BST100-E11/E01/E21 Weighing Controller

For: Ration Belt Weighfeeder

Operation Manual V3.6

Changsha Supmeter Technological Co.,Ltd.

Preface

Thank you very much for your purchase!

This manual covers safety precaution, technical specifications, user interfaces, installation& connection, functions&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 continuous technology update, function improvement and quality enhancement may lead to some differences between this manual and the physical product, please understand.

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Main Features:

- ✧ Suitable for Ration Belt Weighfeeder with Ration Flow Feeding & Ration Weight Batch Control.
- ✧ EMC design with high anti-jamming capability, suitable for industrial environment.
- ✧ 32-bit ARM CPU with 72MHz clock & high arithmetic speed.
- ✧ 128×64 LCD display screen with 7 background colors for English display.
- ✧ 16-key English keypad.
- ✧ Menu&Shortcut mode operation with key tone.
- ✧ 24-bit High-precision and high-speed $\Sigma - \triangle$ A/D conversion module with 1/1,000,000 internal resolution and sampling frequency 400Hz.
- ✧ Broad-range speed pulse input circuit.
- ✧ 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.
- ✧ Max. Connection Quantity: 8 Loadcells (350Ω).
- ✧ Auto-locking, Key-locking, Key-unlocking, Digital Setting&Calibration and I/O Testing functions available.
- ✧ Auto Zero Tracking, Speed Calibration and Belt Length Calibration functions available.
- ✧ One optional 'Flow Setpoint' analog signal input [AI: 4~20mA].
- ✧ Max.3 definable 'Flow/Control Current /…' analog signal outputs [AO: 4~20mA].
- ✧ Quick and steady PID ration feeding control.
- ✧ 3 Definable normally open switch inputs [DI] and 4 definable normally open relay switch outputs [DO].
- ✧ The feeder and belt weigher can be started and stopped by DI&DO signal.
- ✧ 1 'Totalized Weight High-speed Pulse' output [PO].
- ✧ 2 Optional communication ports for connecting IPC/PLC, LED Remote Display, Serial Printer and Wireless Module.
- ✧ Weight Records per shift/day/month of a year can be queried and printed.
- ✧ With the multitasking mode, the weighing&control process will not be interrupted by parameter setting and the other operations.

Model Horizontal Panel-mounting: E11 **Model Vertical Panel-mounting: E01** **Model Wall-mounting: E21**

Contents

1. Safety Precaution

- **Lithium Battery Installation**

  A Lithium battery should be equipped in the product. If it is not allowed to be transported together with the product because of embargo, please make a purchase according to the model offered by us and install it by yourself.

- **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, speed 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.

  If the voltage fluctuation exceeds the allowed range, please use a power stabilizer to get a stable voltage supply.

- **Environmental Protection**

  Before the Lithium battery equipped in the product being discarded, please insulate its positive or negative pole, do not put it into fire.

  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

□ Executing Standard

✧ CMC GB/T 7724-2008《Electronic Weighing Meter》PRC National Standard.
✧ OMIL R50:1997《Continuous Totalizing Automatic Weighing Instruments》International Recommendation.
✧ Accuracy Grade: 0.5.
✧ Accuracy of Flow Control: 0.5%~1.0%.

□ Display

✧ 128×64 LCD display screen with 7 background colors for English display.
✧ Display Refreshing Time: Setting Range 0.1~2.0s.

□ Keypad

✧ 16-key English keypad.
✧ Menu&Shortcut operation with key tone.

□ Loadcell Interface

✧ Excitation Voltage/Max. Current: DC10V/250mA [8-350Ω loadcells].
✧ Signal Input Range: 0~25mV.
✧ 24-bit $\Sigma-\triangle$ ADC with internal resolution 1/1,000,000.
✧ Sampling Frequency: 400Hz.
✧ 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.

□ Speed Sensor Interface

✧ Output Voltage/Max. Current: DC12V/100mA.
✧ Speed Pulse Input Range: 0.5~3000Hz.

□ Switch Signal Interface

✧ 3 Normally Open Switch Inputs [DI].
✧ 4 Normally Open Relay Switch Outputs [DO]: AC250V/DC24V, 1A.
✧ 1 'Totalized Weight High-speed Pulse' Output [PO]: 100mA, DC5~24V; Weight per Pulse and Pulse Width can be preset.

□ Analog Signal Interface

✧ Max.3 Definable 'Flow/Control Current /…' Analog Signal Outputs [AO]: 4~20mA, Non-linearity: 0.05%FS; AO3 is optional.
✧ 1 Optional 'Flow Setpoint' Analog Signal Input [AI]: 4~20mA, Non-linearity: 0.05%FS.

□ Digital Communication Interface

◇ COM1: Optional RS232/RS485/RS422/Profibus-DP/Ethernet modules.
◇ COM2: RS232.
◇ Connectable: IPC/PLC, LED Remote Display, Serial Printer and Wireless Module.

□ Report Print

◇ Weight Records per shift/day/month of a year can be queried and printed.

□ Operating Specification

◇ Operating Voltage: AC220V±15%, 50/60Hz.
◇ Max. Power Consumption: 15W.
◇ Outline Size
  ● Model Horizontal Panel-mounting: 164×86×193mm [W×H×D].
  ● Model Vertical Panel-mounting: 86×164×193mm [W×H×D].
  ● Model Wall-mounting: 202×305×90mm [W×H×D].
◇ Panel Cut-out Size
  ● Model Horizontal Panel-mounting: 153×77mm [W×H].
  ● Model Vertical Panel-mounting: 77×153mm [W×H].
◇ Operating Temperature: -25℃ to +45℃.
◇ Storage Temperature: -30℃ to +60℃.
◇ Relative Humidity: Max. 85%RH.
◇ Protection Level
  ● Front Panel of Model Panel-mounting: IP65.
  ● Model Wall-mounting: IP65.
◇ Weight
  ● Model Panel-mounting: Approx. 1.7kg.
  ● Model Wall-mounting: Approx. 3.4kg.

3. User Interfaces

3.1 Model Horizontal Panel-mounting User Interface

```
┌──────────────────────────────────┬──────────────────────────────────┐
│  ▭            ▭                   │  ┌───┐ ┌───┐ ┌───┐ ┌─────┐        │
│  ┌────────────────────────────┐   │  │ 1 │ │ 2 │ │ 3 │ │MENU │        │
│  │                            │   │  │SET│ │ADJ-││ADJ+│ └─────┘       │
│  │       4800000kg            │   │  ┌───┐ ┌───┐ ┌───┐ ┌─────┐        │
│  │                            │   │  │ 4 │ │ 5 │ │ 6 │ │  ▲  │        │
│  └────────────────────────────┘   │  │AUTO││EXT││ZERO│ └─────┘        │
│                                   │  ┌───┐ ┌───┐ ┌───┐ ┌─────┐        │
│  Flow:          19.9t/h           │  │ 7 │ │ 8 │ │ 9 │ │  ▼  │        │
│  Speed:         0.35m/s           │  │CAL││CLS││REC│ └─────┘          │
│                                   │  ┌────┐┌───┐┌───┐ ┌─────┐         │
│  RUN  AUTO  EXT  ALARM  LOCK      │  │LOCK││ 0 ││F1 │ │ ENT │         │
│   ●    ●    ○     ○     ○         │  └────┘│PRINT└───┘ └─────┘        │
└──────────────────────────────────┴──────────────────────────────────┘
```

3.2 Model Vertical Panel-mounting User Interface

```
┌─────────────────────────────────────┐
│  ┌──────────────┐   ┌──────────────┐ │
│  └──────────────┘   └──────────────┘ │
│  ┌─────────────────────────────────┐ │
│  │  ╭───────────────────────────╮  │ │
│  │  │        4800000kg          │  │ │
│  │  ╰───────────────────────────╯  │ │
│  │                                 │ │
│  │   Flow:            19.9t/h      │ │
│  │   Speed:           0.35m/s      │ │
│  └─────────────────────────────────┘ │
│                                       │
│     RUN   AUTO  EXT  ALARM  LOCK      │
│      ●     ●     ○     ○     ○        │
├───────────────────────────────────────┤
│   ┌────┐ ┌────┐ ┌────┐ ┌────────┐     │
│   │ 1  │ │ 2  │ │ 3  │ │ MENU   │     │
│   │SET │ │ADJ-│ │ADJ+│ │        │     │
│   └────┘ └────┘ └────┘ └────────┘     │
│   ┌────┐ ┌────┐ ┌────┐ ┌────────┐     │
│   │ 4  │ │ 5  │ │ 6  │ │  ▲     │     │
│   │AUTO│ │EXT │ │ZERO│ │        │     │
│   └────┘ └────┘ └────┘ └────────┘     │
│   ┌────┐ ┌────┐ ┌────┐ ┌────────┐     │
│   │ 7  │ │ 8  │ │ 9  │ │  ▼     │     │
│   │CAL │ │CLS │ │REC │ │        │     │
│   └────┘ └────┘ └────┘ └────────┘     │
│   ┌────┐ ┌────┐ ┌────┐ ┌────────┐     │
│   │LOCK│ │ 0  │ │ F1 │ │ ENT    │     │
│   │    │ │PRINT│ │    │ │        │     │
│   └────┘ └────┘ └────┘ └────────┘     │
└───────────────────────────────────────┘
```
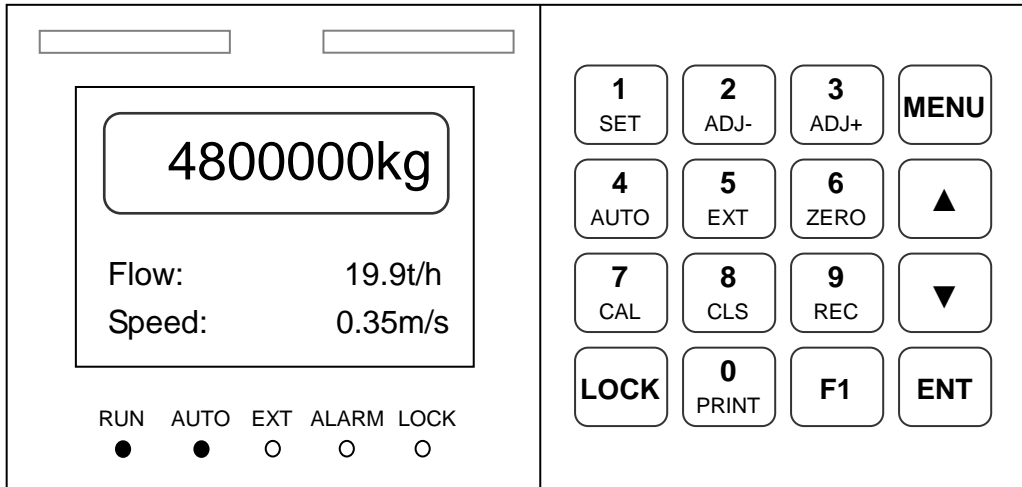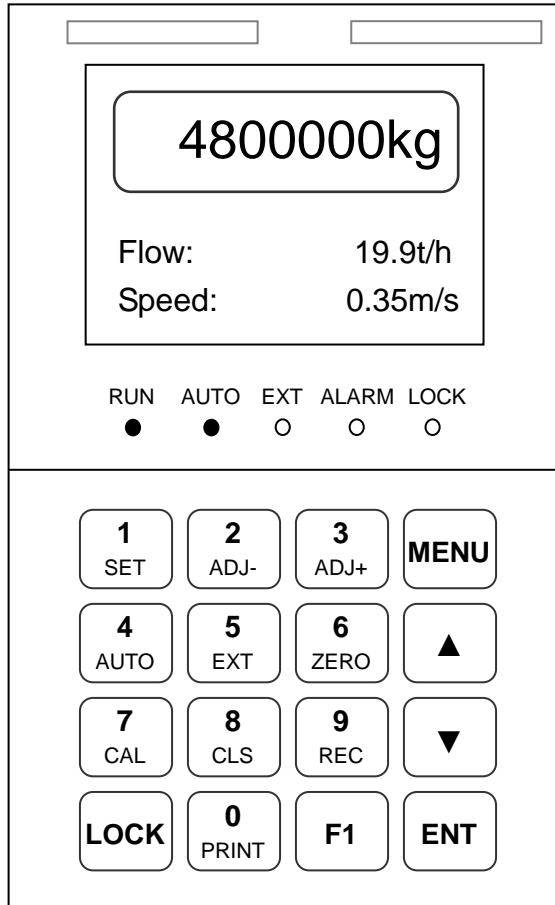
3.3 Model Wall-mounting User Interface

