Linearity Segment 3：d2~d3.	
157	C7			✧ …	
158	C8			✧ Linearity Segment 10：d9~[Max. AD Value].	
159	C9			Max. display value: 9.9999.	
160	CA[C10]			Only for query.	
161	SC	0~1	0 [*]	**Segmenting Weight Calculation Permission** *0: oFF* *1: on* Operating Authorization: Administrator.	

[*]: 'RAM Reset' operation has no effect on the parameter.

6.2.3 Setpoint Parameters (SEtP)

No.	Sign	Range	Default	Description	Set
200	Lo	0~99999	1000	**DO1Weight Lower Limit / Weight Setpoint 1**	
201	HI	0~99999	9000	**DO2 Weight Upper Limit / Weight Setpoint 2**	
202	nL	0~50000	50	**Non-load Zero Range** 'Net Weight > Non-load Zero Range' for triggering the Peak Value detection process. 'Net Weight ≤ Non-load Zero Range' for stopping the Peak Value detection process.	
203	dA	0~2	0	**Data Compared with Weight Setpoints** *0. groS* [Gross Weight] *1. nEt* [Net Weight] *2. PnEt* [Net Weight Peak Value]	
204	do	0~1	1	**DO Output Permission** *0: oFF* *1: on*	
205	dL	0.1~5.0	0.5	**DO Bounce-back Delay Time** [s] Used for avoiding that the DO alarm switch turns on and off frequently with its related real-time data being at the critical point.	
				Min. Interval Time for Peak Value Detection [s] Only after the time delayed, the triggered Peak Value detection process is allowed to be stopped by 'Net Weight ≤ Non-load Zero Range'. And only after the time delayed, the stopped Peak Value detection process is allowed to be triggered again by 'Net Weight > Non-load Zero Range'.	
206	Ao	0~3	0	**AO Signal** *0. groS* [Gross Weight] *1. nEt* [Net Weight] *2. dISP* [Displayed Weight] *3. PnEt* [Net Weight Peak Value]	
207	AE	0.00~21.00	4.00	**Min. AO Value of Weight Signal** [mA or V] It's the AO current or voltage output value of weight signal when 'Weight value ≤ 0'.	

No.	Sign	Range	Default	Description	Set
208	AF	0.00~21.00	20.00	**Max. AO Value of Weight Signal** [mA or V] It's the AO current or voltage output value of weight signal when 'Weight value ≥[209]'.	
209	AC	1~99999	10000	**Max. Weight Value for AO Output**	
210	At	0~1	0	**AO Type** *0: 20EA* [Max. Output 20mA] *1: 10V* [Max. Output 10V]	
211	dI	0~4	0	**DI1 Signal** *0: ≡ZEro* [Zero Fine Adjustment without Power-down Protection and without Clearing Tare Weight] *1: -ZEro* [Zero Calibration with Power-down Protection and Clearing Tare Weight] *2: ≡tArE* [Manual Tare without Power-down Protection] *3: -rStr* [Clear Tare Weight with Power-down Protection] *4: CLS* [Clear the display value of Peak Value]	
212	AP	1~4	1/2/3/4 [*]	**Application Mode** *1. HL* [Weight Limit DO Alarm Mode] *2. HH* [Weight Increment DO Output Mode] *3. LL* [Weight Decrement DO Output Mode] *4. SEC* [Weight Section DO Output Mode] Operating Authorization: Administrator.	

[*]: 'RAM Reset' operation has no effect on the parameter.

6.2.4 Communication Parameters (SErP)

<table>
<tr><th>No.</th><th>Sign</th><th>Range</th><th>Default</th><th>Description</th><th>Set</th></tr>
<tr><td>800</td><td>Ad</td><td>0~99</td><td>1</td><td>Communication Address</td><td></td></tr>
<tr><td>801
802</td><td>b1
b2</td><td>0~2</td><td>0
0</td><td>COM1/COM2 Baud Rate
0 : 9600bps
1 : 19200bps
2: 115200bps [1152d]</td><td></td></tr>
<tr><td>803
804</td><td>P1
P2</td><td>0~2</td><td>0
0</td><td>COM1/COM2 Parity Check
0. none [None Check]
1. EVEn [Even Check]
2. odd [Odd Check]</td><td></td></tr>
<tr><td>805
806</td><td>E1
E2</td><td>0~2</td><td>0
0</td><td>COM1/COM2 Communication Mode
0. HASC [Host-slave, Modbus ASCII]
1. Hrtu [Host-slave, Modbus RTU]
2. Cont [Continuous Sending ASCII]</td><td></td></tr>
<tr><td>807</td><td>dA</td><td>0~3</td><td>2</td><td>Data for Continuous Sending Mode
0. groS [Gross Weight]
1. nEt [Net Weight]
2. dISP [Displayed Characters]
3. PnEt [Net Weight Peak Value]</td><td></td></tr>
<tr><td>808</td><td>SF</td><td>0~9</td><td>2</td><td>Continuous Sending Frequency [Hz]
0: 1Hz; 1: 2Hz; 2: 5Hz; 3: 10Hz
4: 20Hz; 5: 25Hz; 6: 50Hz; 7: 100Hz
8: 500Hz; 9: 1000Hz
<table>
<tr><th>COM1 Baud Rate</th><th>Max. Sending Frequency</th></tr>
<tr><td>9600bps</td><td>50Hz</td></tr>
<tr><td>19200bps</td><td>100Hz</td></tr>
<tr><td>115200bps</td><td>1000Hz</td></tr>
</table></td><td></td></tr>
<tr><td>809</td><td>dF</td><td>0~3</td><td>0</td><td>Modbus Data Format
Reading&Writing Order of 4-Byte Registers:
0: 4321 [HB4 HB3 LB2 LB1]
1: 3412 [HB3 HB4 LB1 LB2]
2: 1234 [LB1 LB2 HB3 HB4]
3: 2143 [LB2 LB1 HB4 HB3]
The HEX byte order of float and long int registers in the controller is ‘HB4 HB3 LB2 LB1’.</td><td></td></tr>
</table>

