BST106-B68[F] Weighing Controller

For: Hopper Ration Batching Scale with 5-material,
Single-speed or Double-speed Feeding

Operation Manual V6.1

Changsha Supmeter Technological Co.,Ltd.

Preface

Thank you very much for your purchase!

This manual covers safety precautions, technical specifications, operation interface, installation and connection, functions&operation and so on. In order to make the product running at its best, please read this manual carefully in advance, and then save it for the future reading.

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

Without our authorization, the contents of this manual are not allowed to be copied and reproduced.

Main Features:

- ✧ Suitable for Hopper Ration Batching Scale with 5-material, Single-speed or Double-speed Feeding.
- ✧ EMC design with high anti-jamming capability, suitable for industrial environment.
- ✧ 14-bit red LED digit display screen with English character display.
- ✧ Menu&Shortcut mode operation with key tone.
- ✧ 24-bit High-precision and high-speed ∑-△A/D conversion module with 130,000 internal code [AD value] used and 200Hz sampling frequency.
- ✧ Special fuzzy filtering algorithm for ensuring the weighing stability and occuracy when there is strong vibration on the load receptor, and the rapid response capability when the weight signal changes.
- ✧ Max. Connection Quantity: 4 Loadcells (350Ω).
- ✧ Data Calibration and Load Calibration available.
- ✧ Auto-locking, Key-locking, Key-unlocking, Digital Setting&Calibration and I/O Testing functions available.
- ✧ 6 Normally open switch inputs [DI] and 8 normally open transistor switch outputs [DO].
- ✧ Auto Pause while alarming and Manual Pause fuctions available.
- ✧ Batching Process Power-off Protection function available.
- ✧ Optional Fall Value Auto Correction function.
- ✧ Optional ‘Target Batch Control’ function [With Target Batch finished, the batching process will stop automatically].
- ✧ One Batch Record can be queried.
- ✧ Optional RS232 or RS485 communication ports for linking to IPC/PLC and remote display terminal, etc.
- ✧ With the multitasking mode, the weighing&control process will not be interrupted by parameter setting and the other operations.

Contents

1. SAFETY PRECAUTIONS.....5

2. TECHNICAL SPECIFICATIONS.....6

3. OPERATION INTERFACE.....7

3.1 OPERATION INTERFACE DIAGRAM.....7

3.2 ALARM SIGNS.....8

3.3 STATE INDICATION.....9

3.4 KEYPAD OPERATION.....10

3.4.1 Menu Operation.....10

3.4.2 Quick Operation.....10

4. INSTALLATION&CONNECTION.....11

4.1 INSTALLATION.....11

4.2 TERMINAL.....12

4.3 CONNECTION.....13

4.3.1 Loadcell Connector (LOADCELL).....13

4.3.2 Digital Switch Input DI & Output DO Connector (CN1&CN2).....14

4.3.2.1 DI/DO Connection for M1~M5 Ration Batching.....16

4.3.2.2 Timing Diagram for M1 Single-material Ration Feeding.....18

4.3.2.3 Timing Diagram for M1~Mn Multiple-material Ration Batching.....19

4.3.3 Digital Communication Port Connection (COM1）.....20

4.3.3.1 RS232 to IPC/PLC Host-slave&Point-to-point Network.....20

4.3.3.2 RS232 to Remote Display Terminal Point-to-point Network.....21

4.3.3.3 RS485 to IPC/PLC Host-slave Data-bus Network.....21

4.3.3.4 RS485 to Remote Display Terminal Point-to-point Network.....22

4.3.4 Power Supply Connector (POWER).....22

4.3.5 Ground Protection.....22

5. OPERATION PROCEDURE.....23

6. FUNCTIONS & OPERATIONS.....24

6.1 MAIN DISPLAY INTERFACES.....24

6.1.1 Batching Process.....24

6.1.2 Gross Weight [GROSS] / Net Weight [NET], Totalized Weight [‘t’].....25

6.1.3 Gross Weight [GROSS] / Net Weight [NET], Batch Count [‘P’].....26

6.1.4 Gross Weight [GROSS] / Net Weight [NET], Working State.....26

6.2 MAIN MENU.....27

6.3 F1-SET PARAMETER SETTING.....29

6.3.1 Weighing Parameters (SCAL).....29

6.3.2 Calibration Parameters (CALP).....31

6.3.3 Setpoint Parameters (SEtP).....32

6.3.4 Working Mode Parameters (APPL).....34

6.3.5 Timer Parameters (-tI-).....36

6.3.6 Communication Parameters (SErP).....38

6.3.7 Display Parameters (dISP).....38

6.3.8 A Parameter Setting Sample.....39

6.4 F2-CAL SYSTEM CALIBRATION.....40

6.4.1 Zero Calibration (ZEro).....40

6.4.2 Data Calibration (dAtA).....41

6.4.3 Load Calibration (LoAd).....43

6.5 F3-REC RECORD QUERY.....44

6.6 F4-CLN DATA CLEARING 45

6.7 F5-LOC KEY-LOCKER 46

6.7.1 Key-unlocking (oPEn) 46

6.7.2 Key-locking (Locc) 46

6.7.3 Password Set (PASS) 47

6.8 F6-FAC FACTORY ADJUSTMENT 48

6.8.1 Exfactory Span Adjustment (SPAn) 48

6.8.2 AD Value of Weighing Signal Linearity Test (AdtS) 50

6.8.3 DO Output Test (dotS) 51

6.8.4 DI Input Test (dItS) 51

6.8.5 RAM Reset (dEFU) 52

6.8.6 Display Test (dStS) 53

6.9 F7-INF PRODUCT INFORMATION 54

6.10 F8-AUD AUDIT TRAIL 54

APPENDIX A. COMMUNICATION PROTOCOLS 55

1. Safety Precautions

- **Prohibit using the product under dangerous environment**

  Prohibit using the product under the dangerous environment with combustible gas and explosive dust. If you have this need, please use our explosion-proof products.

- **Avoid using the product under overheated environment**

  Make sure that the product works under the environment with allowed temperature range to get good performance and long working life.
  Please keep the product away from direct sunlight. If it is installed in a cabinet, please install cooling fans on the top of the cabinet.

- **Controller Grounding Protection**

  The product, as a low-voltage equipment, should be kept away from the high-voltage equipments.
  For avoiding bodily injury from electric shock accident and keeping the product separate from strong interference, the metal shell of the product should be grounded directly and the ground resistance should be less than 4Ω.

- **Scale Frame Grounding Protection**

  For avoiding bodily injury from electric shock accident and keeping the loadcells separate from strong interference, the scale frame should be connected with the electronic scale grounding net and the ground resistance should be less than 4Ω.

- **Cable Laying**

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

- **Power Supply**

  Please use line isolation transformer to keep the power supply of the product separate from the other driving power supply. If the voltage fluctuation exceeds the allowed range of the product, please use a voltage-stabilized power supplier.

- **Environmental Protection**

  Although the product is made of the lead-free components, after used in the industrial environments, it's possible to be polluted. So, 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 Specifications

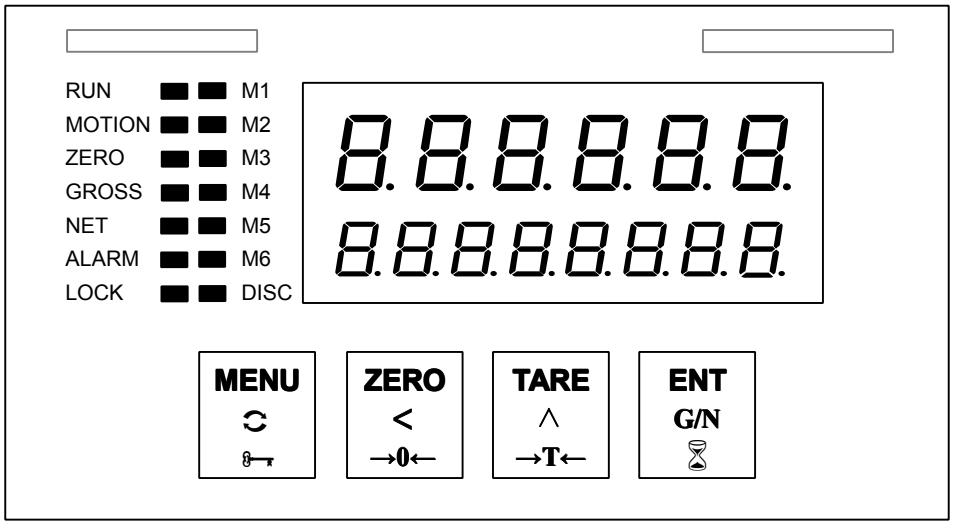
- Power Supply
  - ✧ Operating Voltage : DC24V±20%.
  - ✧ Max. Power: 5W.
- Display
  - ✧ 14-bit red LED digit display screen with English character display.
- Kaypad
  - ✧ 4 keys for Menu&Shortcut mode operation with key tone.
  - ✧ Auto-locking, Key-locking, Key-unlocking, Digital Setting&Calibration and I/O Testing functions available.
- Loadcell Signal Input Interface (LOADCELL)
  - ✧ 1 Weighing Signal Input: 0~25mV.
  - ✧ Excitation Voltage Output: DC9V.
  - ✧ Max. Connection Quantity: 4 Loadcells (350Ω).
- Weighing Accuracy
  - ✧ 24-bit ∑-△ADC with 130,000 internal code [AD value] used.
  - ✧ Sampling Frequency: 200Hz.
  - ✧ Zero Drift: ±0.1μV/℃ RTI (Relative to Input).
  - ✧ Gain Drift: ±5ppm/℃.
  - ✧ Non-linearity: ±0.01%FS.
- Digital Switch Signal Input DI Interface (CN1)
  - ✧ 6 Normally Open Switch Inputs.
- Digital Switch Signal Output DO Interface (CN2)
  - ✧ 8 Normally Open Transistor Switch Outputs.
  - ✧ Capacity of Transistor Switch: DC24V, 250mA.
- Digital Communication Interface (COM1)
  - ✧ Optional: RS232/RS485.
  - ✧ Connectable: IPC/PLC, Remote Display Terminal, etc.
- Outline Dimension
  - ✧ 110 × 62 × 150 mm (W×H×D).
- Cut Dimension
  - ✧ 94 × 47 mm (W×H).
- Weight
  - ✧ Approx. 0.5kg.

- Temperature and Humidity
  - ✧ Service Temperature: -20℃ to +40℃.
  - ✧ Storage Temperature: -30℃ to +60℃.
  - ✧ Relative Humidity: Max. 85%RH.

- IP Grade
  - ✧ IP50.