4800000kg

Flow: 19.9t/h
Speed: 0.35m/s

RUN   AUTO   EXT   ALARM   LOCK
 ●   ●   ○   ○   ○

1 SET	2 ADJ-	3 ADJ+	4 AUTO	MENU
5 EXT	6ZERO	7 CAL	▲	F1
8 CLS	9 REC	0PRINT	▼	ENT
LOCK				
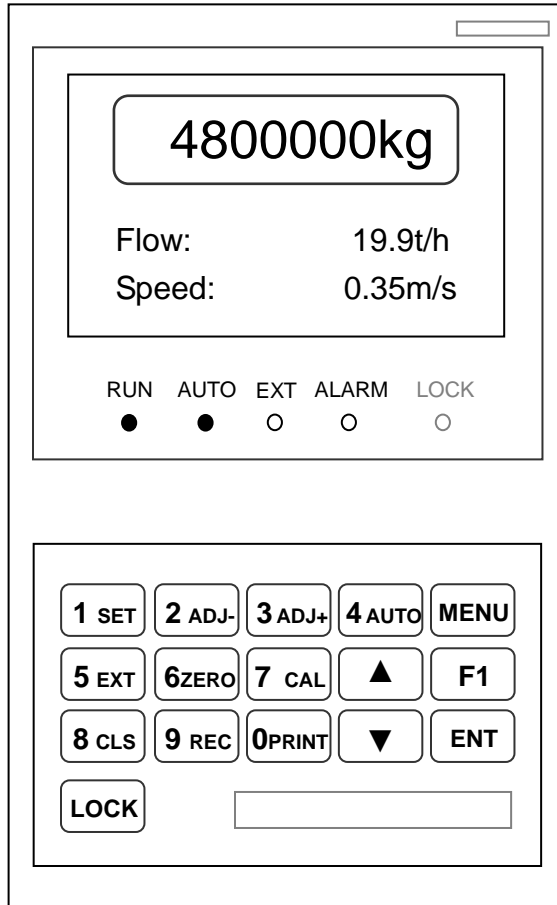
3.4 Keypad Operation

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

Menu Operation	
Key Name	Description
【MENU】(【ESC】)	Enter Main Menu. Exit.
【ENT】	Enter/Save.
【▲】	Cursor shifts up or left. Display the previous interface or option.
【▼】	Cursor shifts down or right. Display the next interface or option.
【0~9】	Digit Input.
Quick Operation	
【LOCK】	✧ Key-locking. ✧ Key-unlocking.
【F1】	Return to the initial display interface.
【SET】	Flow Set Value Setting.
【ADJ-】	Control Current -1mA.
【ADJ+】	Control Current +1mA.
【AUTO】	'Manual/Auto' Control Mode Selection.
【EXT】	'Internal/External' Flow Set Mode Selection.
【ZERO】	Zero Calibration.
【CAL】	Dynamic Span Calibration.
【CLS】	Clear Screen: Clear display value of Totalized Weight.
【REC】	Query and print Weight Record.
【PRINT】	Print.

3.5 State Indication

LED Lamp	Description
[RUN]	ON: Weighing state. OFF: Stopping state.
[AUTO]	Feeding control mode: ON: Auto [PID]. OFF: Manual.
[EXT]	Flow Set Mode: ON: External [AI: 4~20mA]. OFF: Internal.
[ALARM]	Alarm.
[LOCK]	ON: Key-locked. OFF: Key-unlocked.

4. Installation&Connection

4.1 Installation

4.1.1 Model Panel-mounting Installation
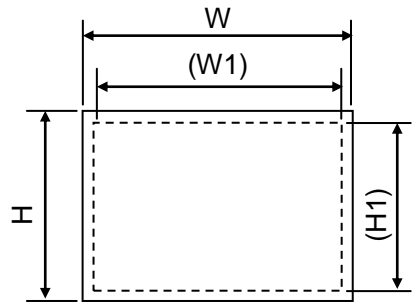
Outline Size

Front Panel Size
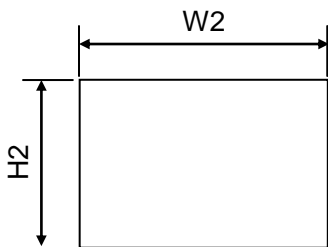
Panel Cut-out Size
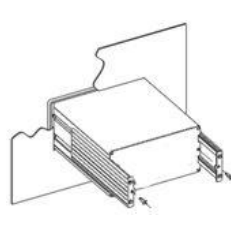
Horizontal Installation Mode   Vertical Installation Mode
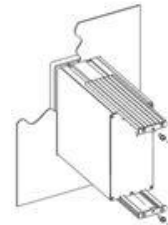
Model	Outline Size W×H×D[mm]	Front Panel Size W×H[mm]	Box Body Size W1×H1[mm]	Panel Cut-out Size W2×H2[mm]
Horizontal	164×86×193	164×86	152×76	153×77
Vertical	86×164×193	86×164	76×152	77×153

4.1.2 Model Wall-mounting Installation
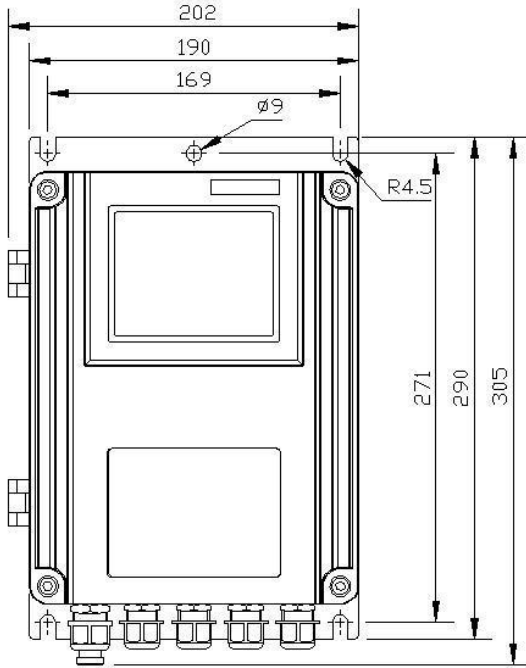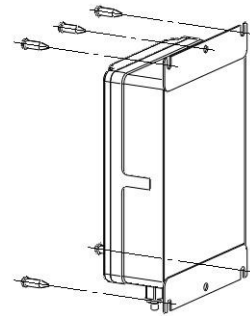
Outline Size

Installation Mode

Outline Size W×H×D[mm]	Mounting Size W×H[mm]	Mounting Hole Size [mm]
202×305×90	169×271	Φ9

4.2 Terminal

4.2.1 Model Horizontal Panel-mounting Terminal

AO/AI/PO

AO1+ AO1- AO2+ AO2- AO3+ AO3- AI+ AI- VIN PO

DO/DI

DO1+ DO1- DO2+ DO2- DO3+ DO3- DO4+ DO4 - COM DI1 DI2 DI3

SENSOR ETHERNET

COM1/2

SEN+ SEN- SIG- SIG+ EXC- EXC+ SHD VS- SIN VS+

E
L   N

POWER
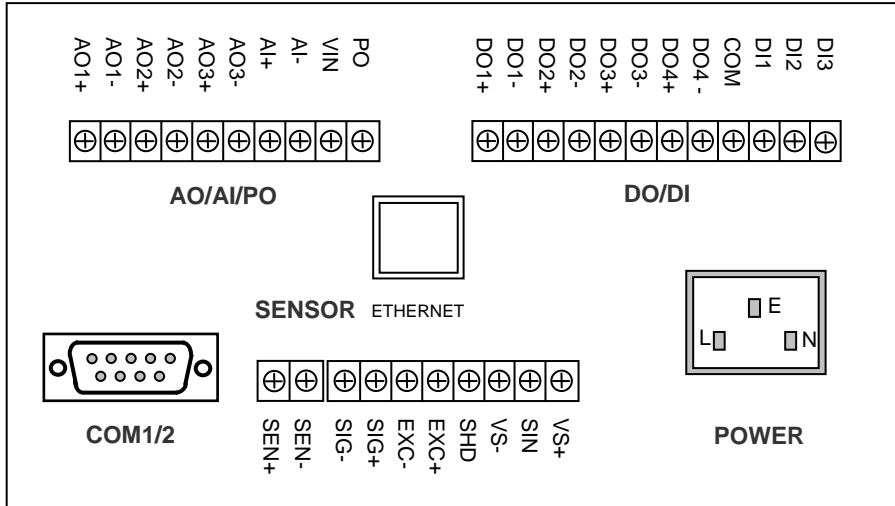
4.2.2 Model Wall-mounting Terminal

AO/AI/PO

AO1+ AO1- AO2+ AO2- AO3+ AO3- AI+ AI- VIN PO

DO/DI

DO1+ DO1- DO2+ DO2- DO3+ DO3- DO4+ DO4- COM DI1 DI2 DI3

1   9 1   10

B- (TXD-) A+(TXD+) DP-(RXD+) (RXD-) DP+   GND RXD TXD +5V

SEN+ SEN- SIG- SIG+ EXC- EXC+ SHD   VS- SIN VS+

N E L

LOADCELL   **SPEED**

POWER

COM1   **COM2**   **SENSOR**

Optional Modules   Fixed on PCB

4.2.3 Model Vertical Panel-mounting Terminal

Terminal
DI3
DI2
DI1
COM
DO4-
DO4+
DO3-
DO3+
DO2-
DO2+
DO1-
DO1+

DO/DI

POWER

N

E

L

VS+
SIN
VS-
SHD
EXC+
EXC-
SIG+
SIG-
SEN-
SEN+

SENSOR   ETHERNET

PO
VIN
AI-
AI+
AO3-
AO3+
AO2-
AO2+
AO1-
AO1+

AO/AI/PO

COM1/2
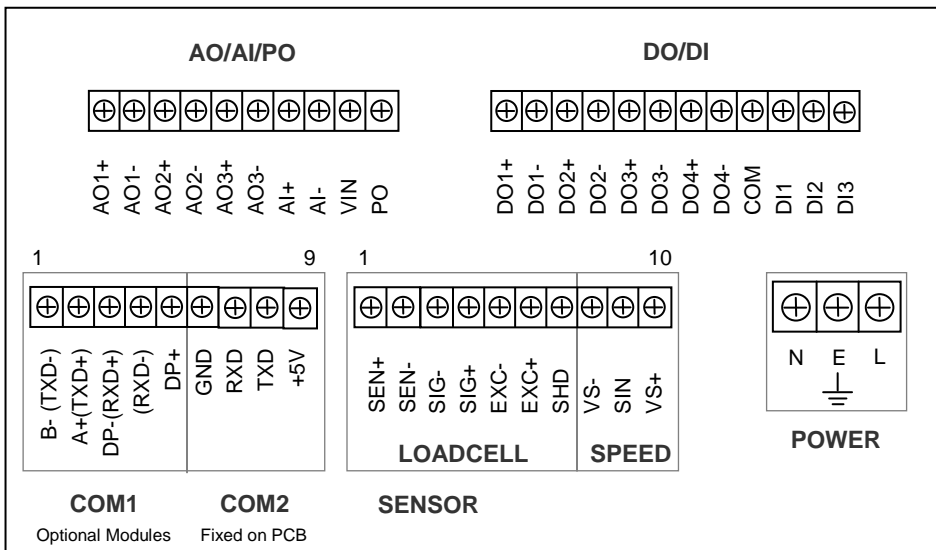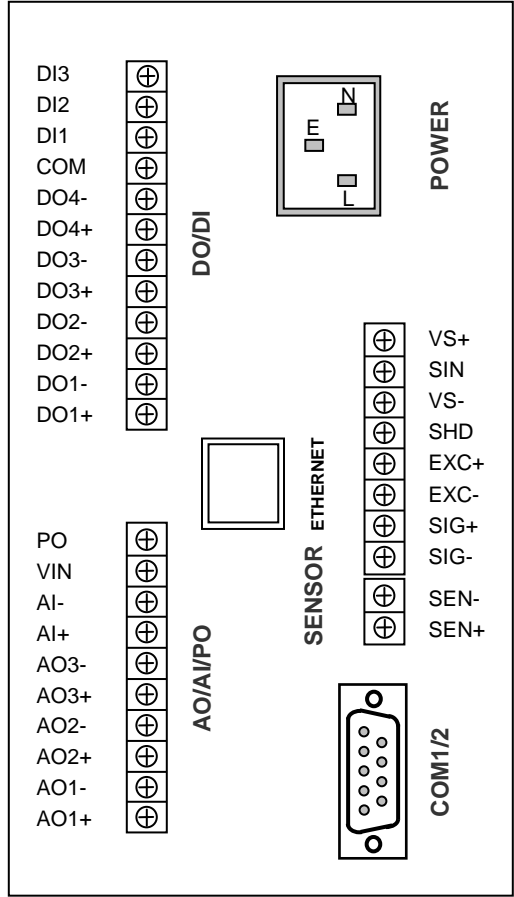
No.	Pin	Description		
SENSOR		**Loadcell / Speed Sensor Port**		
LOADCELL		**Loadcell**		
Connection Mode		6-Wire	4-Wire [Default Set]	
1	SEN+	Feedback Voltage +.		
2	SEN-	Feedback Voltage -.		
3	SIG-	Weighing Signal [mV] Input -.	Weighing Signal [mV] Input -.	
4	SIG+	Weighing Signal [mV] Input +.	Weighing Signal [mV] Input +.	
5	EXC-	Excitation Voltage -.	Excitation Voltage -.	
6	EXC+	Excitation Voltage + [DC10V].	Excitation Voltage + [DC10V].	
7	SHD	Shield Ground.	Shield Ground.	
SPEED		**Speed Sensor**		
		3-Wire [NPN Open-collector Output Type]	**2-Wire**	**Tachogenerator**
8	VS-	Voltage Output -.	Pulse Signal Input -.	
9	SIN	Pulse Signal Input.	Pulse Signal Input +.	Sine Wave Signal Input Terminal 1.
10	VS+	Voltage Output + [DC12V].		Sine Wave Signal Input Terminal 2.
POWER		**AC220V[±15%] Power Input Port**		
1	N	Null Wire.		
2	E	Protective Ground.		
3	L	Live Wire.		
The metal shell should be grounded directly.				

