P2-A Weighing Indicator
Instruction Manual

CONTENTS

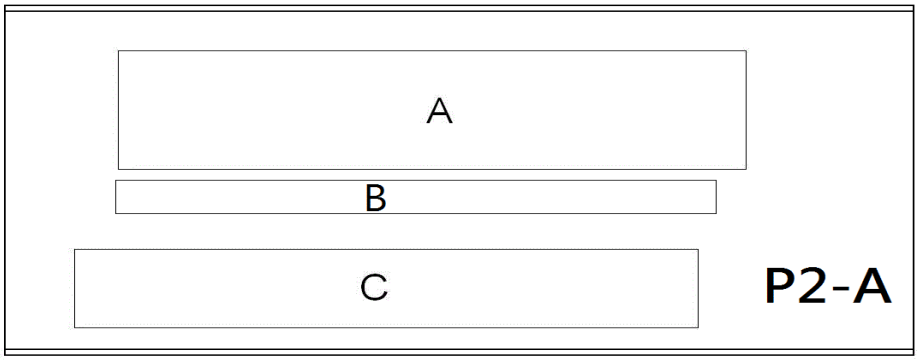
CHAPTER 1 SPECIFICATIONS

1-1 FEATURES

- **POWER SUPPLY UNIT**
  - Voltage Range：85 ~ 264 VAC
  - Frequency Range：47 ~ 440 Hz
  - Power Consumption：< 5W
- **A/D CONVERTER UNIT**
  - Input sensitivity ： ≧ 0.12 uV/d
  - Measurement Voltage： ± 38 mV
  - Load Cell Excitation： DC5V (up to eight 350Ω load cells)
  - Internal resolution：1 / 1,000,000
  - Max sampling speed：120 times / sec
- **DIGITAL UNIT**
  - 6 digits,10mm high,bright red LED 7 segment display. Switchable between net weight and gross weight.
  - Operational Keys：SET、ZERO、TARE、Fn、ENTER
- **WEIGHING CONTROL UNIT**
  - Eight weighing mode , Include batch weighing mode and check weighing mode.
  - The setpoint refers to a weight setting can be set from the key switches、RS232/RS485 interface or through a 8-digit thumbwheel switch (OP3).
- **COMMUNICATION UNIT (Build-in / OP1)**
  - RS232 or RS485（2wire）
  - Baudrate：2400 bps ～ 115200 bps
  - 2.5 kV fully isolated (power and data)
  - ESD Protection：±15KV(air)、±8KV(contact)
- **OPTIONS UNIT**
  - OP1-R2 RS232
  - OP1-R4 RS485（2wire）
  - OP2 Analog output（Current / Voltage output）
  - OP3 External Input / Output（5I / 8O）
  - OP4 External Input / Output & Setpoint Input（7I / 8O / 12D）
  - OP5 Parallel BCD Output

- **Standards and Certifications**
  - Emission
    EN61326-1 Class A、EN 55011 Class A、EN61000-3-2、EN61000-3-3
  - Immunity
    EN61326-1、EN61000-4-2、EN61000-4-3、EN61000-4-4、
    EN61000-4-5、
    EN61000-4-6、EN61000-4-8、EN61000-4-11

1-2 FRONT PANEL



- Ａ **MAIN DISPLAY SECTION**

  A 6-digit , 0.4”High 7-segment display. Displays the gross, net weight, etc.

- Ｂ **STATUS DISPLAY SECTION**

  ZERO Indication when the gross is located at the center of the zero point (center zero).
  STABLE Indication when the weight value is stable.
  GROSS The displayed weight is the gross weight.
  NET The displayed weight is the net weight.

- Ｃ **KEY SWITCHES**

  The key used for zeroing. While inputting a number, pressing this key will increase the number of the blinking digit by one.

  The key used to subtract the tare. While inputting a number, pressing this key decreases the number of the blinking digit by one.

  The capability of this key can be changed depending on

the application. The following capabilities can be selected using the **2.Fn 2** functions.