3. Operation Interface

3.1 Operation Interface Diagram



3.2 Alarm Signs

Sign	Alarm Cause	Solution
Err0	CPU Failure.	Replace the chip CPU.
Err1	RAM Failure.	Replace the chip RAM.
Err2	EEPROM Failure.	Replace the chip EEPROM.
Err3	Signal Reversed. Not connected.	Connect the loadcell correctly.
oL	Overload.	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.
HH	Gross Weight Uppermost Limit Alarm in Stop state.	Refer to parameter [208] 'Gross Weight Uppermost Limit'. 1. Modify the set value of 'Gross Weight Uppermost Limit' if it's too small. 2. Do Manual Discharging if the weighing hopper has been filled with too much materials.
Pr-PAUSE	Pause because of unexpected power-off.	With unexpected power-off in the auto-batching process, the controller will enter pause state after re-power-on. Pressing the DI button 'Start/Recover' or the key【ENT】can recover batching.
HH-PAUSE	Pause because of Gross Weight Uppermost Limit Alarm in the auto-feeding process.	Refer to parameter [208] 'Gross Weight Uppermost Limit'. 1. Modify the set value of 'Gross Weight Uppermost Limit' if it's too small, and then press the DI button 'Start/Recover' or the key 【ENT】to recover batching. 2. Stop batching and do Manual Discharging if the weighing hopper has been filled with too much materials.
dI-PAUSE	Manual Pause.	Pressing the DI button 'Start/Recover' or the key【ENT】can recover batching.
OV-PAUSE	Pause because of Positive Deviation Alarm.	Pressing the DI button 'Start/Recover' or the key【ENT】can recover batching.
dn-PAUSE	Pause because of Negative Deviation Alarm.	It's allowed to do 'Manual SP3 Feeding'. Pressing the DI button 'Start/Recover' or the key【ENT】can recover batching.
bAtCH.End	Alarm or Auto-stop because of 'Target Batch finished'.	Refer to parameter [209] 'Target Batch' and [300] 'Target Batch Control'. Clear Screen or Restart from Stop state can clear the information.
oV-nZ	Over 'Zero Fine Adjusting Range'.	Refer to parameter [123] 'Zero Fine Adjusting Range'.

3.3 State Indication

LED lights	Description
[RUN]	ON: Running state. Blinking: Pause state. OFF: Stop or Calibrating state.
[MOTION]	Weight Variance per unit time exceeds Dynamic Detection Range.
[ZERO]	Net Weight value ≤ No-load Zero Range.
[GROSS]	Gross Weight display.
[NET]	Net Weight display.
[ALARM]	Positive/Negative Deviation Alarm.
[LOCK]	ON: Key-locked. OFF: Key-unlocked.
[M1~M5]	Mn is in the feeding process.
[M6]	Unused.
[DISC]	Stop state: Weight value is reducing.
	Running state: It's in the discharging process.

3.4 Keypad Operation

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

3.4.1 Menu Operation

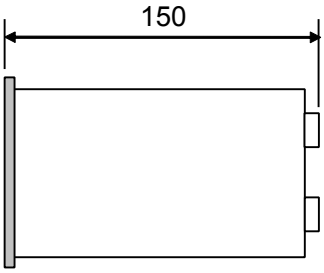
Key Name	Description
【MENU】	Enter Main Menu / Exit.
【ENT】	Enter / Save / Clear Alarm.
	In 'Batching Process' display interface, press【ENT】while pausing: ✧ [Cont]: Recover batching. ✧ [StoP]: Stop batching.
【◄】	Cursor shifts left. Display the previous option.
【▲】	Display the next interface or option. Digit input: +1 (0~9 loop).

3.4.2 Quick Operation

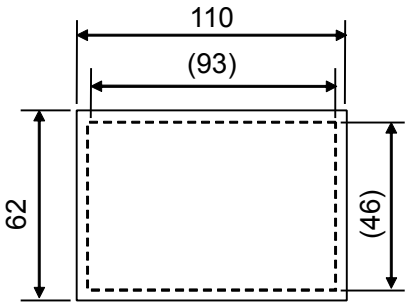
Key Name	Description
【LOCK】	* Keep it pressed for 2 seconds: ✧ Key-locking. ✧ Key-unlocking.
【ZERO】	* Keep it pressed for 2 seconds: ✧ [≡ZEro≡] Zero Fine Adjustment: The operation will be valid when Gross Weight display value is within 'Zero Fine Adjusting Range'. However, the original Zero Value will not be modified. Gross Weight will return to zero, but Tare Weight will not return to Zero, Net Weight + Tare Weight = 0, and the controller will switch to Gross Weight display. ✧ [-ZEro-] Zero Calibration: It's not limited by 'Zero Fine Adjusting Range', and the original Zero Value will be modified. Gross Weight, Tare Weight and Net Weight will return to Zero, and the controller will switch to Gross Weight display.
	M1~M5 Target Values setting.
【TARE】	* Keep it pressed for 2 seconds: ✧ [≡tArE≡] Manual Tare: Tare Weight RAM value = Present display value of Gross Weight. Net Weight = 0, and the controller will switch to Net Weight display. If the Tare Weight RAM value is need to be saved, please do operation [-PStr-]. ✧ [-PStr-] Preset&Save Tare Weight: Net Weight = Gross Weight - Tare Weight, and the controller will switch to Net Weight display. ✧ [-rStr-] Tare Weight Returns to Zero: Net Weight = Gross Weight, and the controller will switch to Net Weight display.
【G/N】	Gross Weight / Net Weight display switch.

4. Installation&Connection

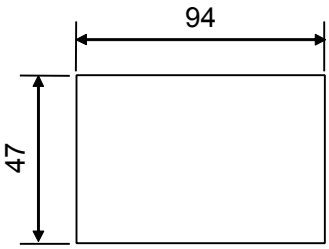
4.1 Installation



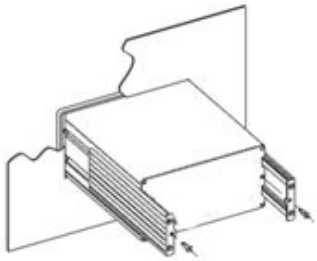
Outline dimension



Panel dimension



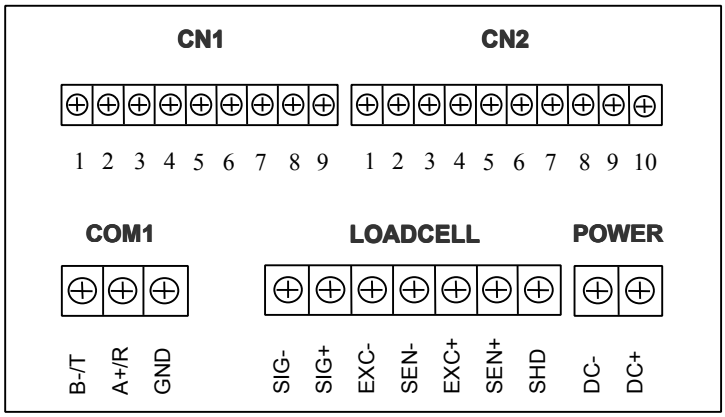
Cut dimension



Installation mode

Outline dimension W×H×D [mm]	Panel dimension W×H [mm]	Box dimension W×H [mm]	Cut dimension W×H [mm]
110×62×150	110×62	93×46	94×47

4.2 Terminal


CN1
CN2
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8 9 10
COM1
LOADCELL
POWER
B-/T
A+/R
GND
SIG-
SIG+
EXC-
SEN-
EXC+
SEN+
SHD
DC-
DC+

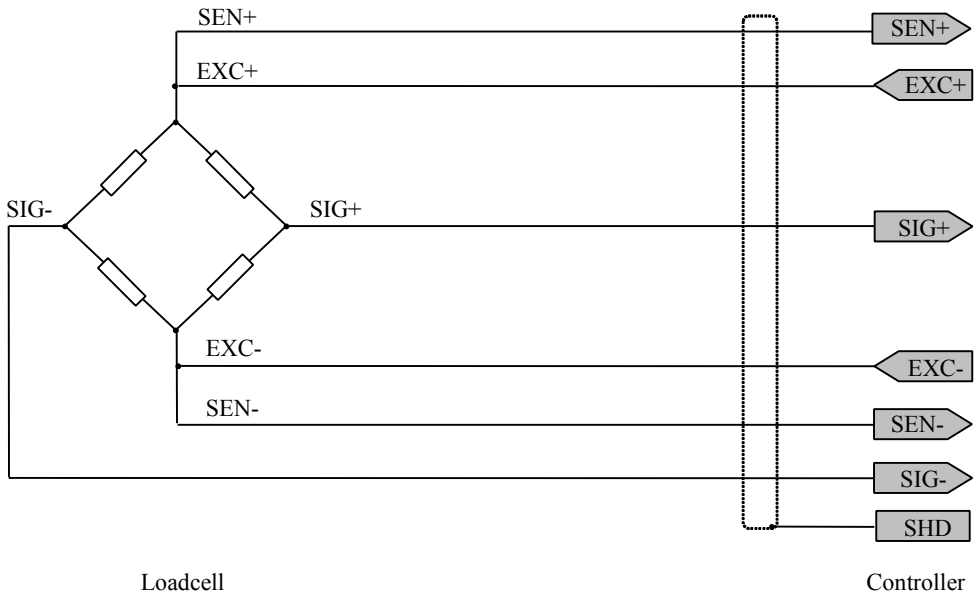
4.3 Connection

4.3.1 Loadcell Connector (LOADCELL)

The shielded cable must be used and kept separate from the AC cable and other noise generating cables. Please use loadcells with the same capacity, bridge resistance & sensitivity (mV/V) for parallel connection.

No.	Pin	Description
1	SIG-	Weighing Signal (mV) Input -
2	SIG+	Weighing Signal (mV) Input +
3	EXC-	Excitation Voltage Output - for Loadcell
4	SEN-	Voltage Feedback - from Loadcell [4-wire connection: short to 'EXC-']
5	EXC+	Excitation Voltage Output + for Loadcell (DC9V)
6	SEN+	Voltage Feedback + from Loadcell [4-wire connection: short to 'EXC+']
7	SHD	Shield

Loadcell Connection:



4.3.2 Digital Switch Input DI & Output DO Connector (CN1&CN2)

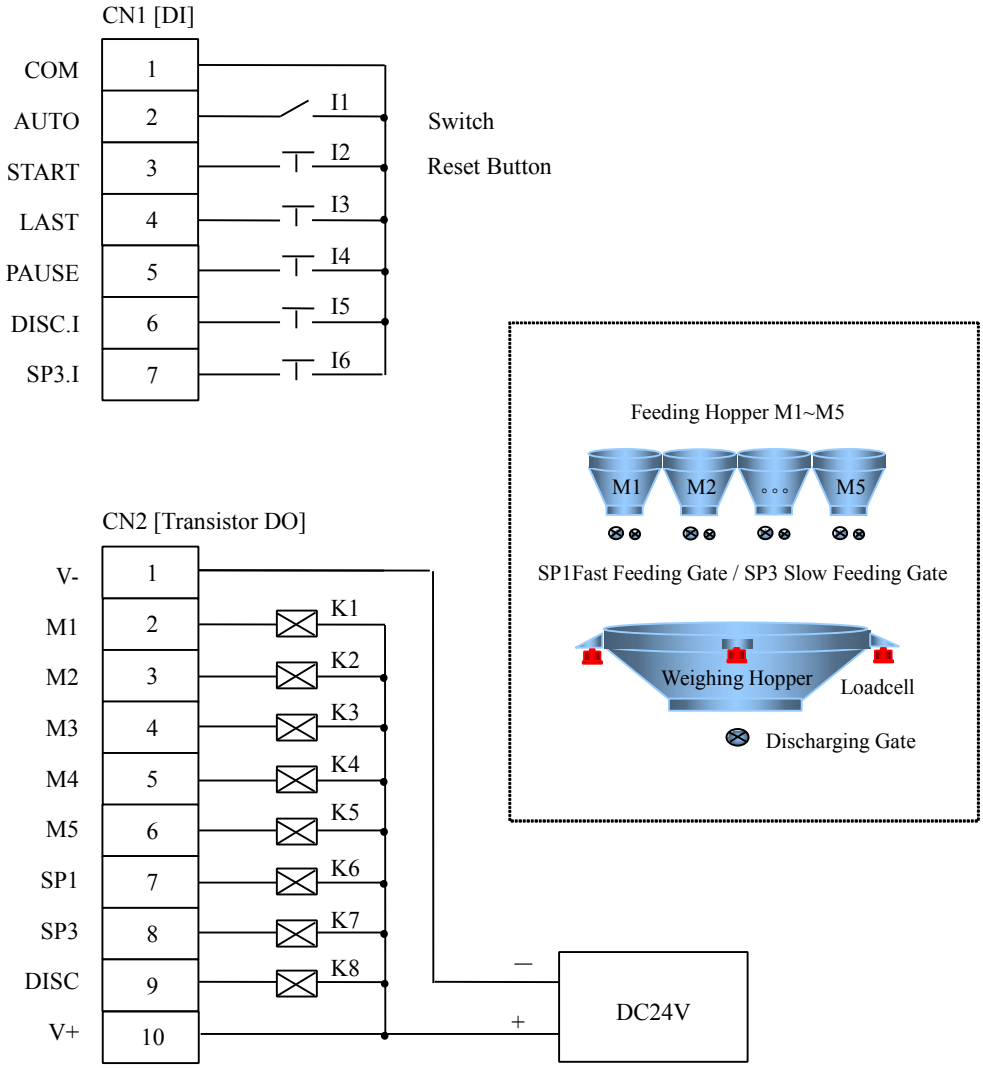
6 Normally open switch inputs are used for receiving control signals from external devices.