Digital Communication Port of Model Panel-mounting				
No.	Pin	Description		
COM1/2		**COM1/COM2 Digital Communication Port**		
COM2 **[DB9 Socket]**		**RS232 Digital Communication Port**		
1				
2				
3				
4				
5	GND	Signal Ground / Shield Ground.		
6	TXD	Transmit Data.		
7	RXD	Receive Data.		
8				
9	+5V	+5V/100mA Output.		
COM1		**RS232/RS485/RS422/Profibus-DP/Ethernet Digital Communication Port** [It's optional to configure one of them]		
DB9 Socket	**RS232**	**RS485**	**RS422**	**Profibus-DP**
1		B-	TXD-	
2	RXD	A+	TXD+	
3	TXD		RXD+	DP- [B-]
4			RXD-	
5	GND			
6				
7				
8				DP+ [A+]
9	+5V			
RJ45[DCE] Socket		**Ethernet** [T568B Wiring Mode]		
1	RXD+	Orange-white		
2	RXD-	Orange		
3	TXD+	Green-white		
4	Unused	Blue		
5	Unused	Blue-white		
6	TXD-	Green		
7	Unused	Brown-white		
8	Unused	Brown		

Digital Communication Port of Model Wall-mounting		
No.	Pin	Description
COM1/2		**COM1/COM2 Digital Communication Port**
COM2 [Wiring Terminal]		**RS232 Digital Communication Port**
1		
2		
3		
4		
5		
6	GND	Signal Ground / Shield Ground.
7	RXD	Receive Data.
8	TXD	Transmit Data.
9	+5V	+5V/100mA Output.

COM1		**RS232/RS485/RS422/Profibus-DP/Ethernet Digital Communication Port** [It's optional to configure one of them]					
Wiring Terminal		**RS232**	**RS485**	**RS422**	**Profibus-DP**	**Ethernet**	
1			B-	TXD-		TXD-	Green
2		RXD	A+	TXD+		TXD+	Green-white
3		TXD		RXD+	DP- [B-]	RXD+	Orange-white
4				RXD-		RXD-	Orange
5					DP+ [A+]		
6		GND					
7							
8							
9		+5V					

No.	Pin	Description
AO/AI/PO		**Analog Output / Analog Input / High-speed Pulse Output Port**
AO		**4~20mA Analog Output Port [Definable]**
1	AO1+	AO1 Output [+/-].
2	AO1-	
3	AO2+	AO2 Output [+/-].
4	AO2-	
5	AO3+	AO3 Output [+/-].
6	AO3-	[It's optional to configure it].
AI		**4~20mA Analog Input Port**
7	AI+	AI Input +.
8	AI-	AI Input -.
PO		**Totalized Weight High-speed Pulse Output Port**
9	VIN	DC5~24V Input.
10	PO	Totalized Weight High-speed Pulse Output.

No.	Pin	Description
DO/DI		**Relay Switch Signal Output / Switch Signal Input Port**
DO		**Relay Switch Signal Output [Definable]**
1	DO1+	Normally Open Contact Output 1 [+/-].
2	DO1-	
3	DO2+	Normally Open Contact Output 2 [+/-].
4	DO2-	
5	DO3+	Normally Open Contact Output 3 [+/-].
6	DO3-	
7	DO4+	Normally Open Contact Output 4 [+/-].
8	DO4-	
DI		**Switch Signal Input [Definable]**
9	COM	DI Common Terminal [GND].
10	DI1	Switch Signal Input 1.
11	DI2	Switch Signal Input 2.
12	DI3	Switch Signal Input 3.
Contact Capacity of Relay Switch: AC250V/DC24V, 1A.		

5. Operation Procedure

```
┌─────────────────────────────┐
│    Connection & Power on     │
└─────────────────────────────┘
              ⇩
┌─────────────────────────────┐
│  'Speed Coeff.' & 'Belt Length' │
│     Setting (Scale Setting)  │
└─────────────────────────────┘
              ⇩
┌─────────────────────────────┐
│       Zero Calibration       │
└─────────────────────────────┘
              ⇩
┌─────────────────────────────┐
│   Dynamic Span Calibration   │
│   Or Static Span Calibration │
└─────────────────────────────┘
              ⇩
┌─────────────────────────────┐
│   'Weighing Dead Band' Setting │
│       (Scale Setting)        │
└─────────────────────────────┘
              ⇩
┌─────────────────────────────┐
│         I/O Setting          │
│      Serial Port Setting     │
└─────────────────────────────┘
              ⇩
┌─────────────────────────────┐
│       Control Setting        │
│    (Used for belt feeder)    │
└─────────────────────────────┘
              ⇩
┌─────────────────────────────┐
│       Other Settings         │
└─────────────────────────────┘
              ⇩
┌─────────────────────────────┐
│        Key-Locking           │
└─────────────────────────────┘
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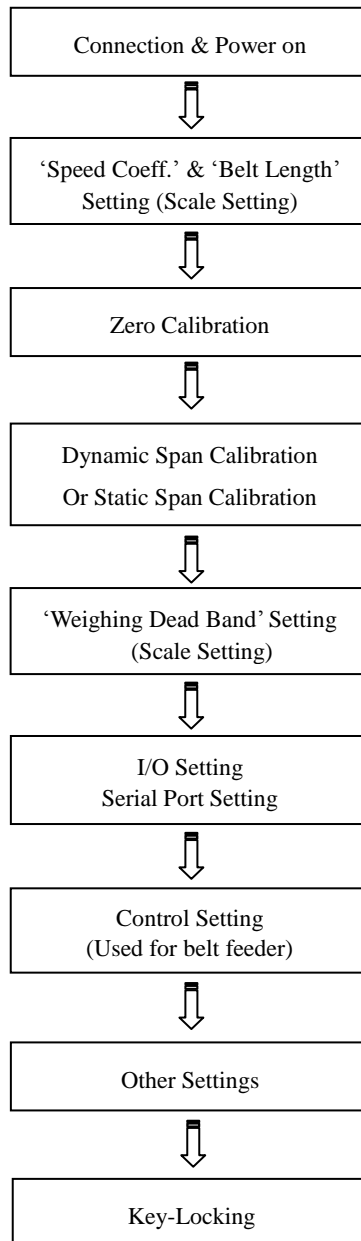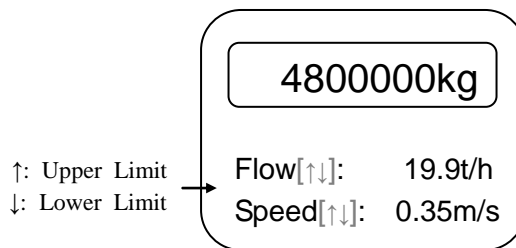
6. Functions&Operation

The following display interfaces are described with 'kg' as the Internal Scale Unit. If the parameter '[P107] Internal Scale Unit' is set to 'g', the actual Weight Display Unit will be different.

6.1 Main Display Interfaces

【▼】【▲】 : Display the next/previous interface.

6.1.1 Totalized Weight, Flow & Belt Speed

↑: Upper Limit
↓: Lower Limit

```
┌──────────────────┐
│  ┌────────────┐  │
│  │ 4800000kg  │  │
│  └────────────┘  │
│                  │
│ Flow[↑↓]:  19.9t/h │
│ Speed[↑↓]: 0.35m/s │
└──────────────────┘
```

Press 【PRINT】 key to print: 2009-05-20   23:59
                                         4800000kg

6.1.2 Totalized Weight, Flow & Flow Setpoint

```
┌──────────────────┐
│  ┌────────────┐  │
│  │ 4800000kg  │  │
│  └────────────┘  │
│                  │
│ Flow[↑↓]:  19.9t/h │
│ Set:       20.0t/h │
└──────────────────┘
```

⇩ 【ENT】 : Set 'Flow Setpoint' value

```
┌──────────────────┐
│ P200 Flow Set     │
│ ═════════════════ │
│                  │
│   0020.00 [t/h]   │
│                  │
│ R: 0.00-5000.00   │
└──────────────────┘
```
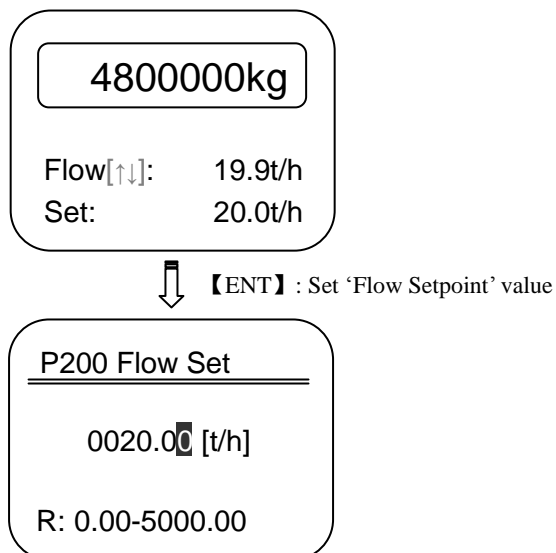
6.1.3 Totalized Weight, Flow & Control Current

```
┌─────────────────────────┐
│   ┌─────────────────┐   │
│   │   4800000kg     │   │
│   └─────────────────┘   │
│                         │
│  Flow[↑↓]:    19.9t/h   │
│  Ctrl[↑↓]:   12.26mA    │
└─────────────────────────┘
```
【ADJ-】【ADJ+】: Control Current ±1mA

⇩ 【ENT】: Set 'Control Current' value

```
┌─────────────────────────┐
│  Control Current         │
│  ═══════════════════════ │
│                         │
│      12.26 [mA]         │
│                         │
│  R: 4.00-20.00          │
└─────────────────────────┘
```

6.1.4 Totalized Weight, Load & Load Setpoint

```
┌─────────────────────────┐
│   ┌─────────────────┐   │
│   │   4800000kg     │   │
│   └─────────────────┘   │
│                         │
│  Load[↑↓]:   15.8kg/m   │
│  Set:        15.9kg/m   │
└─────────────────────────┘
```

Load=Flow / (3.6×Speed)
Load Setpoint=Flow Setpoint / (3.6×Speed)
Load: kg/m
Flow: t/h
Belt Speed: m/s

6.1.5 Totalized Weight, Date & Time