0	No capability	1	Gross/Net weight switch
2	Print command for manual print	3	Clear tare
4	Clear to zero	5	Batch Start
6	Emergency Stop	7	Discharge Start
8	Hold / Hold release		

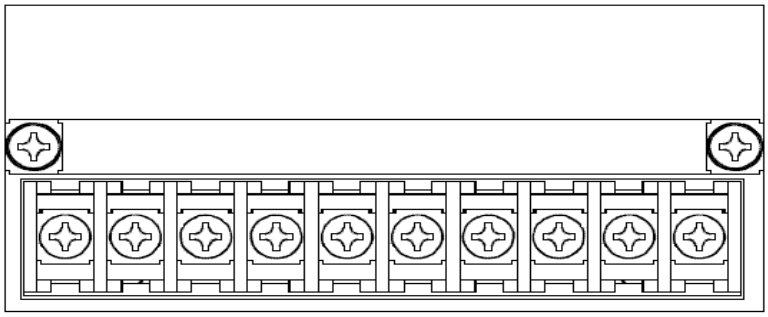
While inputting a number, this key is used to shift the blinking digit to the right.

While inputting a number, pressing this key confirms that number.

If this key is pressed together with the 

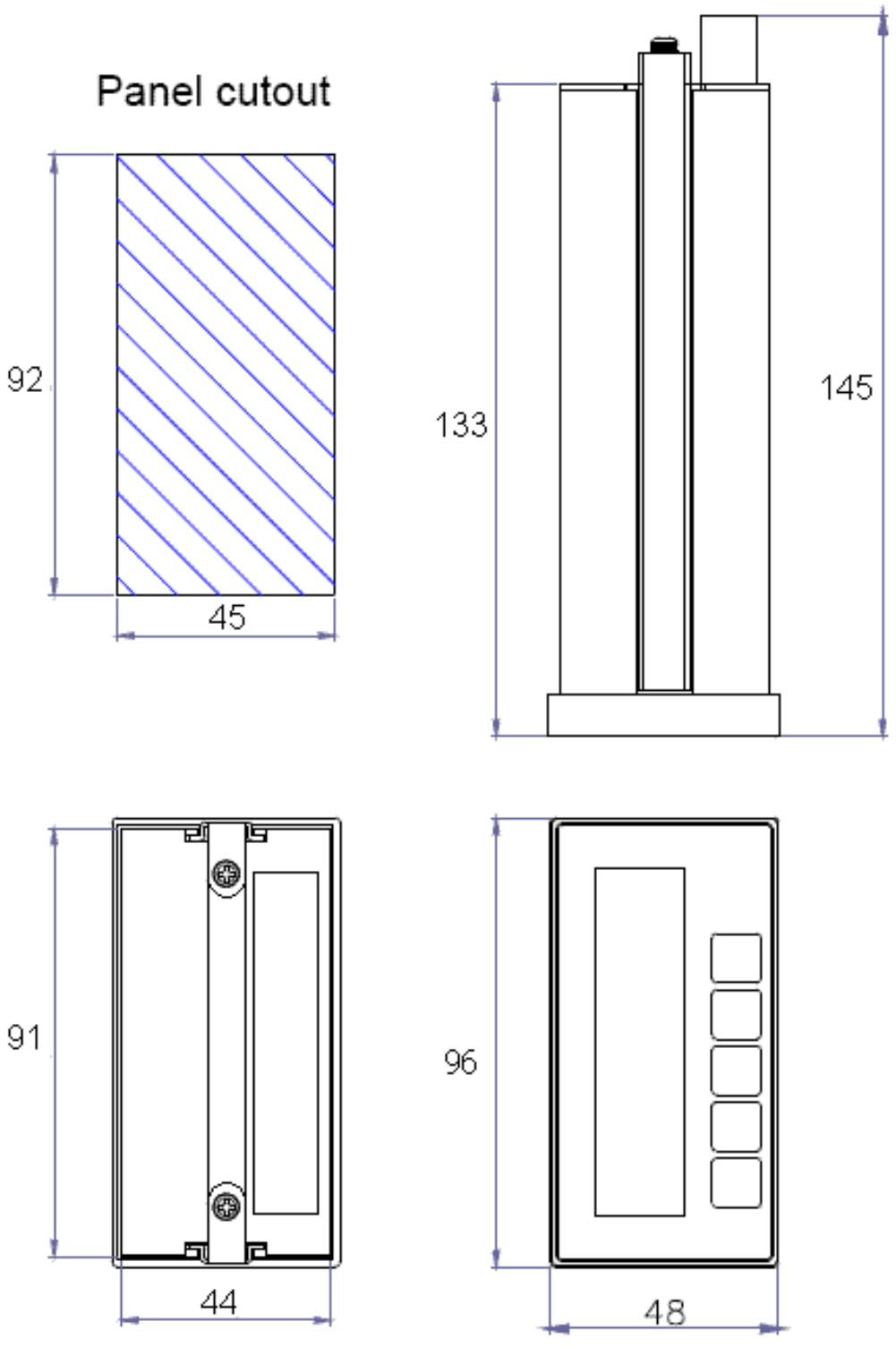
key, you will set a setpoint. While inputting a number, this key serves as the Escape key.