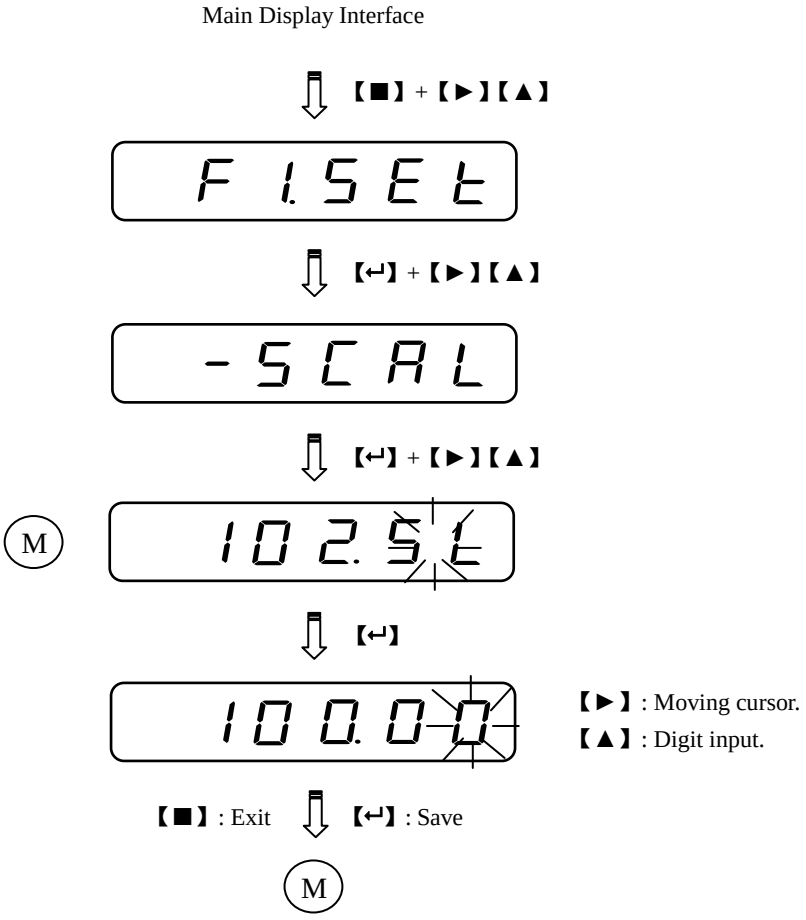
6.2.5 Display Parameters (dISP)

No.	Sign	Range	Default	Description	Set
901	dS	0.01~1.00	0.20	**Display Refreshing Time** [s]	
902	Lc	0~1	0	**Auto-Locking** *0: oFF* *1: on* [If there is not any keypad operation in one minute and it's not in the processes of 'F2 System Calibration' & 'F6 Factory Adjustment', the controller will lock the keypad and return to 'Main Display Interface' automatically]	
903	br	1~4	2	**LED Brightness**	
904	oP	0~1	0 [*]	**Quick Operation Mode** *0. dE* [One key with multifunction] *1. Au* [One key for single function]	

[*]: 'RAM Reset' operation has no effect on the parameter.

6.2.6 A Sample of Parameter Setting

Modify the parameter '[102] Scale Capacity'.