```
┌──────────────────────┐
│  ┌────────────────┐  │
│  │  4800000kg     │  │
│  └────────────────┘  │
│                      │
│    2009-05-20        │
│  23:59:45    Wed.    │
└──────────────────────┘
```
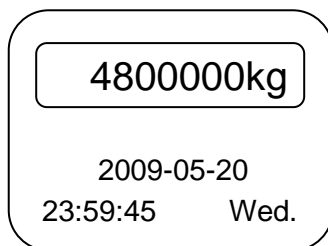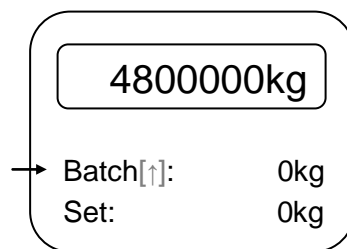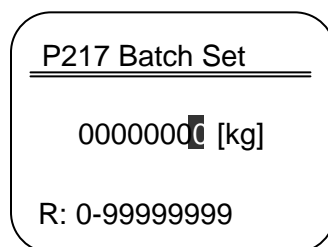
Month-Day-Year
Hour: Minute: Second   Week

6.1.6 Totalized Weight, Batch Weight & Batch Weight Setpoint

↑: BatchEnd (Totalized Weight reaches to Batch Weight Setpoint) →

```
┌──────────────────────┐
│  ┌────────────────┐  │
│  │  4800000kg     │  │
│  └────────────────┘  │
│                      │
│  Batch[↑]:      0kg  │
│  Set:           0kg  │
└──────────────────────┘
```

⇩   【ENT】: Set 'Batch Weight Setpoint' value

```
┌──────────────────────┐
│  P217 Batch Set      │
│  ─────────────────   │
│                      │
│   00000000 [kg]      │
│                      │
│  R: 0-99999999       │
└──────────────────────┘
```

6.1.7 Alarm Items

```
Alarm Items
Flow:OK     Load:OK
Speed:OK  Ctrl: OK
Dev:OK          -0.5%
```

Alarm Item	Alarm Condition
Flow Upper Limit	Flow $\geq$ Flow Range $\times$ Flow Upper Limit(%)
Flow Lower Limit	Flow $\leq$ Flow Range $\times$ Flow Lower Limit(%)
Load Upper Limit	Load $\geq$ Load Range $\times$ Load Upper Limit(%)
Load Lower Limit	Load $\leq$ Load Range $\times$ Load Lower Limit(%)
Speed Upper Limit	Speed $\geq$ Speed Range $\times$ Speed Upper Limit(%)
Speed Lower Limit	Speed $\leq$ Speed Range $\times$ Speed Lower Limit(%)
Control Current Upper Limit	Control Current $\geq$ PID Control Current Upper Limit
Control Current Lower Limit	Control Current $\geq$ PID Control Current Lower Limit
Flow Positive Deviation Limit	Flow Deviation [E%] > Flow Positive Deviation Limit
Flow Negative Deviation Limit	Flow Deviation [E%] < Flow Negative Deviation Limit
Flow Deviation Value [E%]	XXX.X% Flow Deviation [E%] = ((Flow $-$ Flow Setpoint) / Flow Setpoint) $\times$ 100%
OK: Normal HI: Upper Limit / Positive Deviation Limit LO: Lower Limit / Negative Deviation Limit	

6.1.8 DI&DO

```
DI1: OFF    DI2:OFF
DI3: OFF
DO1:OFF    DO2:OFF
DO3:OFF    DO4:OFF
```

DI: Switch Input;   DO: Switch Output

6.1.9 AI&AO

```
AI:        4.00mA
AO1:       4.00mA
AO2:       4.00mA
AO3:       4.00mA
```

AI: Analog Input (4.00~20.00mA)
AO: Analog Output (4.00~20.00mA)

6.1.10 AD Value, Totalized Weight Pulse, Total Weight of Present Shift