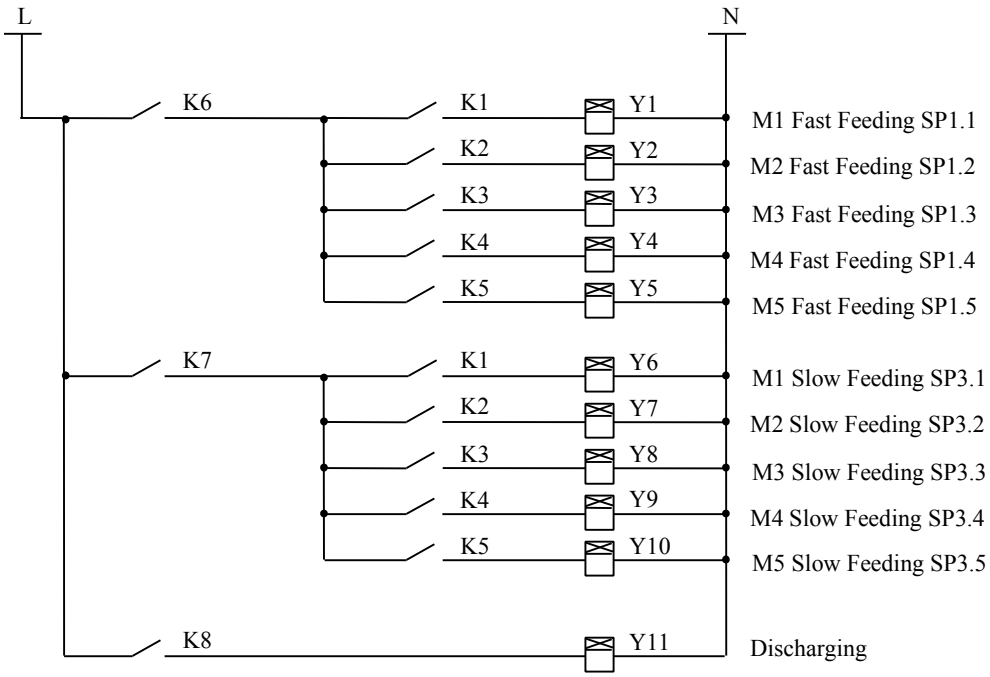
8 Normally open transistor (DC24V, 250mA) switches are used for outputting alarm/control signals to external devices.

CN1 [DI]			
No.	Pin	Signal Name	Description
1	COM	COM	DI Common Terminal.
2	DI1	AUTO	Auto/Manual. ON: Auto state. OFF: Manual state / Emergency Stop.
3	DI2	START	Start / Recover Batching from Pause state. OFF→ON→OFF.
4	DI3	LAST	Last Batch (Stop after the present batch finished). OFF→ON→OFF.
5	DI4	PAUSE	OFF→ON→OFF.
6	DI5	DISC.I	Manual Discharging. 1. Stop state: ✧ ON: Start discharging. ✧ OFF: Stop discharging. 2. In the Auto-batching process If [310] 'Auto Discharging' = '*0: oFF*', it's necessary to input the DI signal 'Manual Discharging' (OFF→ON→OFF) for triggering the discharging process.
7	DI6	SP3.I	Manual SP3 Feeding (Vaild in 'Negative Deviation Pause' state). ON: Start SP3 Feeding. OFF: Stop SP3 Feeding.

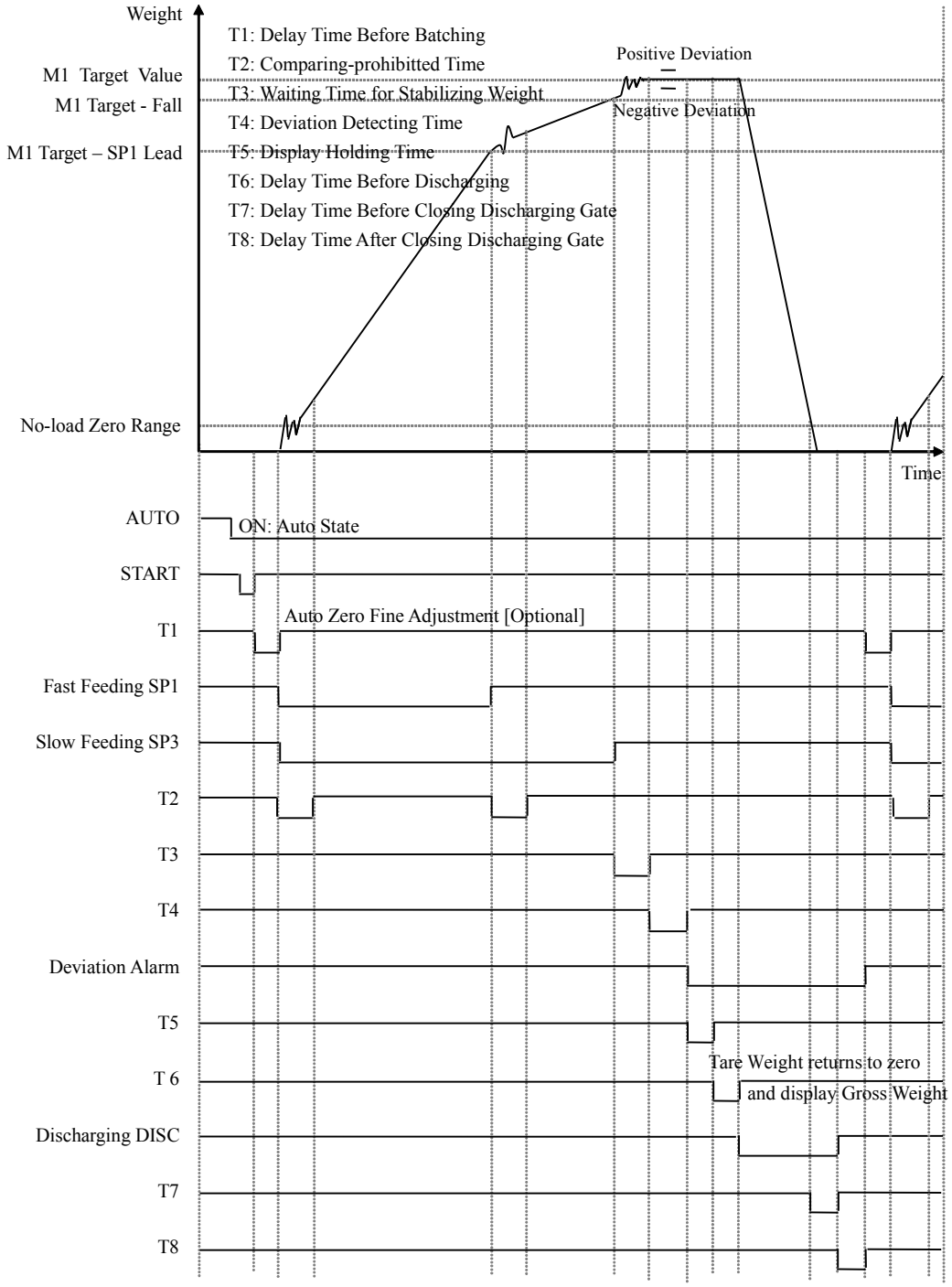
CN2 [Transistor DO]			
No.	Pin	Signal Name	Description
1	V-	V-	The ground terminal of external input power. DO Common Terminal.
2	DO1	M1	M1 Feeding Permission.
3	DO2	M2	M2 Feeding Permission.
4	DO3	M3	M3 Feeding Permission.
5	DO4	M4	M4 Feeding Permission.
6	DO5	M5	M5 Feeding Permission.
7	DO6	SP1	Fast Feeding [Used for Material M1~ M5].
8	DO7	SP3	Slow Feeding [Used for Material M1~ M5].
9	DO8	DISC	Discharging.
10	V+	V+	The positive terminal of external input power DC24V.