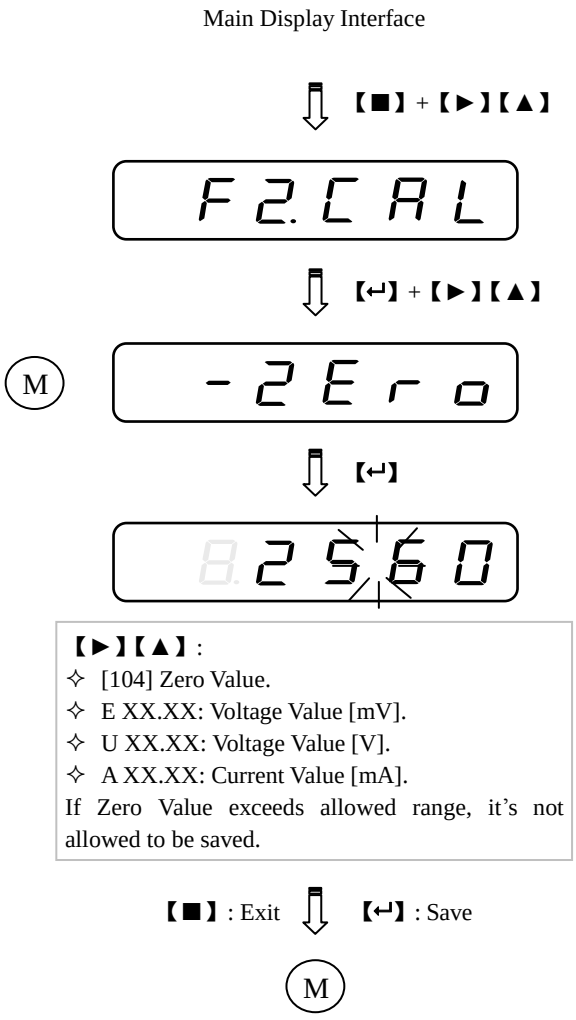


6.3 F2-CAL System Calibration

After doing ‘System Calibration’, Tare Weight value will return to zero automatically.

6.3.1 Zero Calibration (ZEro)

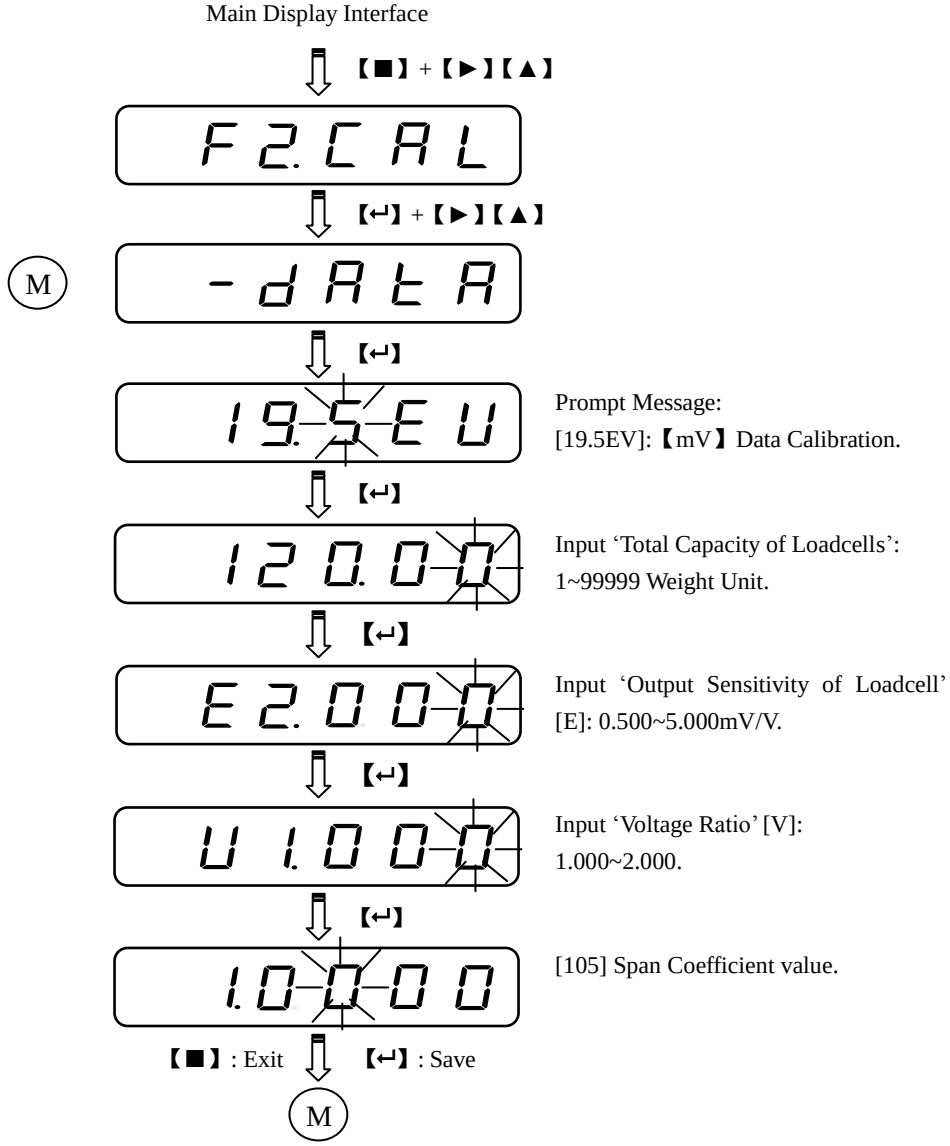
Do Zero Calibration without loading on the weigher and save the new Zero Value.