```
AD:          25122
LP:           4800
HP:          48000
Total:    190150kg
```

LP－Totalized Weight Low-speed Pulse
HP－Totalized Weight High-speed Pulse
Total－Totalized Weight of Present Shift

6.2 Main MENU

Main Menu	Second Menu	Description
F1 Setting	1 Scale[Basic]	Basic scale parameters setting.
	1+Scale[Extra]	Extra scale parameters setting.
	2 Control[Basic]	Basic feeding control parameters setting.
	2+Control[Extra]	Extra feeding and batching control parameters setting.
	3 Flow	Flow parameters setting.
	4 Speed	Speed parameters setting.
	5 Load	Load parameters setting.
	6 Save/Print	Weight record parameters setting.
	7 Comm. Port	Communication port parameters setting.
	8 I/O	Input&output parameters setting.
	9 Display	User interface parameters setting.
	10 Date/Time	Date/Time parameters setting.
F2 Calibration	1 Zero Cal.	Zero Calibration without loading for correcting Zero Value.
	2 Span Cal. Dyn.	Dynamic Span Calibration with loading measured materials or Poise Weights for correcting Span Coefficient.
	3 Span Cal.Stat1	Static Span Calibration with a measured chain weight as a continuous and steady load on the running belt weigher for correcting Span Coefficient.
	4 Span Cal.Stat2	Static Span Calibration with a measured Hanging Weight as a steady load on the running belt weigher for correcting Span Coefficient.
	5 Span Cor. Seg.	Segmenting Span Correction. After doing Dynamic or Static Span Calibration, further corrections for 3 [AD Value: 0~60000] linear segments are optional for correcting Correction Coefficient 1~3.
	6 Speed Cal.	Speed Coefficient Calibration. Keep the belt weigher running at a constant speed. After the running time of a revolution being measured with using a stopwatch, do this operation for correcting Speed Coefficient.
	7 Length Cal.	Belt Length Calibration. Keep the belt weigher running at a constant speed. After the running time of a revolution being measured with using a stopwatch, do this operation for correcting Belt Length.

Main Menu	Second Menu	Description
F3 Weight Record		Query and print Weight Records.
F4 Data Clearing	1 Clear Screen	Clear Totalized Weight and Totalized Weight Pulse Count. But Totalized Weight of Current Shift will not be cleared, so this operation has no effect on recording of weight per shift.
	2 Clear Weight	Clear Totalized Weight, Totalized Weight Pulse Count and Totalized Weight of Current Shift. The cleared value of Totalized Weight of Current Shift will not be recorded.
	3 Clear Records	Clear History Records of Totalized Weight. But Current Totalized Weight, Totalized Weight Pulse Count and Totalized Weight of Current Shift will not be cleared.
F5 Security	1 Auto-locking	If there is not any keypad operation in one minute 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.
	2 Key-locking	Locking keypad.
	3 Key-unlocking	Unlocking keypad.
	4 Password Set	Exfactory Password: 000001.
	5 RAM Reset	Restore to factory defaults.
F6 Factory Adj.		Special for manufacturer.
F7 Product Info.	Only for query.	
	1 Version No.	Version No.
	2 Serial No.	Serial No.
	3 Exfactory Date	Exfactory Date.
	4 Audit Counter	Audit Trail Counter [0~99999999] for Scale parameter's modification.
	5 Auth. Code	Authorization Code.

6.3 F1 Setting

6.3.1 Basic Scale Parameters

No.	Parameter	Range	Default	Set
P100	DispalyUnit (Weight Display Unit)	0: kg 1: t ([P107] Scale Unit = kg) 0: g 1: kg ([P107] Scale Unit = g)	0	
P101	Decimal (Weight Decimal Point)	0: o 1: o.o 2: o.oo When [P100]=1, it's valid.	1	
P102	Belt Length	0.01~5000.00m	10.00 [*]	
P103	SpeedCoeff. (Speed Coefficient)	1.0~99999.9pl/m (pulse/m)	100.0 [*]	
P104	Zero Value	0~60000 (AD Value)	15000 [*]	
P105	Span Coeff. (Span Coefficient)	1~99999999	200000 [*]	
P106	SL Deadband (Weighing Deadband)	±(0.00~200.00) t/h ([P107] Scale Unit = kg) If Flow < Deadband value, the variance of Totalized Weight will be ignored. ±(0.00~200.00) kg/h ([P107] Scale Unit = g)	±0.00	
P107	Scale Unit (Internal Scale Unit)	0: kg 1: g	0/1 [*]	

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

6.3.2 Extra Scale Parameters

No.	Parameter	Range	Default	Set
P110	Cal. Revs (Calibration Revolutions)	1~99R (1R=1 Belt Length)	3	
P111	ChainWeight	0.1~1000.0kg/m ([P107] Scale Unit = kg) Chain Weight for Span Calibration 0.1~1000.0g/m ([P107] Scale Unit = g)	10.0	
P112	HangWeight	0.1~1000.0kg ([P107] Scale Unit = kg) Hanging Weight for Span Calibration 0.1~1000.0g ([P107] Scale Unit = g)	10.0	
P113	WeighLength	0.001~50.000m	1.000	
P114	Cal.Current	4.00~20.00mA Control Current for System Calibration	12.00	
P115	Zero Track (Zero Tracking Permission)	0: OFF; 1: ON	0	
P116	Track Range (Zero Tracking Range)	±(0~10%) ×[P302] Flow Range	±5%	
P117	Zero Adjust (Zero Adjusting Range)	±(0~10%) ×[P104] Zero Value	±5%	
P118	ZeroRefresh	0: RAM (Only Refresh RAM Zero Value) 1: FLASH/RAM (Refresh Original Zero Value)	0	
P119	Breakpoint1	0~[P120] (AD Value: 0~60000) Breakpoint1 of Segmenting Span Correction	18000	
P120	Breakpoint2	[P119]~Max. AD Value (60000) Breakpoint2 of Segmenting Span Correction	42000	
P121	Cor. Coeff1	0.500~2.000; Span Correction Coefficient of AD Value Linear Segment 1: 0~[P119]	1.000	
P122	Cor. Coeff2	0.500~2.000; Span Correction Coefficient of AD Value Linear Segment 2: [P119]~[P120]	1.000	
P123	Cor. Coeff3	0.500~2.000; Span Correction Coefficient of AD Value Linear Segment 3: [P120~Max. AD Value	1.000	
P124	Cal. Add (Totalizing While Calibrating)	0: OFF 1: ON [In the process of 'Load Calibration', the inputted actual weight value will be added to Totalized Weight]	0	
P125	Neg. Add (Negative Totalizing)	0: OFF [The negative variance of Totalized Weight will be ignored] 1: ON	1	

6.3.3 Basic Control Parameters

No.	Parameter	Range	Default	Set
P200	Flow Set[point]	0.00~5000.00t/h ([P107] Scale Unit = kg) 0.00~5000.00kg/h ([P107] Scale Unit = g)	20.00	
P201	P Value	0.1~5000.0 A bigger P value indicates a higher-precision feeding adjustment but a longer time for flow to reach the target value [Flow Setpoint].	100.0	
P202	I Value	0.1~9.9s A smaller I value indicates a higher-frequency feeding adjustment but a potential flow over-adjustment.	0.5	
P203	PID Upper	[P204]~20.00mA Auto[PID]/Manual Control Current Upper Limit	20.00	
P204	PID Lower	4.00~[P203]mA Auto[PID]/Manual Control Current Lower Limit	5.00	
P205	CtrL. Ratio (PID Control Ratio)	1~500% The 2nd&3rd Control Current=Control Ratio×(The 1st Control Current-4.00)+4.00 [mA]	100%	
P206	[Flow] PositiveDev	(0.5~100.0)% Flow Positive Deviation Limit	10.0%	
P207	[Flow] NegativeDev	-(0.5~100.0)% Flow Negative Deviation Limit	-10.0%	
P208	Ctrl. Mode (Feeding Control Mode)	0: Auto[PID] 1: Manual 2: Comm. (Communication)	1	
P209	FlowSetMode	0: Int./Comm. (Internal/Communication) 1: Ext. AI (External AI: 4~20mA)	0	

6.3.4 Extra Control Parameters

No.	Parameter	Range	Default	Set
P210	InIHoldTime	0.0-999.9s PID Initial Current Hold Time	2.0	
P211	PID Ini.Cur (PID Initial Current)	0: Present (Present Current Value) 1: Fuzzy (Fuzzy Current Value) 2: Set [P219] (Set Value of [P219])	0	
P212	Fuzzy Equ. (Fuzzy Equivalent)	0.01~100.00 [t/h]/mA ([P107] Scale Unit = kg) Flow Increment per Increasing 1mA Adjusting Current. 0.01~100.00 [kg/h]/mA ([P107] Scale Unit = g)	2.50	
P213	ST/SP Delay (Start/Stop Delay Time)	0.0~999.9s Delay Time of Feeder Starting Delay Time of Scale Stopping	0.0	
P214	BatchPermit (Batch Permission)	0: OFF; 1: ON	0	
P215	Batch Loop (Batch Loop Mode)	0: Manual Mode; 1: Auto Mode	0	
P216	Batch Int. (Batch Interval)	0.0~9999.9s	60.0	
P217	Batch Set (Batch Weight Setpoint)	0~99999999kg ([P107] Scale Unit = kg) 0~99999999g ([P107] Scale Unit = g)	0	
P218	BatchPreact	0~[P217] kg ([P107] Scale Unit = kg) Batch Preact Weight 0~[P217] g ([P107] Scale Unit = g)	0	
P219	Set Current	4.00~20.00mA Set Value of PID Initial Current	12.00	

Note:

[P213] Start/Stop Delay:

1. Delay Time of Feeder Starting: When there is a "DI.Start" pulse signal input, 'DO. Scale Start&Stop Control' will turn on to start the belt weigher, and after delaying this time, 'DO. Feeder Start&Stop Control' will turn on to start the feeder.

2. Delay Time of Scale Stopping: When there is a "DI.Stop" pulse signal input, 'DO. Feeder Start&Stop Control' will turn off to stop the feeder, and after delaying this time, 'DO. Scale Start&Stop Control' will turn off to stop the belt weigher.

6.3.5 Flow Parameters

No.	Parameter	Range	Default	Set
P300	DisplayUnit (Flow Display Unit)	0: t/h 1: kg/min 2: kg/h ([P107] Scale Unit = kg) 0: kg/h 1: g/min 2: g/h ([P107] Scale Unit = g)	0	
P301	Decimal (Flow Decimal Point)	0: o 1: o.o 2: o.oo	1	
P302	Flow Range	0.01~5000.00t/h ([P107] Scale Unit = kg) 0.01~5000.00kg/h ([P107] Scale Unit = g)	100.00	
P303	Flow Upper (Flow Upper Limit)	(0.0~100.0)% Flow Range	100.0%	
P304	Flow Lower (Flow Lower Limit)	(0.0~100.0)% Flow Range	0.0%	
P305	Flow Filter	1~200	10	
P306	FlowFilter2	1~100 The secondary filter for flow display.	1	
P307	Filter2 Dev	$\pm(0~20)$% Flow Deviation Range for Flow Filter2 When Flow Deviation [E%] is within this range, the secondary filter will work.	±2%	

6.3.6 Speed Parameters

No.	Parameter	Range	Default	Set
P400	Decimal (Speed Decimal Point)	0: o 1: o.o 2: o.oo 3: o.ooo	2	
P401	Speed Range	0.100~5.000m/s	3.000	
P402	Speed Upper (Speed Upper Limit)	(0.0~100.0)% Speed Range	100.0%	
P403	Speed Lower (Speed Lower Limit)	(0.0~100.0)% Speed Range	0.0%	
P404	SpeedFilter	1~200	10	
P405	SpeedSource	0: Ext. Speed (Weighing by the external speed) 1: Int. Speed1 (Weighing by the internal speed) 2: Int. Speed2 (Connect a normally open switch related to the running state of the weighing belt between the terminals 'SIN' and 'VS-'. Switch ON with Belt's Running: Weighing by the internal speed; Switch OFF with Belt's Stopping: Stop weighing) 3: Int. Speed3 (Weighing by the internal speed while the external speed pulse inputting) Note: If a DI signal is defined as '1: Weighing', then only when this DI turns on, the weighing process is allowed.	0	
P406	Int. Speed (Internal Speed)	0.001~5.000m/s	0.500	
P407	Pulse Upper	0.1~3.0kHz Speed Pulse Frequency Upper Limit: if the frequency of speed pulse exceeds this set value, the speed pulse will be invalid.	1.0	

6.3.7 Load Parameters

No.	Parameter	Range	Default	Set
P500	Decimal (LoadDecimal Point)	0: o 1: o.o 2: o.oo	1	
P501	Load Range	0.01~5000.00kg/m ([P107] Scale Unit = kg) 0.01~5000.00g/m ([P107] Scale Unit = g)	100.00	
P502	Load Upper (Load Upper Limit)	(0.0~100.0)% Load Range	100.0%	
P503	Load Lower (Load Lower Limit)	(0.0~100.0)% Load Range	0.0%	
P504	Load Filter	1~20	10	
P505	Calc. Speed	0.000 (Use external speed for Load calculation) 0.001~5.000m/s (Used for Load calculation)	0.000	

6.3.8 Weight Record Parameters

No.	Parameter	Range	Default	Set
P600	Shifts/Day (Shifts per Day)	1: One Shift; 2: Two Shifts; 3: Three Shifts; 4: Four Shifts	3	
P601	Shift1 Time	00:00~23:59	07:59	
P602	Shift2 Time	00:00~23:59	15:59	
P603	Shift3 Time	00:00~23:59	23:59	
P604	Shift4 Time	00:00~23:59	23:59	
P605	Auto-print	0: OFF; 1: Per Hour; 2: Per Shift; 3: Per Day	0	
P606	Auto-clear (Auto Clear Screen)	0: OFF; 1: Per Shift; 2: Per Day; 3: Per Month 'Auto-clear' has no effect on recording of weight per shift.	0	

6.3.9 Communication Parameters

No.	Parameter	Range	Default	Set
P700	Address [Communication Address]	00~99	01	
P701	COM1 Baud [Rate]	0: 1200bps; 1: 2400bps; 2: 4800bps	3	
P702	COM2 Baud [Rate]	3: 9600bps; 4: 19200bps; 5: 115200bps	3	
P703	COM1 Parity [Check]	0: None	0	
P704	COM2 Parity [Check]	1: Even 2: Odd	0	
P705	COM1 Mode [Communication Mode]	0: Host-slave ASC (Modbus ASCII) 1: Continuous ASC (Continuous Sending ASCII) 2: DP-Modicon (Modicon Profibus-DP) 3: DP-Siemens (Siemens Profibus-DP) 4: Print[A] 5: Print[B] 6: Host-slave RTU (Modbus RTU) 7: Continuous RTU (Continuous Sending RTU) 8: TCP 9: User1	0	
P706	COM2 Mode [Communication Mode]	0: Host-slave ASC (Modbus ASCII) 1: Continuous ASC (Continuous Sending ASCII) 2: Unused 3: Unused 4: Print[A] 5: Print[B] 6: Host-slave RTU (Modbus RTU) 7: Continuous RTU (Continuous Sending RTU) 8: TCP 9: User1	0	
P707	[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'.	0	

6.3.10 I/O Parameters

No.	Parameter	Range	Default	Set
P800 P801 P802	AO1 Signal AO2 Signal AO3 Signal	0: None 1: Flow 2: Ctrl. Current (Control Current) 3: Load 4: Speed 5: From AI [4~20mA] 6: From Comm. (Communication Port) 7: HighPulse (Totalized Weight High-speed Pulse, 4mA→20mA→4mA) 8: LowPulse (Totalized Weight Low-speed Pulse, 4mA→20mA→4mA) 9: Batch Weight (Output Capacity: [P217] 'Batch Weight Setpoint')	1 2 0	
P803 P804 P805 P806	DO1 Signal DO2 Signal DO3 Signal DO4 Signal	0: None 1: Flow Upper (Limit Alarm) 2: Flow Lower (Limit Alarm) 3: Load Upper (Limit Alarm) 4: Load Lower (Limit Alarm) 5: Speed Upper (Limit Alarm) 6: Speed Lower (Limit Alarm) 7: PID Upper (Limit Alarm) 8: PID Lower (Limit Alarm) 9: PositiveDev (Flow Positive Deviation Limit Alarm) 10: NegativeDev (Flow Negative Deviation Limit Alarm) 11: LowPulse (Totalized Weight Low-speed Pulse) 12: Auto Control (Auto Feeding Control Mode) 13: Calibrating (State) 14: Running (State) 15: From DI1 16: From DI2 17: From DI3 18: From Comm. (Communication Port) 19: Feeder Ctrl. (Feeder Start&Stop Control) 20: Scale Ctrl. (Belt Weigher Start&Stop Control) 21: BatchEnd[ON] (Totalized Weight reaches to Batch Weight Setpoint) 22: BatchEnd[OFF] (Totalized Weight reaches to Batch Weight Setpoint)	0 0 0 0	

No.	Parameter	Range	Default	Set
P807 P808 P809	DI1 Signal DI2 Signal DI3 Signal	0: None 1: Weighing (ON: Weighing; OFF: No Weighing) 2: PID Start (ON: Start PID; OFF: Stop PID) 3: Sys. Ready (ON: System Ready, DI.Start Signal is valid) 4: Zero Cal. (Zero Calibration, OFF→ON→OFF) 5: Clear Screen (OFF→ON→OFF) 6: Start (OFF→ON→OFF) 7: Stop (OFF→ON→OFF) 8: (Feeding) Ctrl. Mode (ON: Auto Control; OFF: Manual Control) 9: Flow Set Mode (ON: Internal; OFF: External) 10: Clear Batch (OFF→ON→OFF, Clear Batch Weight) 11: Batch Permit (ON: Batch Control) 12: End Batch (OFF→ON→OFF)	0 0 0	
P810	Alarm Sound	0: OFF 1: ON	0	
P811	Alarm Delay	0.0~9.9s Alarm Delay Time	1.0	
P812	HP Weight	1~1000kg ([P107] Scale Unit = kg) Weight value per high-speed pulse outputting from PO/AO port	100	
		1~1000g ([P107] Scale Unit =kg)		
P813	HP Width	50~500ms Width of high-speed pulse	100	
P814	LP Weight	10~10000kg ([P107] Scale Unit = kg) Weight value per low-speed pulse outputting from DO/AO port	1000	
		10~10000g ([P107] Scale Unit = g)		
P815	LP Width	50~1000ms Width of low-speed pulse	200	

6.3.11 Display Parameters

No.	Parameter	Range	Default	Set
P900	Language	0: Chinese 1: English	0/1 [*]	
P901	RefreshTime	0.1~2.0s	0.5	
P902 P903	LED1 Data LED2 Data	0: Flow 1: Flow Set[point] 2: Speed 3: Load 4: Load Set[point] Used for the controller with LED display screen.	0 1	
P904	LED/VFD Lum (LED/VFD Brightness)	5~15 Used for the controller with LED/VFD display screen.	10 [*]	
P905 P906	LCDRunColor (LCD Background Color in Running State) LCDStpColor (LCD Background Color in Stop State)	0: None; 1: Orange; 2: Green; 3: Yellow 4: Blue; 5: Purple; 6: Light Blue 7: White Used for the controller with LCD display screen.	2 2	
P907	LCDContrast	5~20 Used for the controller with LCD display screen.	12 [*]	
P908	Ini.Display (Initial Display Interface)	1~6[#]	1	
P909	DisplayItem (Displayable Interfaces)	0: Six 1: ALL	1	
P910	[Cooling] Fan Running	0: OFF 1: ON	1	

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

6.3.12 Date/Time Parameters

No.	Parameter	Range	Default	Set
P998		20YY-MM-DD HH: MM: SS Week	Local Time	

6.3.13 A Sample of Parameter Setting

Modify the parameter '[P103] Speed Coefficient'.

Main Display Interface

⬇ 【MENU】 + 【▲】【▼】 : F1 Setting
　　【ENT】

```
F1Setting
1 Scale[Basic]
1+Scale[Extra]
2 Control[Basic]
```

⬆ 【ENT】 + 【▲】【▼】

(M)

```
1 Scale[Basic]
P101 Decimal
P102 Belt Length
P103 SpeedCoeff.
```

⬆ 【ENT】

```
P103 SpeedCoeff.