4.3.2.1 DI/DO Connection for M1~M5 Ration Batching

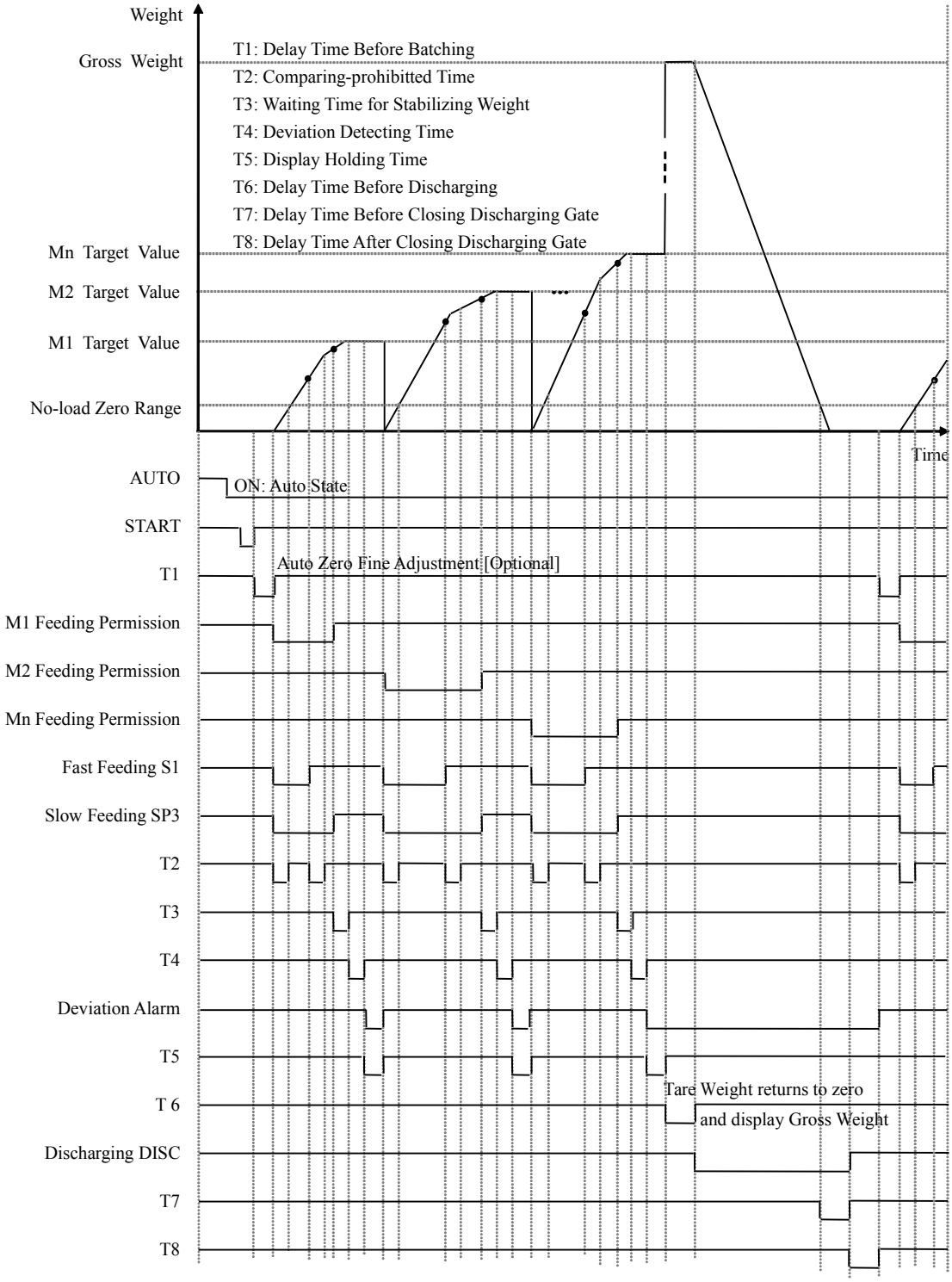



L
N
K6
K1
Y1
M1 Fast Feeding SP1.1
K2
Y2
M2 Fast Feeding SP1.2
K3
Y3
M3 Fast Feeding SP1.3
K4
Y4
M4 Fast Feeding SP1.4
K5
Y5
M5 Fast Feeding SP1.5
K7
K1
Y6
M1 Slow Feeding SP3.1
K2
Y7
M2 Slow Feeding SP3.2
K3
Y8
M3 Slow Feeding SP3.3
K4
Y9
M4 Slow Feeding SP3.4
K5
Y10
M5 Slow Feeding SP3.5
K8
Y11
Discharging

4.3.2.2 Timing Diagram for M1 Single-material Ration Feeding



4.3.2.3 Timing Diagram for M1~Mn Multiple-material Ration Batching

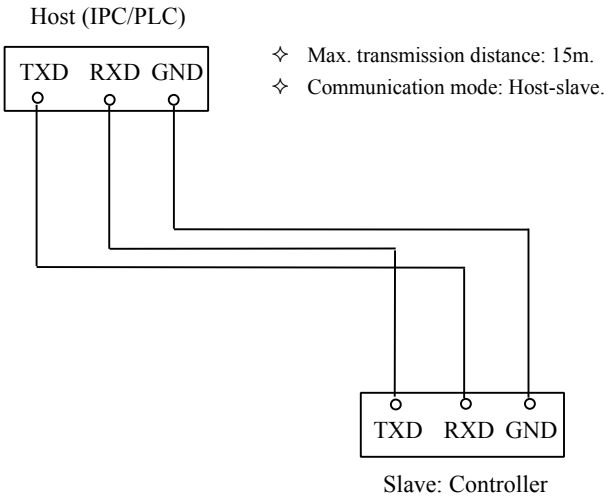


4.3.3 Digital Communication Port Connection (COM1）

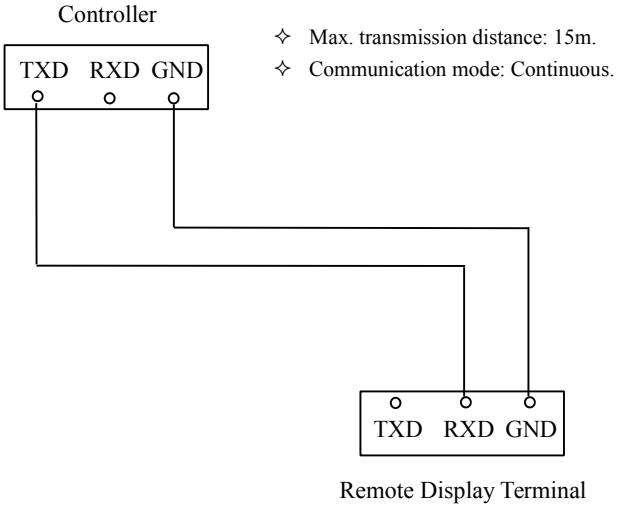
COM1 Optional: RS232/RS485.
Connectable: IPC/PLC, Remote Display Terminal, etc.

No.	COM1	
	RS232	RS485
1	T [TXD]	B-
2	R [RXD]	A+
3	GND	GND

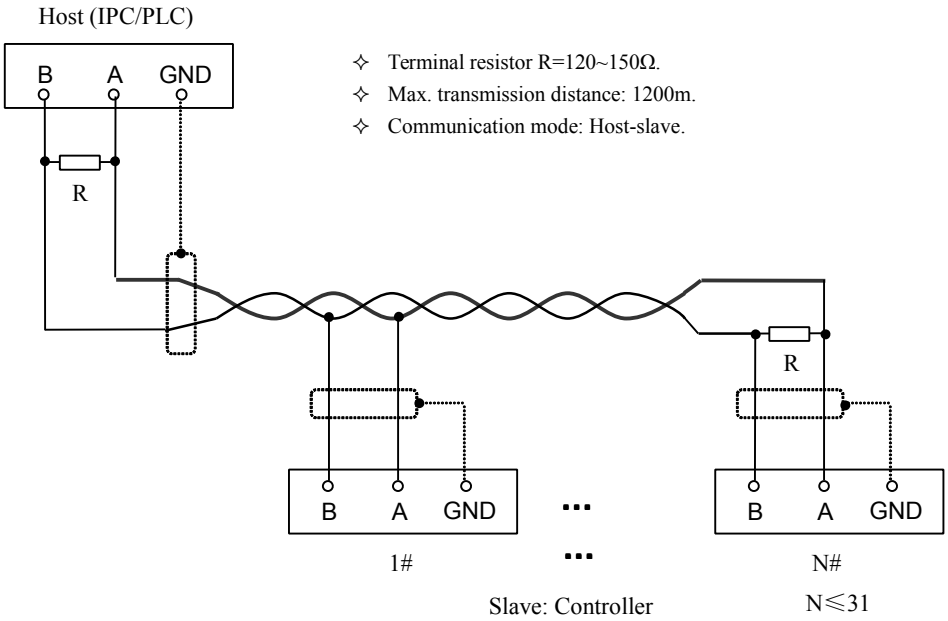
4.3.3.1 RS232 to IPC/PLC Host-slave&Point-to-point Network



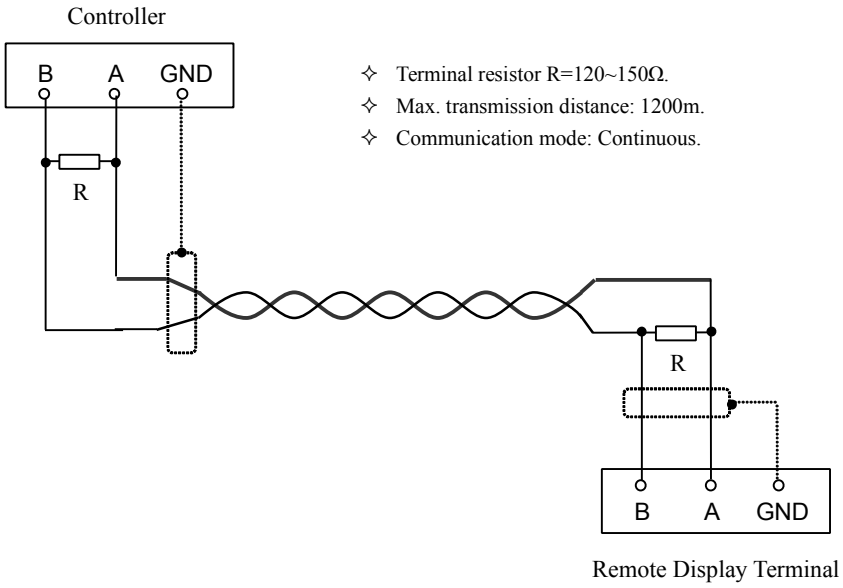
4.3.3.2 RS232 to Remote Display Terminal Point-to-point Network



4.3.3.3 RS485 to IPC/PLC Host-slave Data-bus Network



4.3.3.4 RS485 to Remote Display Terminal Point-to-point Network



4.3.4 Power Supply Connector (POWER)

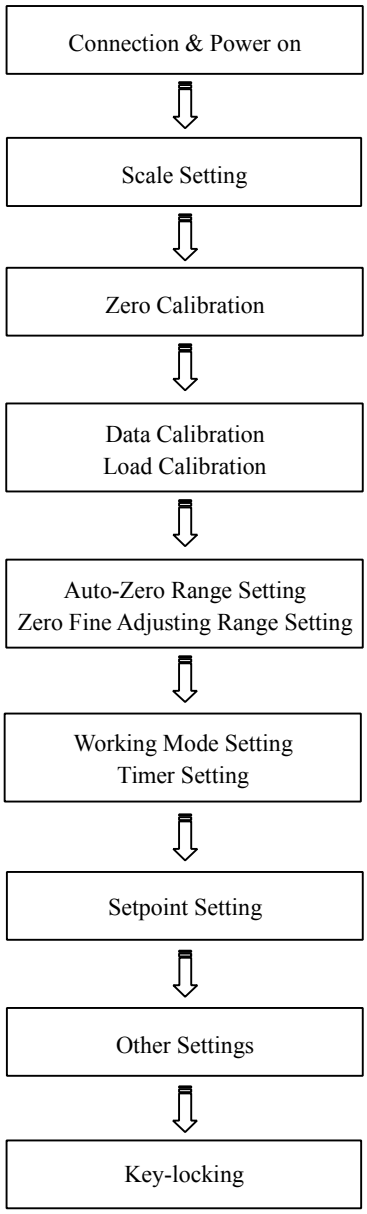
Please make sure that the power supply is correct before power-on. If the voltage fluctuation exceeds the allowable range, please use regulated power supply.

Pin	Description	Voltage
DC-	DC Input -	DC24V±20%
DC+	DC Input +	

4.3.5 Ground Protection

For avoiding electric shocks, the metal shell should be grounded directly.