6.3.2 Data Calibration (dAtA)

6.3.2.1【mV】Data Calibration

Input the specification parameter values of loadcell according to the actual configuration of the weighing system to correct Span Coefficient. If there is no access to get the specification parameter values for Data Calibration, then it's necessary to do Load Calibration.

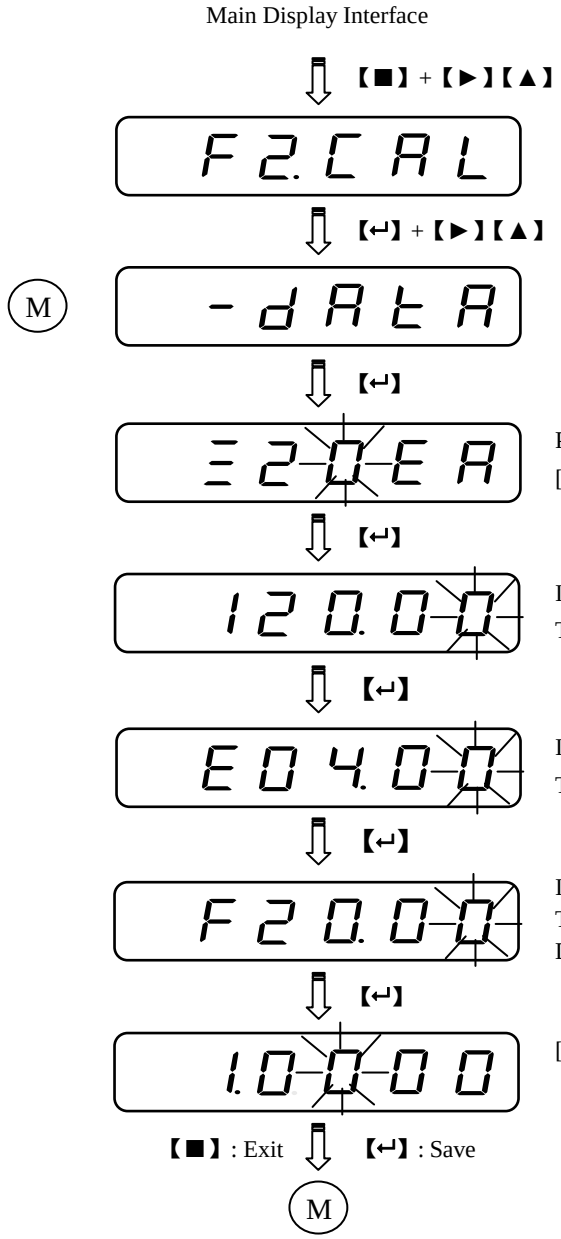


Note:

- ✧ Total Capacity of Loadcells = Loadcell Capacity × Loadcell Number.
- ✧ Voltage Ratio = Excitation Voltage on the terminal of controller / Excitation Voltage on the terminal of loadcells.
- ✧ The rated excitation voltage for loadcells is DC5V. It's best to measure the actual voltage value.