  0100.00

R: 1.0-99999.9
```

【▲】【▼】 : Moving cursor.
【0~9】 : Digit input.

【MENU】 : Exit ⬇ 【ENT】 : Save

(M)

6.4 F2 System Calibration

6.4.1 Zero Calibration

Keep the belt weigher running without load for correcting Zero Value.

Main Display Interface

M

【MENU】+【▲】【▼】: F2 Calibration
【ENT】+【▲】【▼】: 1 Zero Cal.
【ENT】

P110 Cal. Revs

05[R]

R: 1-99

【ENT】

---

1 Zero Cal.

Zero:	14400
Flow:	0.0t/h
01R	10.00m

Revolution Count →

【▲】【▼】:
← Display Flow, Load or AD Value
← Remainder length of a revolution

After running Calibration Revolutions:

---

1 Zero Cal.

Old Zero:	15000
New Zero:	14400
E%:	-1.00%

$E\% = (ER / \text{Max. AD Value}) \times 100\%$

ER = New Zero Value - Old Zero Value

Max. AD Value = 60000

【MENU】: Exit   【ENT】: Save

M

6.4.2 Dynamic Span Calibration

Let the belt weigher run with loading measured materials or Poise Weights for correcting Span Coefficient.

Main Display Interface

M

【MENU】+【▲】【▼】: F2 Calibration
【ENT】+【▲】【▼】: 2 Span Cal. Dyn.
【ENT】& Start loading

```
2 Span Cal. Dyn.
W:              1.0kg
Flow:          12.6t/h
01R            10.00m
```

【▲】【▼】:
← Display Flow, Load , AD Value
← Remainder length of a revolution

Revolution Count →

Stop loading & 【ENT】

```
2 Span Cal. Dyn.
W:            489.2kg
Flow:          12.6t/h
Wait…           1.00m
```

After running the last revolution:

```
2 Span Cal. Dyn.
W:            499.2kg
End               5R
[ENT]: Input…
```

【ENT】

```
Input Weight

   0000500.0[kg]

R:0.1-9999999.9
```
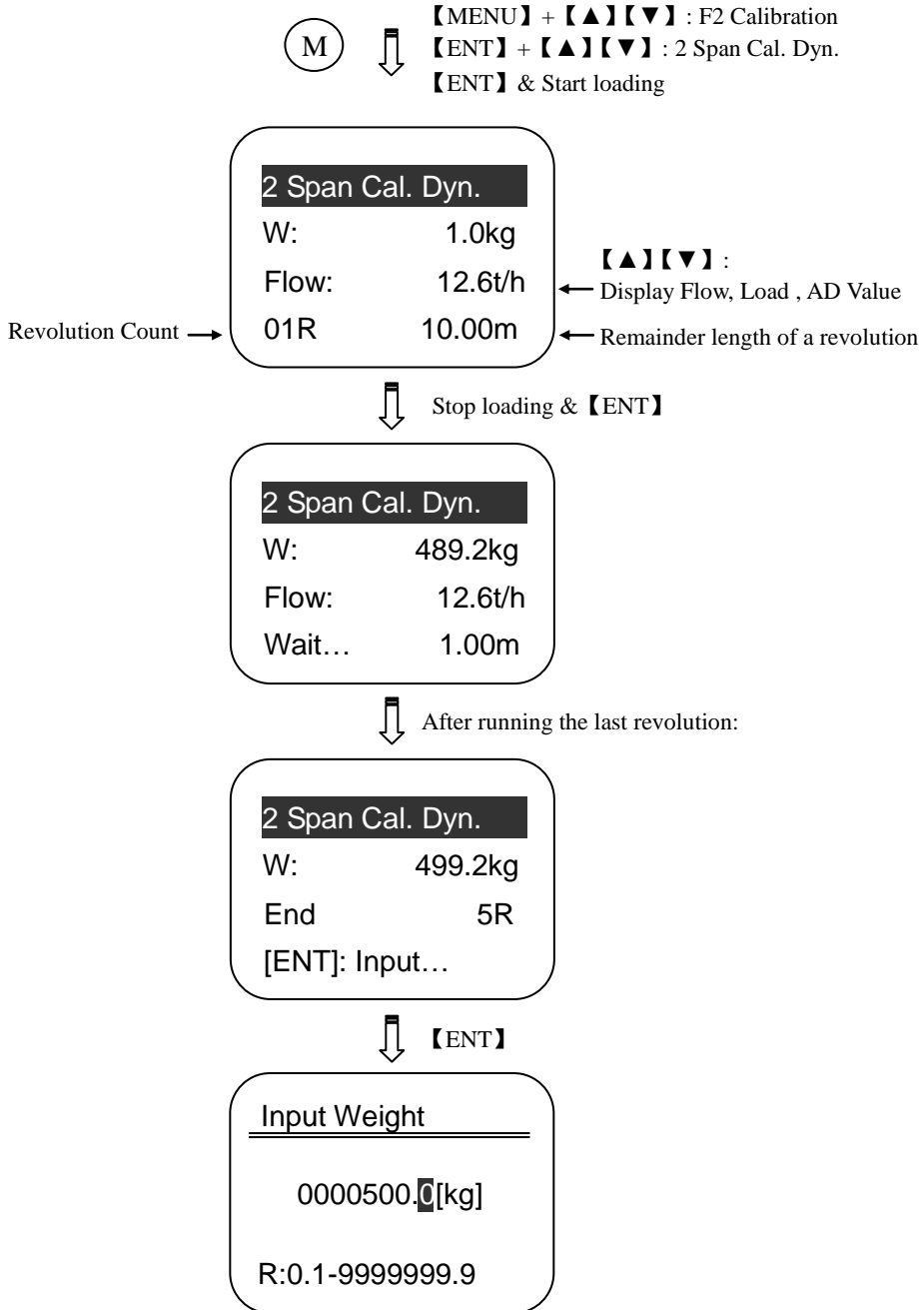
【ENT】

```
┌──────────────────────────┐
│ 2 Span Cal. Dyn.         │
│ OldSpan:    200000       │
│ NewSpan:    200320       │
│ E%:          -0.16%      │
└──────────────────────────┘
```

$E\% = (\text{Display Weight} - \text{Input Weight}) / \text{Input Weight} \times 100\%$

【MENU】: Exit 【ENT】: Save

M

6.4.3 Static Span Calibration with Chain Weight

Keep the belt weigher running with loading a chain weight for correcting Span Coefficient.

Put a measured chain weight as a continuous and steady load on the belt weigher and then start the belt weigher.

Main Display Interface

M 【MENU】+【▲】【▼】: F2 Calibration
   【ENT】+【▲】【▼】: 3 Span Cal.Stat1
   【ENT】

```
┌──────────────────────────┐
│ P110 Cal. Revs           │
│                          │
│        05[R]             │
│                          │
│ R: 1-99                  │
└──────────────────────────┘
```

【ENT】

```
┌──────────────────────────┐
│ P111 ChainWeight         │
│                          │
│     010.0[kg/m]          │
│                          │
│ R: 0.1-1000.0            │
└──────────────────────────┘
```

⇧ 【ENT】

```
┌──────────────────────────┐
│ 3 Span Cal.Stat1         │
│                          │
│ W:            1.0kg      │
│                          │
│ Load:      9.98kg/m      │  ← Display Flow, Load , AD Value
│                          │
│ 01R        10.00m        │  ← Remainder length of a revolution
└──────────────────────────┘
```

【▲】【▼】:

Revolution Count →

⇧ After running Calibration Revolutions:

```
┌──────────────────────────┐
│ 3 Span Cal.Stat1         │
│                          │
│ W:          499.2kg      │
│                          │
│ End            5R        │
│                          │
│ [ENT]: Input…            │
└──────────────────────────┘
```

⇧ 【ENT】

```
┌──────────────────────────┐
│ Input Weight             │
│ ─────────────            │
│                          │
│    0000500.0[kg]         │
│                          │
│                          │
│ R:0.1-9999999.9          │
└──────────────────────────┘
```

Input Calibrating Weight = Cal. Rev.s × Belt Length × Chain Weight

⇧ 【ENT】

```
┌──────────────────────────┐
│ 3 Span Cal.Stat.         │
│                          │
│ OldSpan:    200000       │
│                          │
│ NewSpan:    200320       │
│                          │
│ E%:          -0.20%      │
└──────────────────────────┘
```

【MENU】: Exit ⇧ 【ENT】: Save

(M)
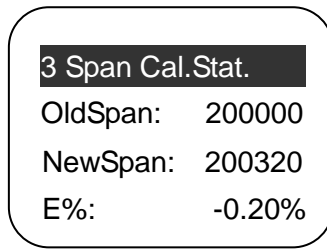
6.4.4 Static Span Calibration with Hanging Weight

Keep the belt weigher running with loading hanging weights for correcting Span Coefficient.
Put a measured hanging weight as a steady load on the belt weigher and then start belt weigher.

Main Display Interface

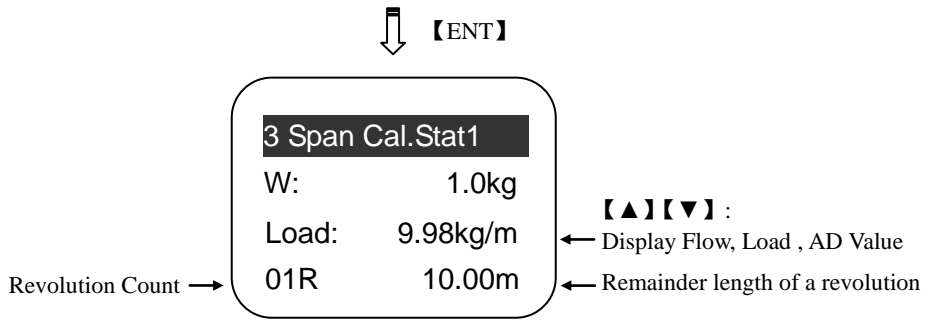【MENU】+【▲】【▼】: F2 Calibration
M   ⇩   【ENT】+【▲】【▼】: 4 Span Cal.Stat2
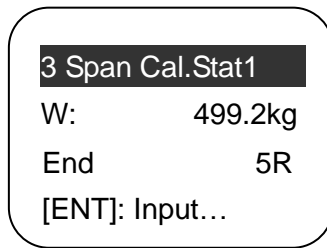【ENT】

P110 Cal. Revs

0**5**[R]

R: 1-99
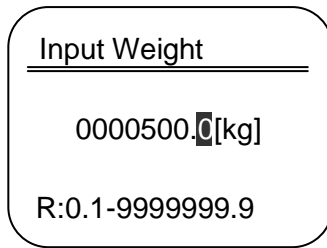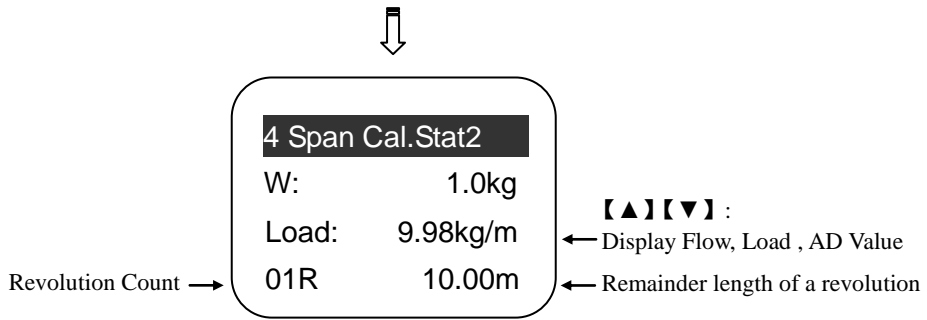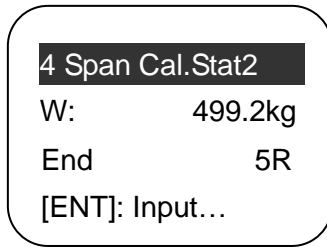
⇩ 【ENT】

P112 HangWeight

0010.**0**[kg]

R: 0.1-1000.0

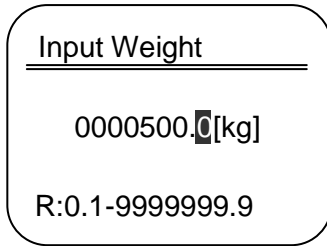⇩ 【ENT】

P113 WeighLength

01.00**0** [m]

R: 0.001-50.000

⇩ 【ENT】

```
                        ⇩

        ┌─────────────────────────┐
        │ ▌4 Span Cal.Stat2       │
        │  W:            1.0kg     │        【▲】【▼】:
        │                         │  ←─ Display Flow, Load , AD Value
        │  Load:      9.98kg/m     │
Revolution Count ──→ 01R    10.00m  │  ←─ Remainder length of a revolution
        └─────────────────────────┘

                        ⇩   After running Calibration Revolutions:

        ┌─────────────────────────┐
        │ ▌4 Span Cal.Stat2       │
        │  W:          499.2kg     │
        │                         │
        │  End            5R       │
        │  [ENT]: Input…           │
        └─────────────────────────┘