5. Operation Procedure



6. Functions & Operations

6.1 Main Display Interfaces

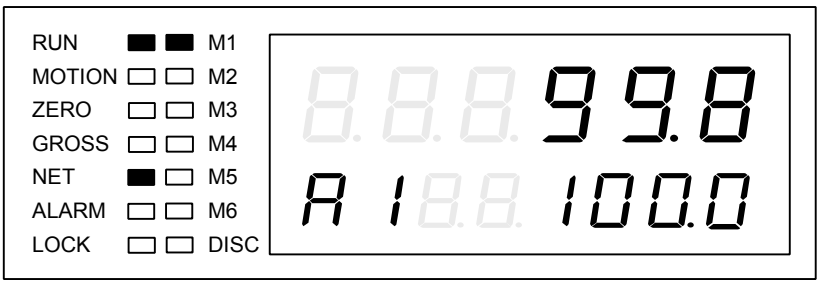
【G/N】: Gross Weight / Net Weight display switch.

【▲】: Display interface switch.

6.1.1 Batching Process

In Mn feeding process:

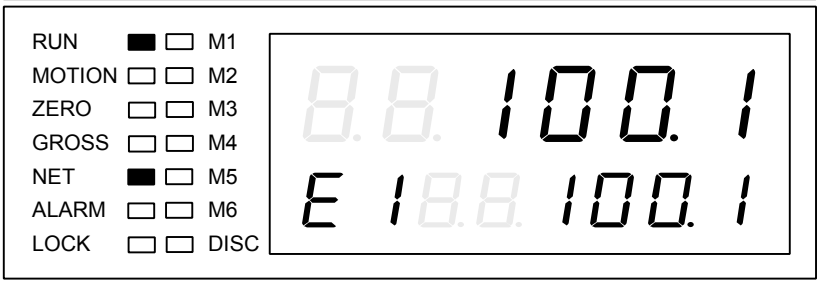
[NET] ON: Switch to display Mn's Net Weight automatically.
[RUN] ON: Running State; [Mn] ON: Mn Feeding.



A1~A5: Target Value of Mn.

Mn Feeding process ended:

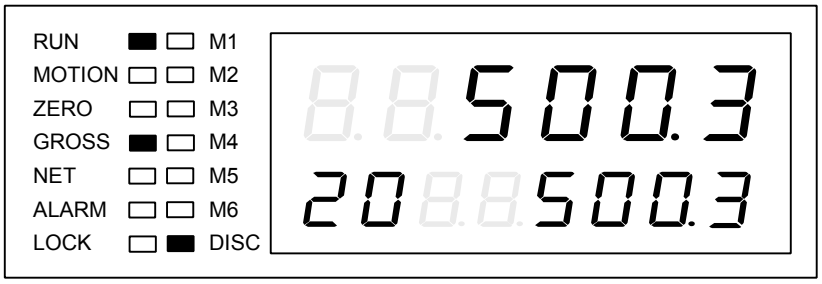
[Mn] OFF: Mn Feeding ended.



E1~E5: Final Feeding Weight of Mn.

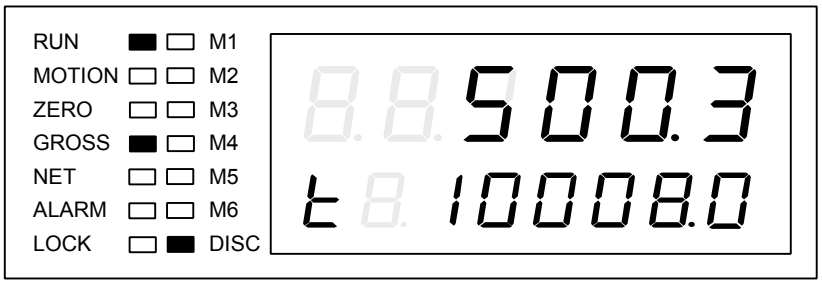
M1~Mn Feeding process ended:

[GROSS] ON: Switch to display Gross Weight automatically.
[DISC] ON: Discharging process.



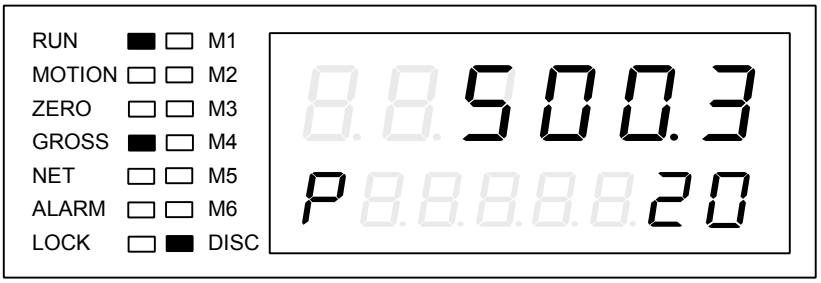
Batch Count: only display the last two bits; Total Feeding Weight of M1~Mn.

6.1.2 Gross Weight [GROSS] / Net Weight [NET], Totalized Weight [‘t’]



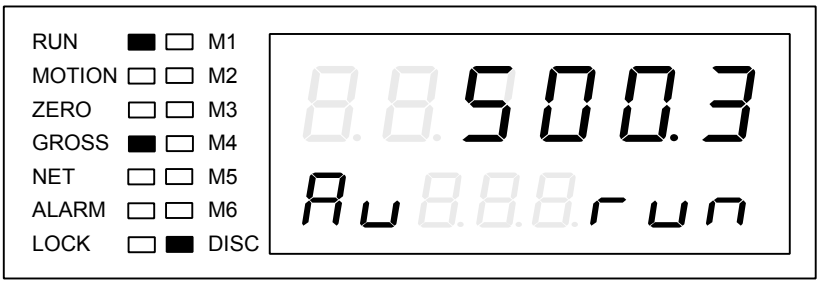
t: Totalized Weight of M1~Mn.

6.1.3 Gross Weight [GROSS] / Net Weight [NET], Batch Count [‘P’]



P: Batch Count (0~9999999).

6.1.4 Gross Weight [GROSS] / Net Weight [NET], Working State



Hd: Manual State; Au: Auto State.

Run: Running State; PAUS: Pause State; StoP: Stop State.

6.2 Main Menu

Main Menu		Second Menu	
Sign	Function	Sign	Description
F1-SEt	Parameter Setting	-SCAL-	Scale parameters setting.
		-CALP-	Calibration parameter setting.
		-SEtP-	Setpoint parameters setting.
		-APPL-	Working mode parameters setting.
		--tI--	Timer 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 for correcting the original Zero Value.
		-DAtA-	Data Calibration: Input Total Capacity of Loadcells, Output Sensitivity of Loadcell and the other parameters according to the actual configure of the weighing system for correcting Span Coefficient. If there is no access to get these parameters, only do Load Calibration.
		-LoAd-	Load Calibration: After doing Data Calibration, if there are conditions for Load Caliration, do Load Caliration with loading standard weight on the weigher for correcting Span Coefficient further.
F3-rEC	Record Query		Query one Batch Record.
F4-CLn	Data Clearing	--CLS-	Clear Screen: ✧ Clear Feeding Weight, Totalized Weight and Batch Count. ✧ Clear Alarm.
F5-Loc	Key-locker	-oPEn-	Key-unlocking.
		-Locc-	Key-locking.
		-PASS-	Password Set. Operator Password: 000000; Administrator Password: 000001.

Main Menu		Second Menu	
Sign	Function	Sign	Description
F6-FAC	Factory Adjustment	-SPAn-	Exfactory Span Adjustment: Use standard weighing test equipment to adjust the weighing controller for normalizing Span Coefficient to 1.
		-AdtS-	AD Value of Weighing Signal Linearity Test.
		-dotS-	DO Output Test.
		-dItS-	DI Input Test.
		-dEFU-	RAM Reset: Reset to factory defaults.
		-dStS-	Display Test.
F7-InF	Product Information	--VEr-	Version No. (Only for query).
		--Sn--	Serial No. (Only for query).
		-dAtE-	Exfactory Date (Only for query).
F8-Aud	Audit Trail	-Cntr-	Operation Audit Trail Counter [0~999999] (Only for query).
		-oPtr-	Operation Trail (Only for query). ✧ nonE: No Operation. ✧ SCAL: Scale Setting. ✧ dEFU: RAM Reset.

6.3 F1-SET Parameter Setting

6.3.1 Weighing Parameters (SCAL)

No.	Sign	Range	Default	Description	Set
100	UnIt	0~3	1	**Weight Unit** *0: None* *1: kg* *2: t* *3: g*	
101	dot	0~4	oooo.o	**Decimal Point** *0: ooooo* *1: oooo.o* *2: ooo.oo* *3: oo.ooo* *4: o.oooo*	
102	SCAL	1~100000	10000	**Max. Capacity** Max. loading weight of the load receptor. Max. Capacity ≤ (Loadcell Capacity × Loadcell Quantity) – Load Receptor Weight. Its Display Unit and Decimal Point are in accordance with the set values of [100]&[101].	
103	dIV	1~500	1	**Display Division** *1, 2, 5, 10, 20, 50, 100, 200, 500* If the Weight Variance without Decimal Point is less than Display Division value, the display value will not change.	
104	ZEro	-2000~ +99999	0 [*]	**Zero Value** 【▲】: Optional '0' or ' -' (negative sign) at the highest bit. * Only for query. 'RAM Reset' operation has no effect on this parameter.	
105	SPAn	>0	1.0000 [*]	**Span Coefficient** Max. display value: 99.9999. * Only for query. 'RAM Reset' operation has no effect on this parameter.	

No.	Sign	Range	Default	Description	Set
106	dyn.r	1~500	5	**Dynamic Detection Range** *Set Value × Display Division*	
107	dyn.t	0.2~1.0	0.2	**Dynamic Detection Time** [s]	
108	FuZ.A	0~999	60	**Fuzzy Factor A** *0: Close Fuzzy Filtering Arithmetic* *1~999: Open Fuzzy Filtering Arithmetic* [Empirical Value: 60] Fuzzy Filtering Arithmetic: For reducing the effection from vibration and impact on the feeding process. The smaller the set value [1~999], the smaller the amplitude of weight variation, but the worse the followup sensitivity.	
109	FuZ.b	0.001~1.000	0.300	**Fuzzy Factor B** For further reducing the effection from vibration and impact on the slow feeding process. The smaller the set value, the smaller the amplitude of weight variation, but the worse the followup sensitivity. Empirical Value: Single-speed Feeding: 0.300~1.000. Double-speed Feeding: 0.100~0.300.	
110	FLt1	1~3	2	**Filter I** *1, 2, 3*	
111	FLt2	1~32	16	**Filter II** *1, 2, 4, 8, 16, 32*	
112	gAIn	1/64	64 [*]	**Gain II** *1, 64* * Factory set. Only for query. 'RAM Reset' operation has no effect on this parameter.	