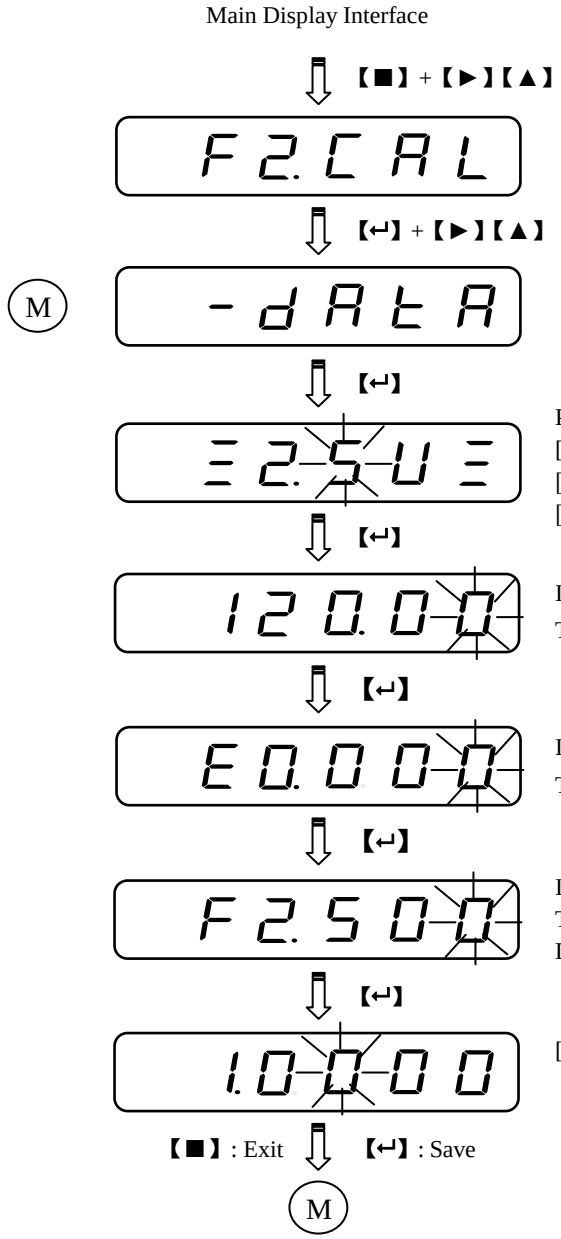
6.3.2.2【mA】Data Calibration

Input the specification parameter values of the current output type weighing transmitter according to the actual configuration of the weighing system to correct Span Coefficient. If there is no access to get the specification parameter values for Data Calibration, then it's necessary to do Load Calibration.



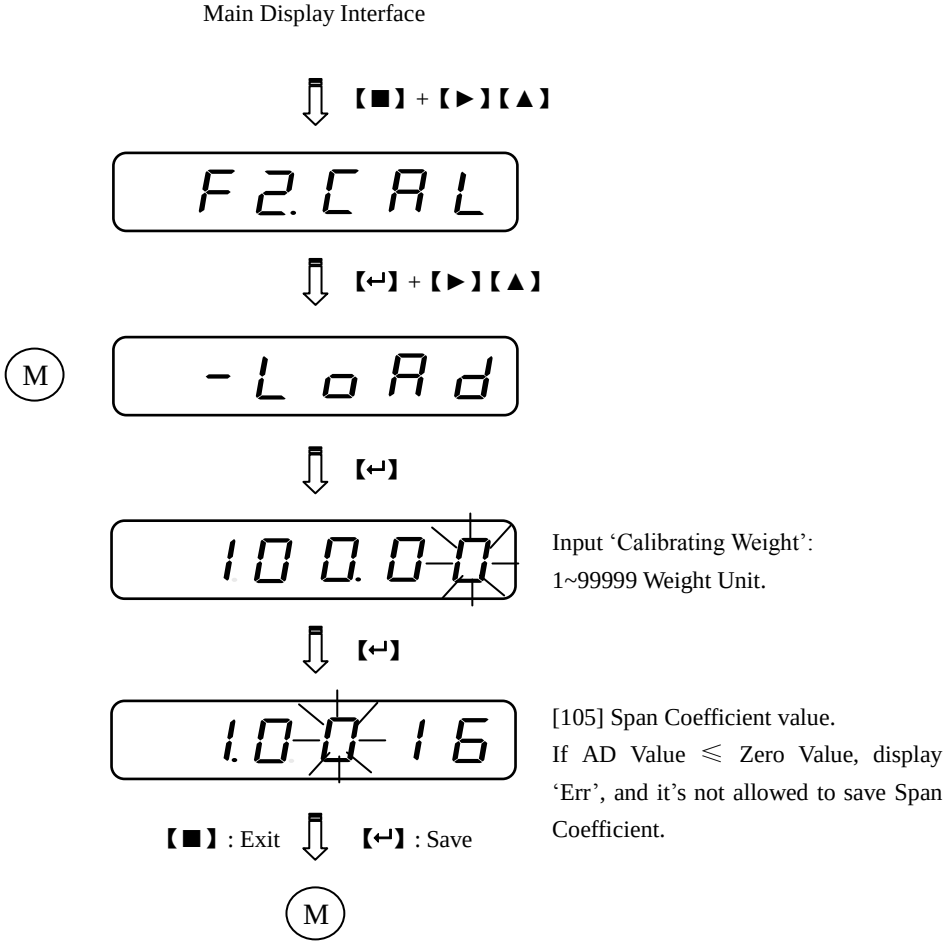
6.3.2.3【V】Data Calibration

Input the specification parameter values of the voltage output type weighing transmitter according to the actual configuration of the weighing system to correct Span Coefficient. If there is no access to get the specification parameter values for Data Calibration, then it's necessary to do Load Calibration.