                        ⇩   【ENT】

        ┌─────────────────────────┐
        │  Input Weight            │
        │  ─────────────           │
        │                         │
        │    0000500.0[kg]         │      Input Calibrating Weight = Cal. Rev.s ×Belt
        │                         │      Length ×Chain Weight / Weigh Length
        │  R:0.1-9999999.9         │
        └─────────────────────────┘

                        ⇩   【ENT】

        ┌─────────────────────────┐
        │ ▌4 Span Cal.Stat2       │
        │  OldSpan:    200000      │
        │                         │
        │  NewSpan:    200320      │
        │                         │
        │  E%:          -0.16%     │
        └─────────────────────────┘

【MENU】: Exit ⇩ 【ENT】: Save

                        Ⓜ
```
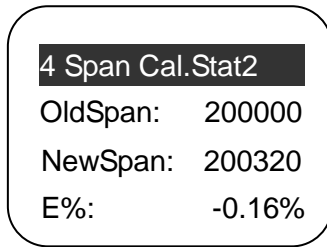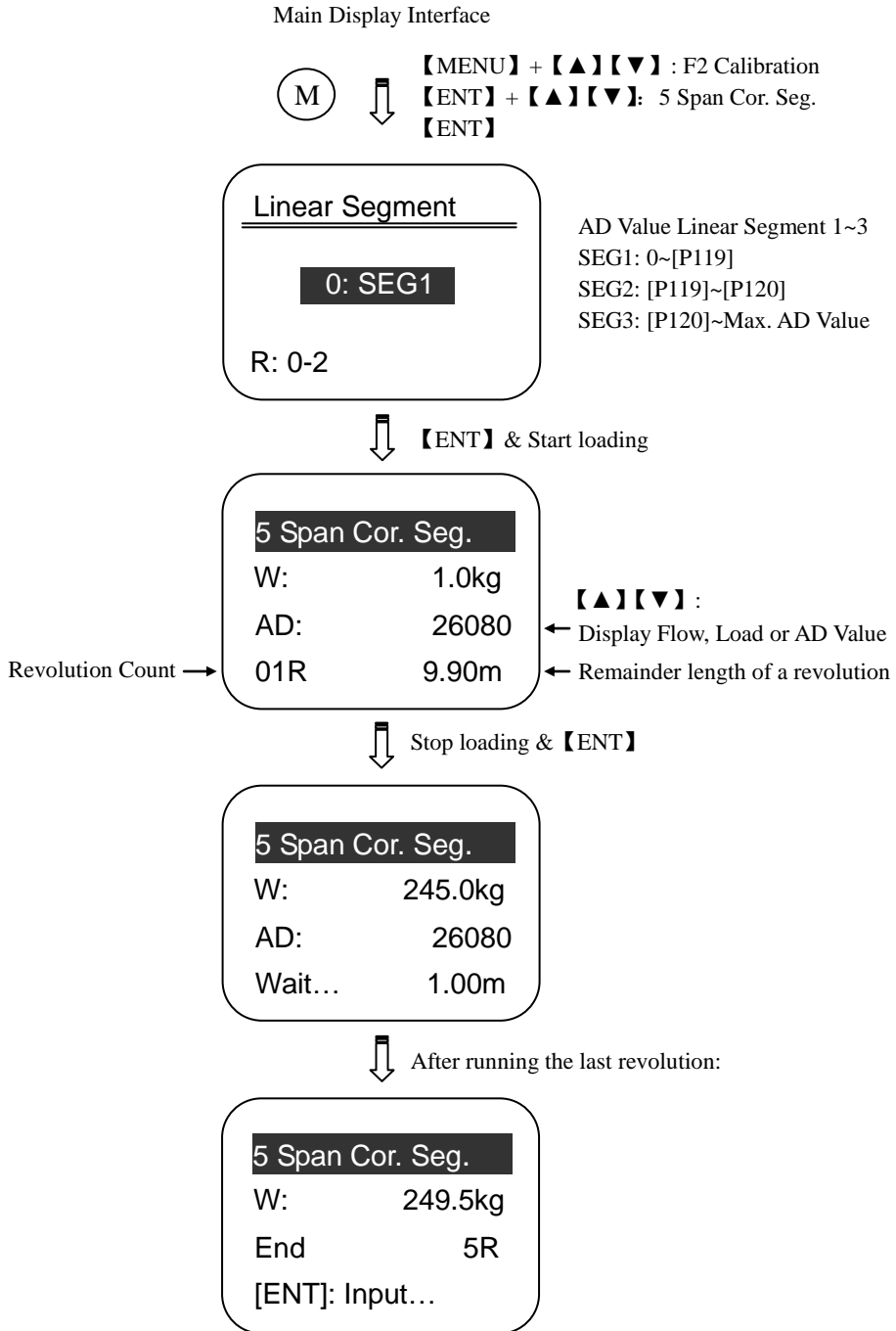
6.4.5 Segmenting Span Correction

After doing Dynamic or Static Span Calibration, further corrections for 3 [AD Value: 0~60000] linear segments are optional for correcting Correction Coefficient 1~3.

Main Display Interface

⧇ M ⇩ 【MENU】 + 【▲】【▼】 : F2 Calibration
       【ENT】 + 【▲】【▼】: 5 Span Cor. Seg.
       【ENT】

```
┌──────────────────────────┐
│  Linear Segment          │
│  ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾        │
│                          │
│     ▐ 0: SEG1 ▌          │
│                          │
│  R: 0-2                  │
└──────────────────────────┘
```

AD Value Linear Segment 1~3
SEG1: 0~[P119]
SEG2: [P119]~[P120]
SEG3: [P120]~Max. AD Value

⇩ 【ENT】 & Start loading

```
┌──────────────────────────┐
│ ▐5 Span Cor. Seg.▌       │
│  W:           1.0kg      │
│  AD:          26080      │
│  01R          9.90m      │
└──────────────────────────┘
```

Revolution Count →

【▲】【▼】 :
← Display Flow, Load or AD Value
← Remainder length of a revolution

⇩ Stop loading & 【ENT】

```
┌──────────────────────────┐
│ ▐5 Span Cor. Seg.▌       │
│  W:         245.0kg      │
│  AD:          26080      │
│  Wait…        1.00m      │
└──────────────────────────┘
```

⇩ After running the last revolution:

```
┌──────────────────────────┐
│ ▐5 Span Cor. Seg.▌       │
│  W:         249.5kg      │
│  End            5R       │
│  [ENT]: Input…           │
└──────────────────────────┘
```

【ENT】

 Input Weight

   000250.0[kg]

R: 0.1-9999999.9

【ENT】

5 Span Cor. Seg.
Old COR1:   1.000
New COR1:   1.002
E%:   -0.20%

[P121]/[P122]/[P123] Span Correction
Coefficient: 0.500~2.000

【MENU】: Exit 【ENT】: Save

M

6.4.6 Speed Calibration

Keep the belt weigher running at a constant speed. After the belt running time of a revolution being measured by stopwatch, do this operation for correcting Speed Coefficient.

Main Display Interface

【MENU】 + 【▲】【▼】 : F2 Calibration
（M）　⇓　【ENT】 + 【▲】【▼】 : 6 Speed Cal.
　　　　　【ENT】

Run-timer

0028.0 [s]

R: 1.0-9999.9

⇓ 【ENT】

P102 Belt Length

0010.00 [m]

R: 0.01-5000.00

⇓ 【ENT】

6 Speed Cal.

Pulse:　　　　35　　　　Pulse Count

Length:　　10.00m　　Belt Length Set value

Timer:　　　27.0s

⇓ Run-timer over

6 Speed Cal.

Old:　　　100.0pl/m　　[P103]: Speed Coefficient [pulse/m]

New:　　　100.0pl/m

Pulse:　　　　980

【MENU】 : Exit ⇓ 【ENT】 : Save

（M）

6.4.7 Belt Length Calibration

Keep the belt weigher running at a constant speed. After the belt running time of a revolution being measured by stopwatch, do this operation for correcting Belt Length.

Main Display Interface

M

【MENU】+【▲】【▼】: F2 Calibration
【ENT】+【▲】【▼】: 7 Length Cal.
【ENT】

```
Run-timer

      0028.0 [s]

R: 1.0-9999.9
```

【ENT】

```
7 Length Cal.
Length:       0.35m
Pulse:           35
Timer:         27.0s
```

Run-timer over or 【ENT】

```
7 Length Cal.
Old LEN:    10.00m
New LEN:     9.80m
Pulse:          980
```
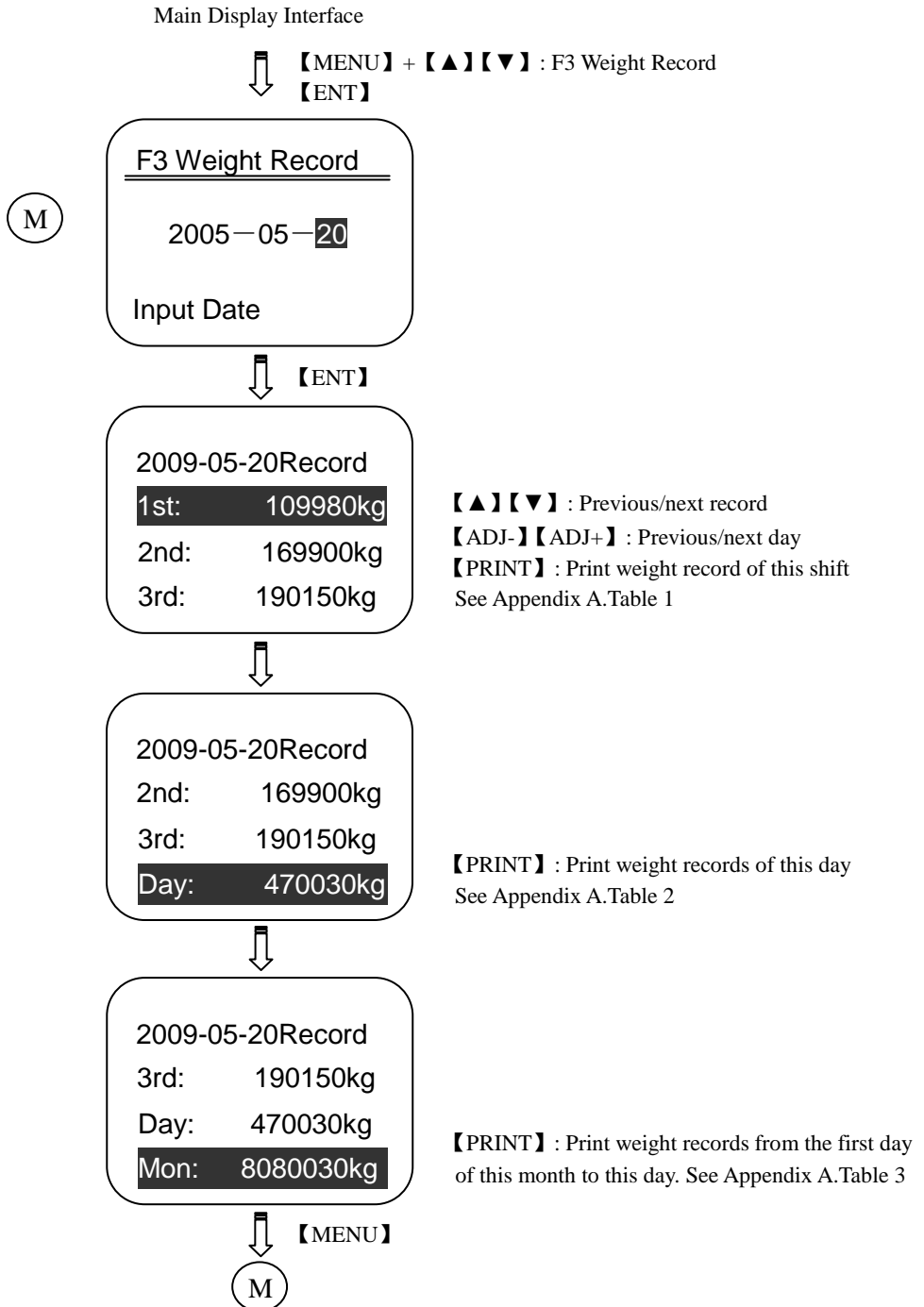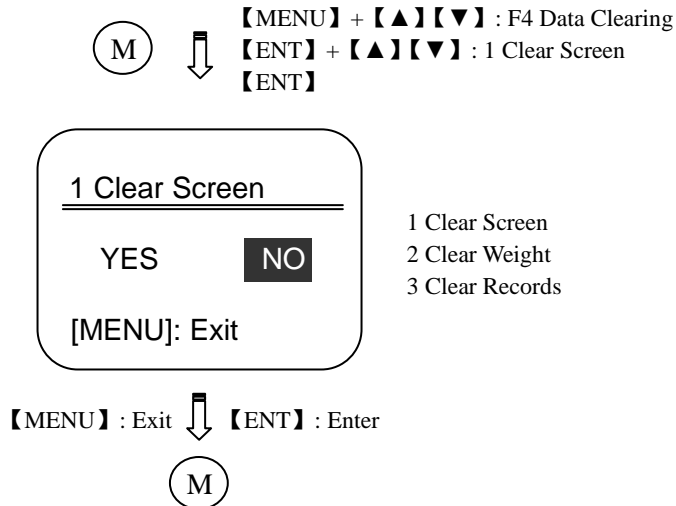
[P102]: Belt Length [m]

【MENU】: Exit   【ENT】: Save

M

6.5 F3 Weight Record for Querying&Printing

Weight records per shift/day/month of a year can be queried and printed.

Main Display Interface

【MENU】+【▲】【▼】: F3 Weight Record
【ENT】

F3 Weight Record

2005－05－20

Input Date

M

【ENT】

2009-05-20Record
1st: 109980kg
2nd: 169900kg
3rd: 190150kg

【▲】【▼】: Previous/next record
【ADJ-】【ADJ+】: Previous/next day
【PRINT】: Print weight record of this shift
See Appendix A.Table 1

2009-05-20Record
2nd: 169900kg
3rd: 190150kg
Day: 470030kg

【PRINT】: Print weight records of this day
See Appendix A.Table 2

2009-05-20Record
3rd: 190150kg
Day: 470030kg
Mon: 8080030kg

【PRINT】: Print weight records from the first day
of this month to this day. See Appendix A.Table 3

【MENU】

M

6.6 F4 Data Clearing

Main Display Interface

【MENU】+【▲】【▼】: F4 Data Clearing
【ENT】+【▲】【▼】: 1 Clear Screen
【ENT】

M ⇩