6.3.2 Calibration Parameters (CALP)

No.	Sign	Range	Default	Description	Set
120	dS.Zr	0~1	1	**Auto-Zero Permission** *0: OFF* *1: ON*	
121	Zr.tI	0.0~9.9	0.5	**Auto-Zero Time** [s]	
122	Z.rAg	1~500	1	**Auto-Zero Range** *Set Value × Display Division* When Weight display value without Decimal Point keeps within this range in 'Auto-Zero Time', its display value will return to zero automatically. However, the original Zero Value will not be modified.	
123	nZ	0~50000	50000	**Zero Fine Adjusting Range** When Gross Weight display value is within this range, Manual and Auto Zero Fine Adjusting operation will be valid. However, the new Zero RAM Value will not be saved as the original Zero Value. Its Display Unit and Decimal Point are in accordance with the set values of [100]&[101].	
124	LoAd	1~100000	9000 [*]	**Calibrating Weight** Loading Weight for Span Calibration.	
125	totL	1~100000	10000 [*]	**Total Capacity of Loadcells** Total Capacity of Loadcells = Loadcell Capacity × Loadcell Number.	
126	SEnS	0.500~5.000	2.000 [*]	**Output Sensitivity of Loadcell** [mV/V]	

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

6.3.3 Setpoint Parameters (SEtP)

No.	Sign	Range	Default	Description	Set
201	CH.no	1~8	1	**Material No. Mn** [2N2]~[2N6] are the parameter numbers of material 'Mn' of the present Formula.	
2N2	SEtn	0~60000	1000	**Mn Target Value** If 'set value = 0', Mn will not participate in the Batching process. Its Display Unit and Decimal Point are in accordance with the set values of [100]&[101].	
2N3	Ldn	0~60000	100	**SP1 Initial Lead Value for Mn Fast Feeding** When 'Feeding Weight ⩾ (Target Value − SP1 Lead)' in the Fast Feeding process, the DO switch 'SP1 Fast Feeding' will turn off. If 'set value = 0 or Target Value', the DO switch 'SP1 Fast Feeding' will not participate in feeding process.	
2N4	FALn	0~60000	10	**SP3 Fall Value for Mn Slow Feeding** When 'Feeding Weight⩾(Target Value−SP3 Fall)' in the Slow Feeding process, the DO switches 'Mn Feeding Permission' and 'SP3 Slow Feeding' will turn off.	
2N5	OVn	0~60000	5	**Mn Positive Deviation** Positive Deviation = Feeding Weight–Target Value.	
2N6	Undn	0~60000	5	**Mn Negative Deviation** Negative Deviation = Target Value–Feeding Weight.	
207	nuLL	0~60000	50	**No-load Zero Range** In the auto-discharging process, 'Net Weight ⩽ No-load Zero Range' is used as the judging condition that the materials in the weighing hopper have been discharged completely.	

No.	Sign	Range	Default	Description	Set
208	HH	0~100000	0	**Gross Weight Uppermost Limit** 0: No judging Gross Weight Uppermost Limit. 1~100000: ✧ Stop state: If 'Gross Weight ⩾ Gross Weight Uppermost Limit', the alarm information will display. ✧ Auto-feeding process: If 'Gross Weight ⩾ Gross Weight Uppermost Limit', the feeding process will pause automatically for avoiding that the materials overflow from the weighing hopper.	
209	PCS	0~9999	0	**Target Batch** With 'set value > 0', after Batch Count reached to this set value, the controller will switch the display between the original data and the message of 'bAtCH.End' automatically.	
210	FEd.n	1~5	1	**Material Quantity for Batching N** N=1: M1 Single-material Ration Feeding. N=2~5: M1~Mn Multiple-material Ration Batching.	

6.3.4 Working Mode Parameters (APPL)

No.	Sign	Range	Default	Description	Set
300	P.Ctr	0~1	0	**Target Batch Control** *0: oFF* *1: on* [With Target Batch finished, the batching process will stop automatically]	
301	Au.Zr	0~99	0	**Batch Count for Auto Zero Fine Adjustment** *0：No doing Auto Zero Fine Adjustment* *1~99：After Batch Count reached to this set value, the controller will do 'Auto Zero Fine Adjustment' before batching if Gross Weight display value is within 'Zero Fine Adjusting Range'*	
302	SP3	0~1	0	**SP3 Slow Feeding Mode** *0: Continuous Feeding Mode* *1: Continuous-Inching Feeding Mode* [In SP1 Fast Feeding process: SP3 Continuous Feeding Mode; After SP1 Fast Feeding process ended: SP3 Inching Feeding Mode]	
303	tI.A	0.1~9.9	0.5	**SP3 OFF Holding Time Ta** [s] Only used for SP3 Inching Feeding Mode.	
304	tI.b	0.1~9.9	0.5	**SP3 ON Holding Time Tb** [s] Only used for SP3 Inching Feeding Mode.	
305	PAUS	0~1	0	**Auto Pause while Deviation Alarming** *0: oFF* *1: on*	
306	F.Cor	0~1	0	**Fall Value Auto Correction** *0: oFF* *1: on*	
307	Cor.n	1~99	1	**Interval of Fall Value Auto Correction N** After Deviation Alarm Count reached to N, Fall Value will be corrected automatically.	

No.	Sign	Range	Default	Description	Set
308	C.rAg	(0.1~99.9)%	50.0%	**Fall Value Auto Correction Range** [%] *Set Value[%] × Target Value* If the absolute value of deviation exceeds this range, it will not be used for the calculation of Fall Correction Value.	
309	C.rAt	(25~100)%	50%	**Fall Value Auto Correction Ratio** [%] *25%* *50%* *100%* New Fall Value = Orignal Fall Value + Deviation Value × Fall Value Auto Correction Ratio. Deviation Value = Feeding Weight - Target Value.	
310	A.dIS	0~1	1	**Auto Discharging** *0: oFF* [It's necessary to input the DI signal 'Manual Discharging' (OFF→ON→OFF) for triggering the discharging process] *1: on* [Auto enter discharging process]	

6.3.5 Timer Parameters (-tI-)

No.	Sign	Range	Default	Description	Set
400	t1.Fd	0.0~9.9	1.0	**Delay Time Before Batching T1** [s] Delay Time Before Auto Zero Fine Adjustment. If Auto Zero Fine Adjustment (set via the parameter [301]) is not necessary before batching, the batching process will start immediately without delaying T1.	
401	t2.nC	0.0~9.9	0.5	**Comparing-prohibited Time T2** [s] When 'SP1 Fast Feeding' starts and stops, the weighing hopper will vibrate because of the impact and sudden stop. In order to ensure that the feeding process runs well, the comparation between Feeding Weight and Target Value will be prohibitted in time T2.	
402	t3.Sb	0.3~9.9	1.0	**Waiting Time for Stabilizing Weight T3** [s] When 'SP3 Slow Feeding' stops, some materials have left the Feeding Hopper but still in mid-air, so the delay time T3 is necessary for all of the materials in mid-air fall into the weighing hopper, then enter the detecting process of Feeding Weight and Deviation.	
403	t4.CH	0.3~9.9	0.5	**Deviation Detecting Time T4** [s] After delaying time T4, the controller will do Final Feeding Weight recording, Deviation calculation and Deviation Alarm/Pause (set via the parameter [305]), and then enter the process of 'Final Feeding Weight Display Holding'.	
404	t5.Hd	0.0~9.9	0.5	**Display Holding Time T5** [s] Final Feeding Weight Display Holding Time. After delaying time T5 for displaying Final Feeding Weight, the controller will enter the feeding process of the next material or the discharging process.	

No.	Sign	Range	Default	Description	Set
405	t6.dS	0.0~9.9	0.5	**Delay Time Before Discharging T6** [s] After the Feeding Weight Detection of the last material finished, the controller will switch to display Gross Weight, and Tare Weight will return to zero automatically. And after delaying time T6 for displaying Gross Weight, the DO switch 'Discharging' will turn on.	
406	t7.C1	0.0~9.9	0.5	**Delay Time Before Closing Discharging Gate T7** [s] After 'Net Weight ≤ No-load Zero Range' in the auto-discharging process, the delay time T7 is necessary for ensuring all of the materials in the weighing hopper discharged completely, then the DO switch 'Discharging' will turn off for closing the discharging gate.	
407	t8.C2	0.0~9.9	0.5	**Delay Time After Closing Discharging Gate T8** [s] After delaying time T8 for ensuring the discharging gate closed, the controller will enter the ration control process of the next batch automatically.	

6.3.6 Communication Parameters (SErP)

No.	Sign	Range	Default	Description	Set
800	Adr	0~99	1	**Communication Address** Used for Host-slave communication.	
801	bPS1	0~5	3	**COM1 Baud Rate** *0: 1200bps* *1: 2400bps* *2: 4800bps* *3: 9600bps* *4: 19200bp* *5: 115200bps*	
802	CHC1	0~2	0	**COM1 Parity Check** *0. none* [None Check] *1. EVEn* [Even Check] *2. odd* [Odd Check]	
803	Con1	0~2	0	**COM1 Communication Mode** *0. HASC* [Host-slave, Modbus ASCII] *1. Hrtu* [Host-slave, Modbus RTU] *2. Cont* [Continuous Sending]	
804	dAtA	0~4	2	**Data for Continuous Sending Mode** *0. groS* [Gross Weight] *1. nEt* [Net Weight] *2. dISP* [Displayed Characters] *3. bAt* [Total Feeding Weight of Present Batch] *4. tot* [Totalized Weight]	
805	rAtE	1~20	5	**Continuous Sending Frequency** [Hz]	

6.3.7 Display Parameters (dISP)

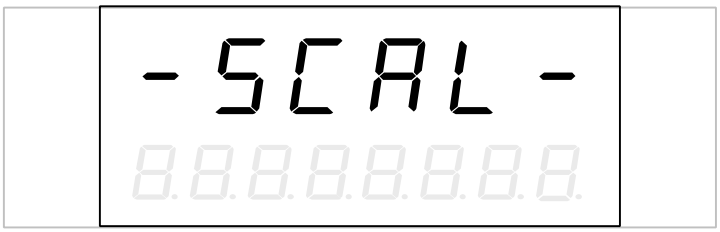
No.	Sign	Range	Default	Description	Set
901	dS.tI	0.00~1.00	0.05	**Display Refreshing Time** [s]	
902	A.Loc	0~1	0	**Auto-Locking** *0: oFF* *1: on* [If there is not any keypad operation in two minutes and it's not in the processes of 'F2 Calibration' & 'F6 Factory Adj.', the controller will lock the keypad and return to 'Main Display Interface' automatically]	

6.3.8 A Parameter Setting Sample

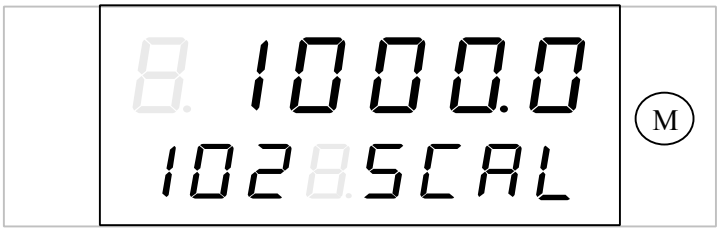
Modify the parameter '[102] Max. Capacity'.

Main Display Interface

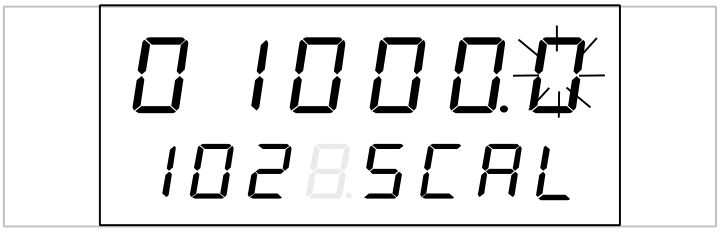
【MENU】+【◄】【▲】: F1-SEt
【ENT】+【◄】【▲】



【ENT】+【◄】【▲】



【ENT】



【◄】: Moving cursor; 【▲】: Digit input.