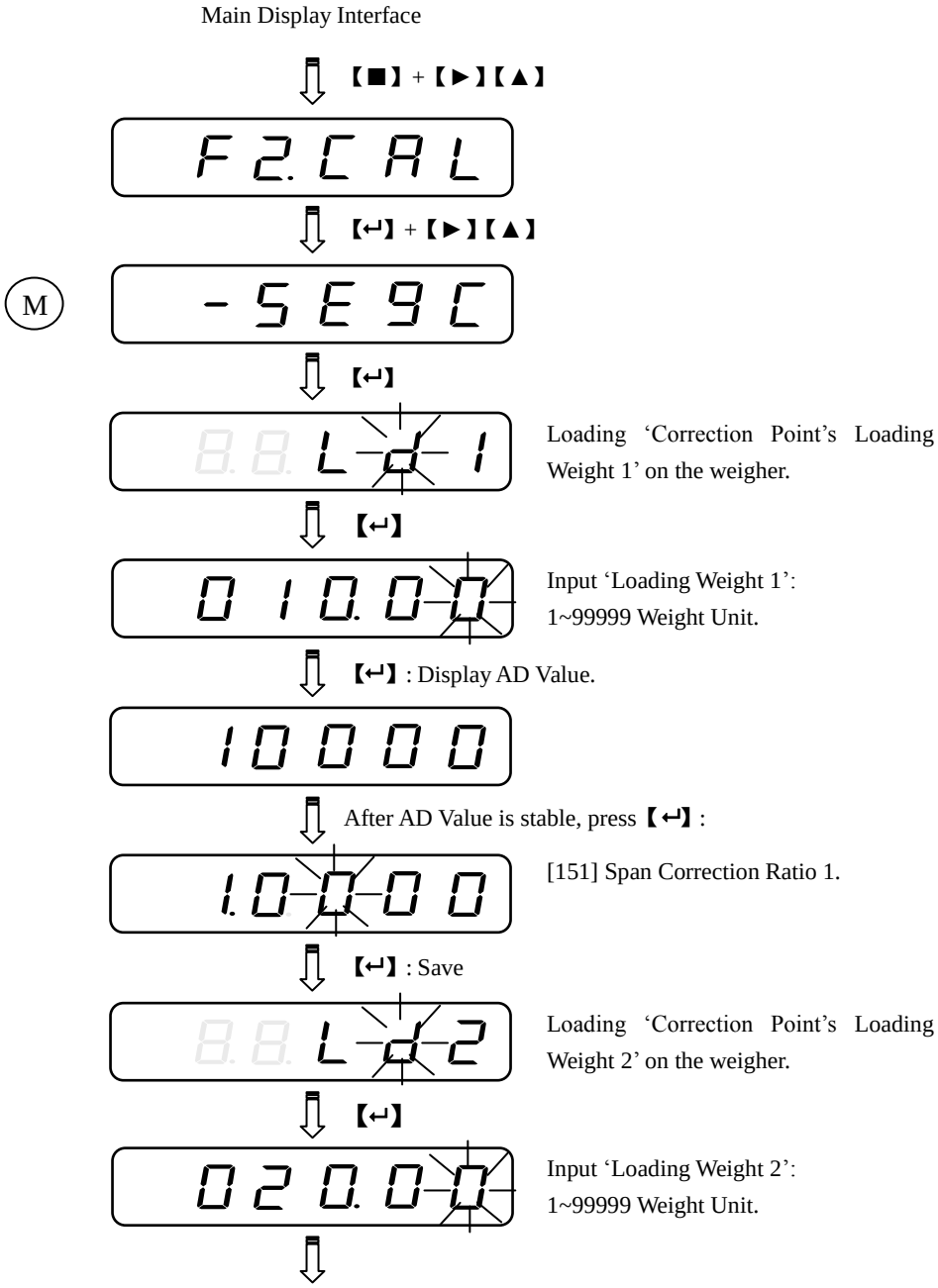
6.3.3 Load Calibration (LoAd)

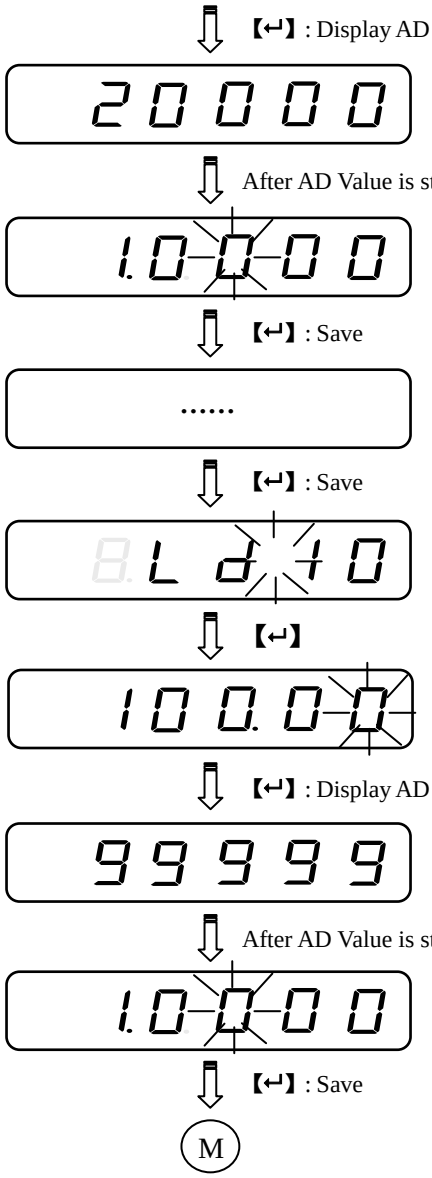
After doing Data Calibration, if there are conditions for Load Caliration, do Load Calibration with loading standard weight on the weigher to correct Span Coefficient further for higher weighing accuracy. The loading weight should be bigger than 50% of Scale Capacity value.