```
┌─────────────────────────────┐
│  1 Clear Screen             │
│  ─────────────────          │
│                             │
│    YES        [ NO ]        │
│                             │
│  [MENU]: Exit               │
└─────────────────────────────┘
```

1 Clear Screen
2 Clear Weight
3 Clear Records

【MENU】: Exit ⇩ 【ENT】: Enter

M

Data Clearing Mode Description:

- Manual Clearing Mode

  ◇ 1 Clear Screen: Clear Totalized Weight and Totalized Weight Pulse Count. But Totalized Weight of Current Shift will not be cleared, so this operation has no effect on recording of weight per shift.

  ◇ 2 Clear Weight: Clear Totalized Weight, Totalized Weight Pulse Count and Totalized Weight of Current Shift. The cleared value of Totalized Weight of Current Shift will not be recorded.

  ◇ 3 Clear Records: Clear History Records of Totalized Weight. But Current Totalized Weight, Totalized Weight Pulse Count and Totalized Weight of Current Shift will not be cleared.

- Timing Auto Clearing Mode

  ◇ The parameter '[P606] Auto-clear' can be set to '0: OFF / 1: Per Shift / 2: Per Day / 3: Per Month', and its default value is '0: OFF'.

  ◇ 'Timing Auto Clearing' has no effect on recording of weight per shift.

  ◇ [P606]='1: Per Shift': After recording Totalized Weight per Shift, do operation 'Clear Screen' automatically.

  ◇ [P606]='2: Per Day': After recording Totalized Weight of the last Shift per Day, do operation 'Clear Screen' automatically.

  ◇ [P606]='3: Per Month': After recording Totalized Weight of the last Shift per Month, do operation 'Clear Screen' automatically.

- Auto Clearing Before Overflowing Mode

  ◇ When Totalized Weight value reaches to the maximum value 2×10^9[Scale Unit], do operation 'Clear Screen' automatically.

  ◇ 'Auto-clear Before Overflowing' has no effect on recording of weight per shift.
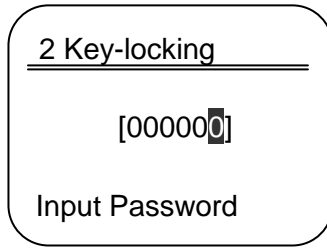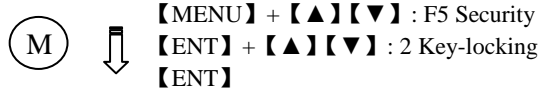
6.7 F5 Security

6.7.1 Auto-locking
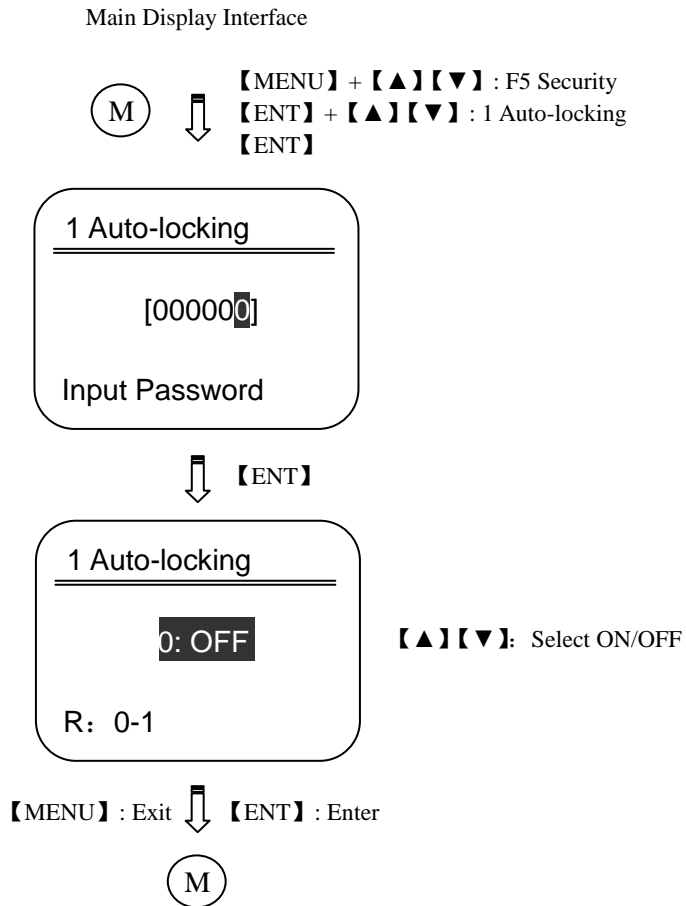
Main Display Interface

【M】

【MENU】+【▲】【▼】: F5 Security
【ENT】+【▲】【▼】: 1 Auto-locking
【ENT】

```
1 Auto-locking
───────────────
     [000000]

Input Password
```

【ENT】

```
1 Auto-locking
───────────────
        0: OFF

R：0-1
```
【▲】【▼】：Select ON/OFF

【MENU】: Exit   【ENT】: Enter

【M】

Auto-locking: If there is not any keypad operation in one minute 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.

6.7.2 Key-locking

Main Display Interface

【MENU】 + 【▲】【▼】 : F5 Security
(M) ⬇ 【ENT】 + 【▲】【▼】 : 2 Key-locking
【ENT】

2 Key-locking
_____

[00000**0**]

Input Password

【MENU】 : Exit ⬇ 【ENT】 : Enter

(M)

6.7.3 Key-unlocking

Main Display Interface

【MENU】 + 【▲】【▼】 : F5 Security
(M) ⬇ 【ENT】 + 【▲】【▼】 : 3 Key-unlocking
【ENT】

3 Key-unlocking
_____

[00000**0**]

Input Password

【MENU】 : Exit ⬇ 【ENT】 : Enter

(M)
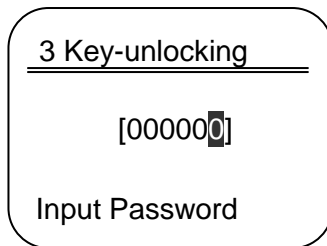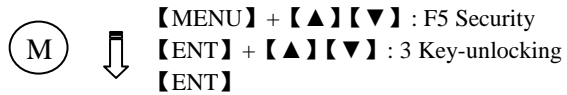
6.7.4 Password Set

Main Display Interface

【M】 ⇩ 【MENU】+【▲】【▼】: F5 Security
　　　　【ENT】+【▲】【▼】: 4 Password Set
　　　　【ENT】

```
4 Password Set
──────────────

     [00000 0 ]


Old Password
```

⇩ 【ENT】

```
4 Password Set
──────────────

     [00000 0 ]


New Password
```

Please remember it.

【MENU】: Exit ⇩ 【ENT】: Save

（M）

6.7.5 RAM Reset

Main Display Interface

(M) ⇩ 【MENU】+【▲】【▼】: F5 Security
【ENT】+【▲】【▼】: 5 RAM Reset
【ENT】

```
5 RAM Reset

   YES      NO

[MENU]: Exit
```

【MENU】: Exit ⇩ 【ENT】: Enter

(M)
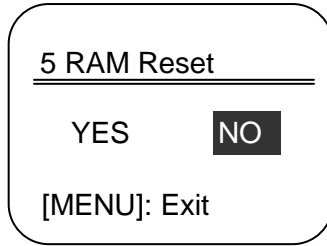
7. Ration Flow Auto-Feeding System

Feeder

Loadcell

Belt Weigher   Speed Sensor

Summing Box

Weighing Signal

Speed Signal

Frequency Convertor
& Relays

DI/DO/AO: Definable.
AO3: If you need it, inform us in your order.

AO.Corntrol Current

AO.Corntrol Current   COM

DO.Feeder Control   DI. System Ready   Diverter Switch

Controller   DI. Start

DO.Belt Weigher Control   DI. Stop

DO.Alarm

Reset Button

PLC/IPC   AO.Flow

IPC/ PLC

AI.Flow Setpoint

RS485/RS232/RS422/Profibus-DP/Ethernet

Appendix A. Print Formats

Print Format A:

☐ Table 1. Weight Record For A Shift (SW)

```
WEIGHT RECORD
-------------------------
DATE:    2009-05-20
NAME:         SW
TW:      109980kg


-------------------------
2009-05-20   23:59
```

☐ Table 2. Weight Record For A Day (DW)

```
WEIGHT RECORD
-------------------------
DATE:    2009-05-20
NAME:         1W
TW:      109980kg


DATE:    2009-05-20
NAME:         2W
TW:      169900kg


DATE:    2009-05-20
NAME:         3W
TW:      190150kg


DATE:    2009-05-20
NAME:         DW
TW:      470030kg


-------------------------
2009-05-20   23:59
```

☐ Table 3. Weight Record For A Month (MW)

```
WEIGHT RECORD
-------------------------
DATE:    2009-05-01
NAME:         DW
TW:      387090kg


DATE:    2009-05-02
NAME:         DW
TW:      568800kg


 ° ° °              ° ° °


DATE:    2009-05-20
NAME:         DW
TW:      470030kg


DATE:    2009-05-20
NAME:         MW
TW:      8080030kg


-------------------------
2009-05-20   23:59
```

Print Format B:

☐   Table 1. Weight Record For A Shift (SW)

WEIGHT RECORD

```
--------------------------------------------------
DATE          NAME          WEIGHT
2009-05-20    SW            109980kg
--------------------------------------------------
2009-05-20    23:59
```
`

☐   Table 2. Weight Record For A Day (DW)

WEIGHT RECORD

```
--------------------------------------------------
DATE          NAME          WEIGHT
2009-05-20    1W            109980kg
2009-05-20    2W            169900kg
2009-05-20    3W            190150kg
2009-05-20    DW            470030kg
--------------------------------------------------
2009-05-20    23:59
```

☐   Table 3. Weight Record For A Month (MW)

WEIGHT RECORD

```
--------------------------------------------------
DATE          NAME          WEIGHT
2009-05-01    DW            387090kg
2009-05-02    DW            568800kg
2009-05-03    DW            190150kg
° ° °         ° ° °         ° ° °
2009-05-20    DW            470030kg
2009-05-20    MW            8080030kg
--------------------------------------------------
2009-05-20    23:59
```

Appendix B. Communication Protocols

If you need the communication protocols, please contact us.

PA 2006F108-43   C E CPC16/042377

Changsha Supmeter Technological Co., Ltd.

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