【MENU】: Exit 【ENT】: Save

M

6.4 F2-CAL System Calibration

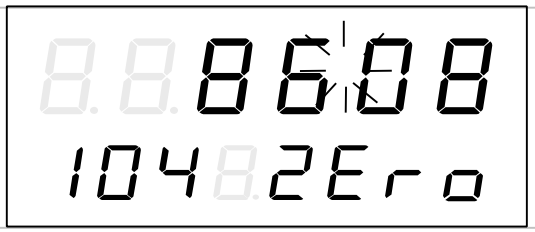
After doing ‘System Calibration’, Tare Weight value will return to zero automatically.

6.4.1 Zero Calibration (ZEro)

Do Zero Calibration with no loading on the weigher. The measured result of Zero Calibration will be saved as the original zero value.

Main Display Interface

M ⇩ 【MENU】+【◄】【▲】: F2-CAL
【ENT】+【◄】【▲】: -ZEro-
【ENT】



【◄】【▲】:

- ✧ 104: New Zero Value (-2000~+99999).
- ✧ oLd: Original Zero Value.
- ✧ Er: Error = New Value - Original Value.

If Zero Value exceeds allowed range, it’s not allowed to be saved.

【MENU】: Exit ⇩ 【ENT】: Save

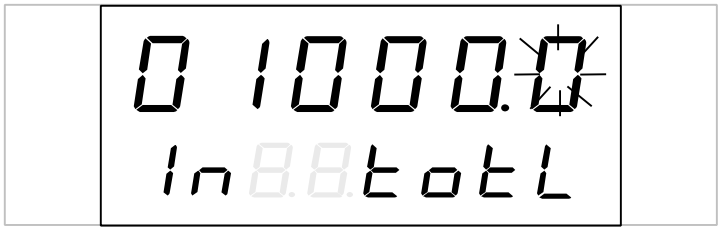
M

6.4.2 Data Calibration (dAtA)

Input Total Capacity of Loadcells, Output Sensitivity of Loadcell and the other parameters according to the actual configure of the weighing system for correcting Span Coefficient. If there is no access to get these parameters, only do Load Calibration.

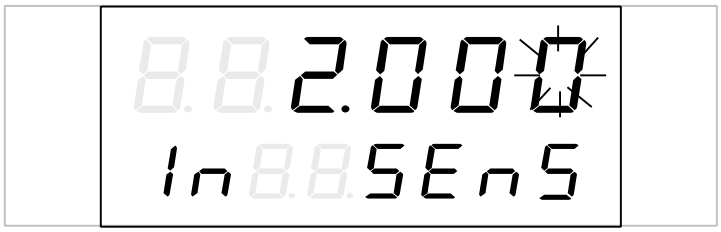
Main Display Interface

M ⇩ 【MENU】+【◄】【▲】: F2-CAL
【ENT】+【◄】【▲】: -dAtA-
【ENT】



Input 'Total Capacity of Loadcells' [totL]: 1~100000 Weight Unit.

⇩ 【ENT】

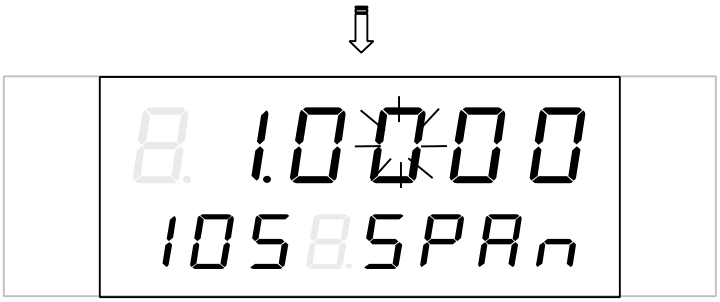


Input 'Output Sensitivity of Loadcell' [SEnS]: 0.500~5.000mV/V.

⇩ 【ENT】

Input 'Voltage Ratio' [VoL.r]: 1.0000~2.0000.

⇩ 【ENT】



【◄】【▲】:

- ✧ 105: New Span Coefficient value (Max. Display Value: 99.9999).
- ✧ oLd: Original Span Coefficient value.
- ✧ Sr: Span Correction Ratio = New Value / Original Value (Display range: 0.00001~9.99999).

【MENU】: Exit ⇩ 【ENT】: Save

M

Note:

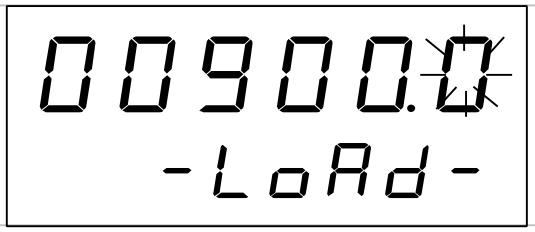
- ✧ Total Capacity of Loadcells = Loadcell Capacity × Loadcell Number.
- ✧ Voltage Ratio = Excitation Voltage on the terminal of Controller / Excitation Voltage on the terminal of loadcells.
- ✧ The rated excitation voltage for loadcells is DC9V. It's best to measure the actual voltage value.
- ✧ 4-wire connection: The voltage attenuation is big, the voltage on both sides should be measured.
- ✧ 6-wire connection: The voltage attenuation is small, Voltage Ratio can be set to 1.0000.

6.4.3 Load Calibration (LoAd)

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

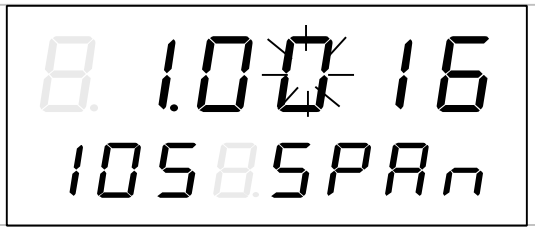
Main Display Interface

M ⇩ 【MENU】+【◀】【▲】: F2-CAL
【ENT】+【◀】【▲】: -LoAd-
【ENT】



Input 'Calibrating Weight': 1~100000 Weight Unit.

⇩ 【ENT】



【◀】【▲】:

- ✧ 105: New Span Coefficient value (Max. Display Value: 99.9999).
- ✧ oLd: Original Span Coefficient value.
- ✧ Sr: Span Correction Ratio = New Value / Original Value (Display Range: 0.00001~9.99999).
- ✧ Ad: AD Value (Checking Range: -131071~+131071. Display Range : -99999~+131071).

If AD Value ≤ Zero Value, display 'Err', and it's not allowed to save Span Coefficient.

【MENU】: Exit ⇩ 【ENT】: Save

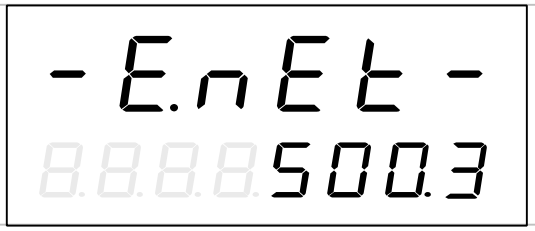
M

6.5 F3-REC Record Query

Main Display Interface

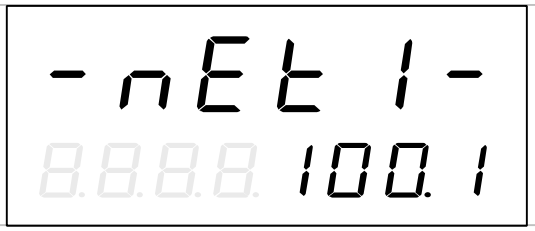
M ⇩ 【MENU】+【◄】【▲】: F3-rEC
【ENT】

One Batch Record can be queried.
【◄】: Query the previous item.
【▲】: Query thenext item.
【MENU】: Exit.



Total Feeding Weight: SUM=∑NET.

⇩ 【◄】【▲】



Mn Feeding Weight (NET1~NET5).

⇩ 【MENU】

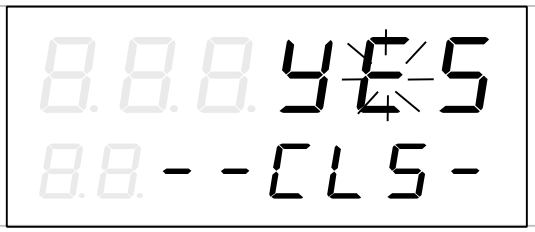
M

6.6 F4-CLN Data Clearing

Main Display Interface

M ⇩ 【MENU】+【◀】【▲】: F4-CLn
【ENT】+【◀】【▲】: --CLS-
【ENT】

CLS: Clear Screen.



【◀】【▲】: YES/NO.

【MENU】: Exit ⇩ 【ENT】: Enter

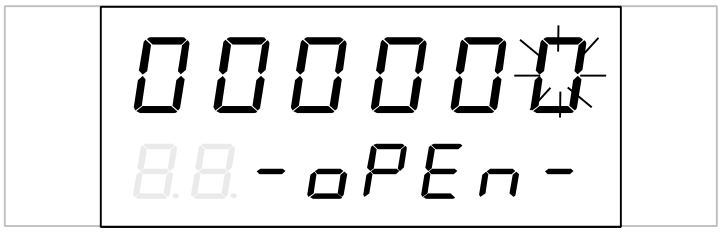
M

6.7 F5-LOC Key-locker

6.7.1 Key-unlocking (oPEn)

Main Display Interface

M ⇩ 【MENU】+【◀】【▲】: F5-Loc
【ENT】+【◀】【▲】: -oPEn-
【ENT】



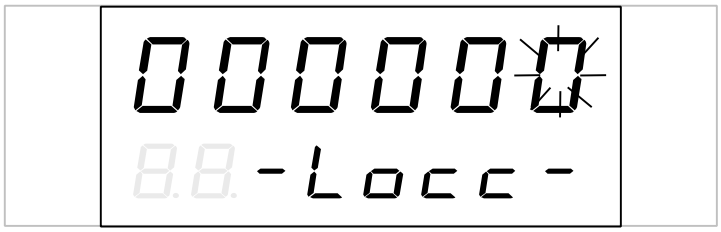
⇩ 【ENT】: If inputted password is correct, Key-unlocking will be valid and [LOCK] will turn off.

M

6.7.2 Key-locking (Locc)

Main Display Interface

M ⇩ 【MENU】+【◀】【▲】: F5-Loc
【ENT】+【◀】【▲】: -Locc-
【ENT】



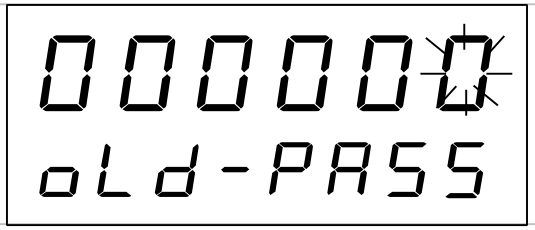
⇩ 【ENT】: If inputted password is correct, Key-locking will be valid and [LOCK] will turn on.