6.3.4 Segmenting Span Correction (SEgC)

After doing Zero Calibration and Load Calibration [or Data Calibration], it's allowed to do Segmenting Span Correction with loading standard weight on the weigher by 10 Correction Points to get Span Correction Ratio of 10 linearity segments for higher weighing accuracy.





Note:

✧ It's free to interrupt the process of 'Segmenting Span Correction' by pressing key【■】.

✧ Number of Linearity Segments = Number of Finished Correction Points.

✧ Parameter [161] is used for opening/closing the function of 'Segmenting Weight Calculation'.

6.4 F5-LOC Key-locker

6.4.1 Key-unlocking (oPEn)

Main Display Interface

M ⇩ 【■】+【►】【▲】: F5. Loc
【↵】+【►】【▲】: -oPEn
【↵】

If inputted password is correct,
Key-unlocking will be valid.

【■】: Exit ⇩ 【↵】: Enter

M

6.4.2 Key-locking (Locc)

Main Display Interface

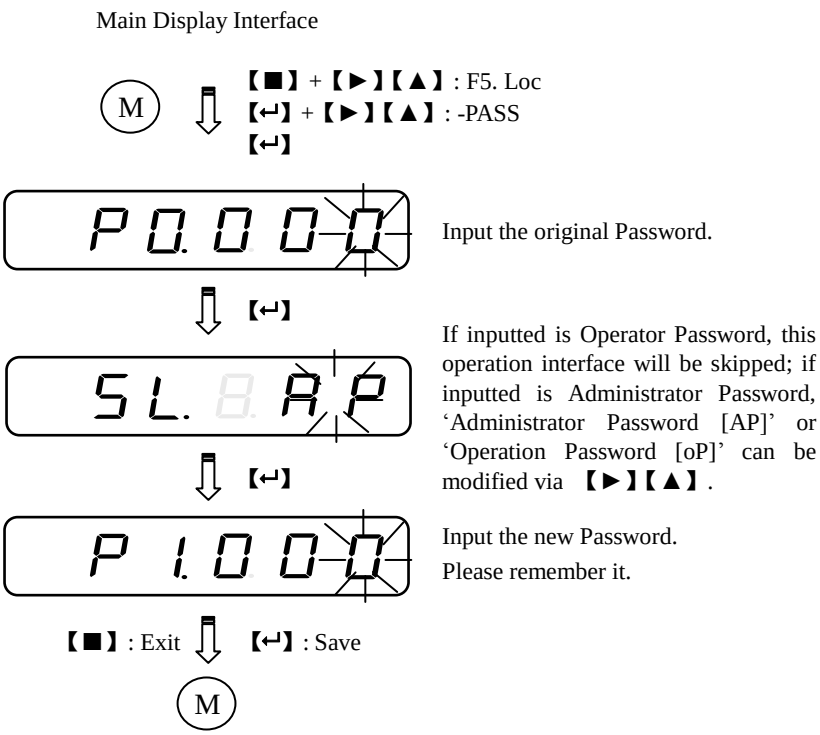
M ⇩ 【■】+【►】【▲】: F5. Loc
【↵】+【►】【▲】: -Locc
【↵】

If inputted password is correct,
Key-locking will be valid.

【■】: Exit ⇩ 【↵】: Enter

M

6.4.3 Password Set (PASS)



Appendix A. Register Table of Host-Slave MODBUS[ASCII/RTU]

Data Name	Type	Address	Attribute	Command [HEX]	Description
Gross Weight	Long	40001	R	03	
Net Weight	Long	40003	R	03	
Running State 1	UnShort	40005.0	R	03	1: In Peak Value detection process.
		40005.1			
		40005.2			
		40005.3			
		40005.4			
		40005.5			
		40005.6			
		40005.7			
		40005.8			
		40005.9			
		40005.10			
		40005.11			
		40005.12			
		40005.13			1: Weight is stable.
		40005.14			1: Overload Alarm.
		40005.15			1: Controller Fault.
Running State 2 [Unused]	UnShort	40006.0	R	03	
		40006.1			
		40006.2			
		40006.3			
		40006.4			
		40006.5			
		40006.6			
		40006.7			
		40006.8			
		40006.9			
		40006.10			
		40006.11			
		40006.12			
		40006.13			
		40006.14			
		40006.15			

Data Name	Type	Address	Attribute	Command [HEX]	Description
DO State	UnShort	40007.0	R	03	1: DO1 ON; 0: DO1 OFF.
		40007.1			1: DO2 ON; 0: DO2 OFF.
		40007.2			
		40007.3			
		40007.4			
		40007.5			
		40007.6			
		40007.7			
		40007.8			
		40007.9			
		40007.10			
		40007.11			
		40007.12			
		40007.13			
		40007.14			
		40007.15			
Operation	UnShort	40008	W	06	0xA500: Unused. 0xA501: Unused. 0xA502: Unused. 0xA503: Unused. 0xA504: Unused. 0xA505: Unused. 0xA506: Unused. 0xA507: Unused. 0xA508: Unused. 0xA509: Unused. 0xA50A: Clear Screen. 0xA50B: Manual Tare. 0xA50C: Alarm Acknowledge. 0xA50D: Zero Fine Adjustment. 0xA50E: Zero Calibration. 0xA50F: Load Calibration [Do Span Calibration with the value of 'Calibrating Weight' as loading weight]. 0xA510~0xA5FF: Unused.
Calibrating Weight	UnLong	40009	R/W	03/10	
	UnLong	40011	R	03	
	UnLong	40013	R	03	

Data Name	Type	Address	Attribute	Command [HEX]	Description
	UnLong	40015	R	03	
Non-load Zero Range	UnShort	40017	R/W	03/06	
DO1 Weight Lower Limit Setpoint	UnLong	40018	R/W	03/10	
DO2 Weight Upper Limit Setpoint	UnLong	40020	R/W	03/10	
Net Weight Peak Value	UnLong	40022	R	03	
	UnLong	40024	R/W	03/10	
Data Compared with Weight Setpoints	UnShort	40026	R/W	03/06	0: Gross Weight. 1: Net Weight. 2: Net Weight Peak Value.
	UnShort	40027	R/W	03/06	
	UnShort	40028	R/W	03/06	
	UnShort	40029	R/W	03/06	
	UnShort	40030	R/W	03/06	
	UnShort	40031	R/W	03/06	
	UnShort	40032	R/W	03/06	
	UnShort	40033	R/W	03/06	
	UnLong	40034-40037	W	10	
	UnShort	40038	W	06	
Key Code	UnShort	40039	R	06	0x02:【■】 (【MENU】) 0x04:【►】 0x40:【▲】 0x80:【↵】 (【ENT】)
Serial No.	UnLong	40040	R	03	6 Digits.

UnShort: Unsigned Short Int; UnLong: Unsigned Long Int; Long: Signed Long Int.

Appendix B. Data Frame Format of Continuous Sending [ASCII]

Field Name		Code	HEX	Description	Example
START [Byte1]		=	3D		=
Weighing State [Byte2]		O	4F	Overload	S
		S	53	Stable	
		M	4D	Motion	
Data Name [Byte3]		G	47	Gross Weight	N
		N	4E	Net Weight	
		P	50	Net Weight Peak Value	
		B	42	Unused	
		T	54	Unused	
		D	44	Displayed Characters	
		U	55	Unused	
Data [9 Bytes]	Format A: Weight Data [Byte4~12]	+/-	2B/2D	Sign	+00123.4k [DEC]
		Weight Value [7 Bytes]	30~39 2EH	0~9 Decimal Point '.'	
		Unit [1 Byte]: (Space) k t g	 20 6B 74 67	 Space: None k: kg	
	Format B: Displayed Characters [Byte4~12]	d	64	ID Code	d
		Point Code [1 Byte]	00~FF	BIT7=0: Unused	2. dISP Highest Bit's Point: ON Point Code =20H
				BIT6=0: Unused	
				If BIT5=1: Highest Bit's Point: ON	
				If BIT4=1: Bit5's Point: ON	
				If BIT3=1: Bit4's Point: ON	
				If BIT2=1: Bit3's Point: ON	
				If BIT1=1: Bit2's Point: ON	
				If BIT0=1: Lowest Bit's Point: ON	
		Characters [6 Bytes]	XX XX XX XX XX XX	ACSII	
		d	64	ID Code	d
SUM Check [Byte13]		1 Byte	XX	SUM=Byte1+Byte2+…+Byte12	
END [Byte14~15]		<CR> <LF>	0D 0A		<CR> <LF>

Example 1. Sending Weight Data '+00123.4kg'

Byte	Field Name	HEX	Note
1	START	3D	=
2	Weighing State	53	S
3	Data Name	4E	N
4	Sign	2B	+
5	Weight Value	30	0
6	Weight Value	30	0
7	Weight Value	31	1
8	Weight Value	32	2
9	Weight Value	33	3
10	Weight Value	2E	.
11	Weight Value	34	4
12	Unit	6B	k
13	SUM	CC	SUM=Byte1+Byte2+…+Byte12
14	END	0D	<CR>
15	END	0A	<LF>

Example 2. Sending Displayed Characters '2. dISP'

Byte	Field Name	HEX	Note
1	START	3D	=
2	Weighing State	53	S
3	Data Name	44	D
4	ID Code	64	d
5	Point Code	20	
6	Displayed Characters	32	2
7	Displayed Characters	20	Space
8	Displayed Characters	64	d
9	Displayed Characters	49	I
10	Displayed Characters	53	S
11	Displayed Characters	50	P
12	ID Code	64	d
13	SUM	5E	SUM=Byte1+Byte2+…+Byte12
14	END	0D	<CR>
15	END	0A	<LF>

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