M

6.7.3 Password Set (PASS)

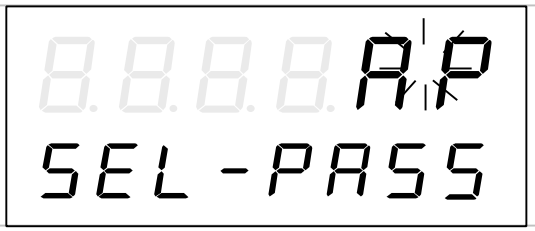
Main Display Interface

M ⇩ 【MENU】+【◄】【▲】: F5-Loc
【ENT】+【◄】【▲】: -PASS-
【ENT】

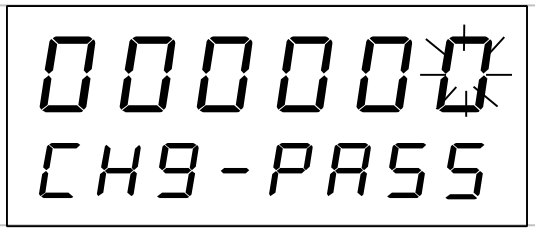


⇩ 【ENT】

If inputted is Operator Password, this operation interface will be skipped; if inputted is Administrator Password, 'Administrator Password [AP]' or 'Operation Password [oP]' can be modified via【◄】【▲】.



⇩ 【ENT】



Input the new Password. Please remember it.

【MENU】: Exit ⇩ 【ENT】: Save

M

6.8 F6-FAC Factory Adjustment

Only after Key-unlocking with Administrator Password, this operation will be valid.

6.8.1 Exfactory Span Adjustment (SPAn)

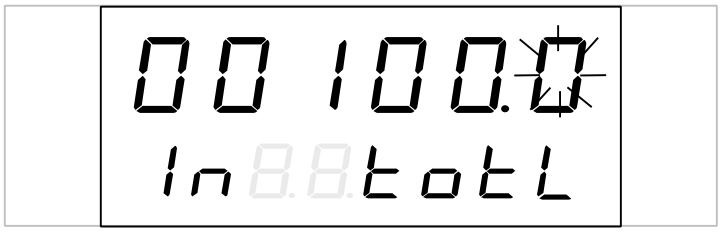
Use standard weighing test equipment to adjust the controller for normalizing Span Coefficient to 1.
Adjusting Tools:

- ✧ 1 Platform Scale: Total Capacity of Loadcells 100kg, Output Sensitivity 2.0mV/V, Non-linearity 0.03%FS.
- ✧ 2~4 Standard Weights [25kg].

Note: Total Capacity of Loadcells = Loadcell Capacity × Loadcell Number.

Main Display Interface

M ⇩ 【MENU】+【◀】【▲】: F6-FAC
【ENT】+【◀】【▲】: -SPAn-
【ENT】



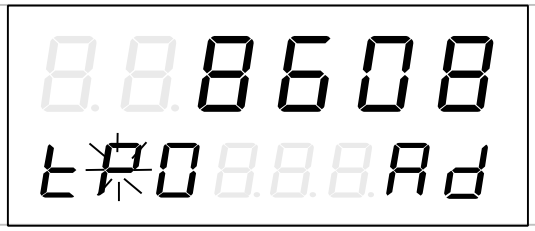
Input 'Total Capacity of Loadcells' [totL]: 1~100000kg.

⇩ 【ENT】

Input 'Output Sensitivity of Loadcell' [SEnS]: 0.500~5.000mV/V.

⇩ 【ENT】

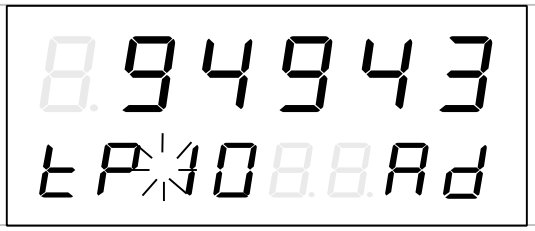
Keep the platform scale on no-load state.



Display AD Value. when AD Value is stable, press【ENT】.

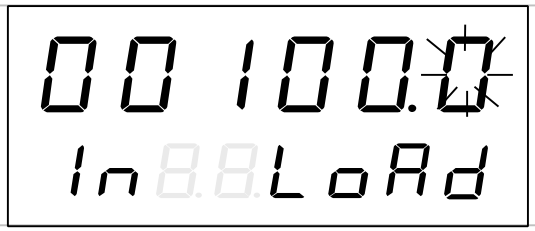
【ENT】

Load on the platform scale. The load weight should be 25~100% of Total Capacity of Loadcells.



Display AD Value. When AD Value is stable, press【ENT】.

【ENT】



Input actual 'Load Weight' [LoAd]: 1~100000kg.

【MENU】: Exit

【ENT】: Save

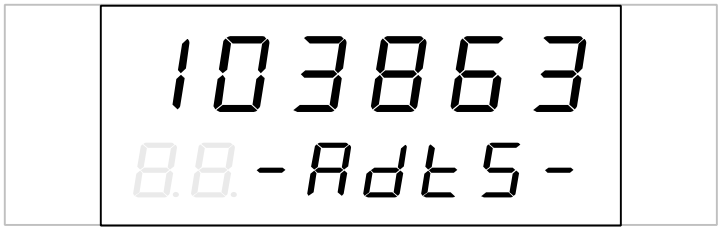
[105] Span Coefficient returns to 1.0000.

M

6.8.2 AD Value of Weighing Signal Linearity Test (AdtS)

Main Display Interface

M ⇩ 【MENU】+【◀】【▲】: F6-FAC
【ENT】+【◀】【▲】: -AdtS-
【ENT】



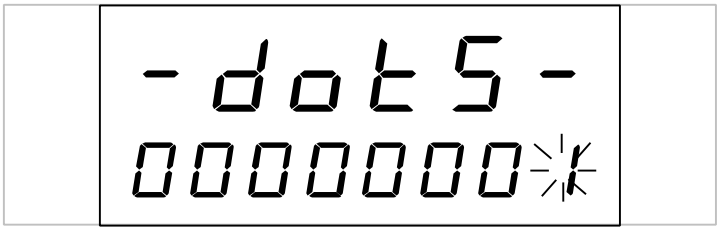
Input weighing signal 0~25mV to test linearity of AD value.
Checking Range: -131071~+131071. Display Range: -99999~+131071.

⇩ 【MENU】
M

6.8.3 DO Output Test (dotS)

Main Display Interface

M ⇩ 【MENU】+【◀】【▲】: F6-FAC
【ENT】+【◀】【▲】: -dotS-
【ENT】



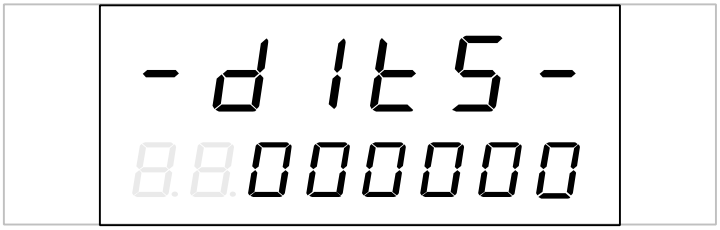
DO8~DO1 state (1: ON; 0: OFF).
【ENT】: Turn DO1~DO8 on/off one by one
to check if they works fine.

⇩ 【MENU】
M

6.8.4 DI Input Test (dItS)

Main Display Interface

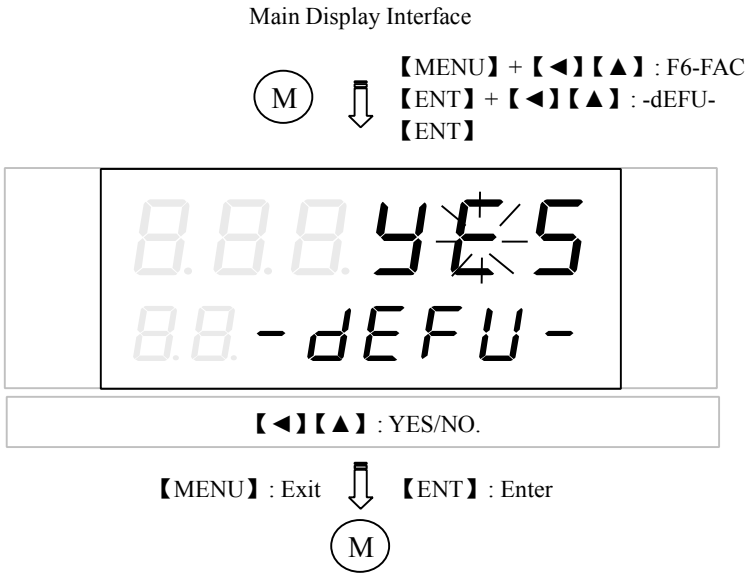
M ⇩ 【MENU】+【◀】【▲】: F6-FAC
【ENT】+【◀】【▲】: -dItS-
【ENT】



DI6~DI1 state (1: ON; 0: OFF).
Change input state of DI1~DI6 to check if they works fine.

⇩ 【MENU】
M

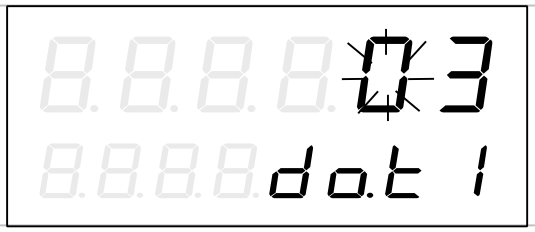
6.8.5 RAM Reset (dEFU)



6.8.6 Display Test (dStS)

Main Display Interface

M ⇩ 【MENU】+【◀】【▲】: F6-FAC
【ENT】+【◀】【▲】: -dStS-
【ENT】



Input 'Holding Time of DO output state' [do.tI]: 1~99s.

⇩ 【ENT】

(1) All of the display units turn off.
(2) All of the DO switches turn off.
(3) The display units light one by one.
(4) The DO switches turn on and off one by one.
(5) This process will go on cyclically.

⇩ 【MENU】

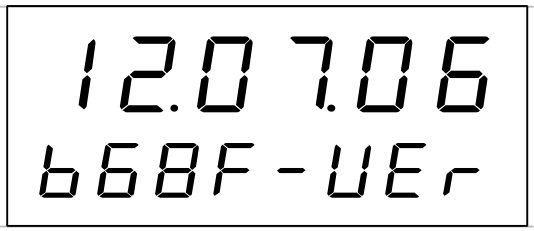
M

6.9 F7-INF Product Information

Main Display Interface

M ⇩ 【MENU】+【◀】【▲】: F7-InF
【ENT】+【◀】【▲】: --VEr-
【ENT】

VEr: Version No.
Sn: Serial No.
dAtE: Exfactory Date.



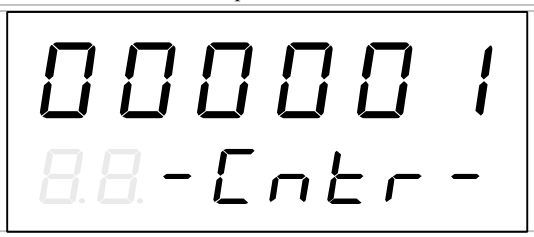
⇩ 【MENU】
M

6.10 F8-AUD Audit Trail

Main Display Interface

M ⇩ 【MENU】+【◀】【▲】: F8-Aud
【ENT】+【◀】【▲】: -Cntr-
【ENT】

Cntr: Operation Audit Trail Counter.
oPtr: Operation Trail.



⇩ 【MENU】
M

Appendix A. Communication Protocols

If you need the communication functions and protocols, please contact us.

User’s Memo

Changsha Supmeter Technological Co.,Ltd.

Address: Building A6, Lugu International Industrial Park,
Changsha, 410205, China
Tel: +86 731 85115100
Fax: +86 731 85158100
Website: www.supmeter.com.cn
E-mail: supmeter@163.com