1-3 REAR PANEL



1. Power source AC / L
2. Power source AC / N
3. FG
4. RS232 / RS485 signal ground
5. RS232 RxD / RS485 D－
6. RS232 TxD / RS485 D＋
7. EXC＋ / Load cell excitation voltage (＋)
8. EXC－ / Load cell excitation voltage (－)
9. S＋ / Load cell input (＋)
10. S－ / Load cell input (－)

1-4 DIMENSIONS



CHAPTER 2 OPERATION

2-1 OPERATION MODE

MODE	STEP	DISPLAY	DESCRIPTION
General Calibration	In weighing mode [ENTER] key and [Fn] key are pressed together.	0.CAL 1	3-3
Linearity Calibration		0.CAL 2	3-4
Digital Calibration		0.CAL 3	3-5
Other Function setting		1.CFn 1 : 9.PFn 1	2-2 APPENDIX A
Weighing Mode Setpoint Setting	In weighing mode [ENTER] key and [SET] key are pressed together.	1. tGEt or 1. hiHi or 1. hi	2-3
All data initialization	During power on and display down count, [ZERO] key and [ENTER] key are pressed together.	1. iALL	5-1
function initialization		2. iFnC	
Setpoint initialization		3. CLr5	
Clear zero compensation value, tare value.		4. CLrb	
Self-test	During power on and display down count, [SET] key and [ENTER] key are pressed together.	1 d5P : 11 Con	5-2
firmware Version	During power on and display down count, press [ENTER] key.	P2A 1.0	

2-2 FUNCTION

In normal weighing mode

1. With the ENTER key pressed and held, press the Fn key. “0.CAL” is displayed to inform you that the indicator is entering the function mode.
2. When you did not want to enter the function mode, press the SET key. The indicator will return to the normal mode.
3. Select the target function group, using the Fn key. Select the function number , using the ZERO or TARE keys. After selecting press the ENTER key.

DISPLAY	FUNCTION GROUP
0.CAL	**Weighing Calibration**
1.CFn	**CALIBRATION RELATED FUNCTIONS**
2.Fn	**BASIC FUNCTIONS**
3.uF1	**Build-in RS232 / RS485 FUNCTIONS**
4.uF2	**OP1 RS232 / RS485 FUNCTIONS**
5.AF1	**OP2-1 ANALOG OUTPUT FUNCTIONS**
6.AF2	**OP2-2 ANALOG OUTPUT FUNCTIONS**
7.iFn	**OP3、OP4 EXTERNAL I/O INPUT FUNCTIONS**
8.oFn	**OP3、OP4 EXTERNAL I/O OUTPUT FUNCTIONS**
9.PFn	**WEIGHING SEQUENCE FUNCTIONS**
A.bFn	**OP5 BCD OUTPUT FUNCTIONS**

4. Using the Fn , ZERO and TARE keys to set the parameter. After setting press the ENTER key to confirm or SET key to give up.

5. You will be asked to enter the password before entering the setup menu, if you used password function. (2.Fn 8)

2-3 SETTING A SETPOINT

The setpoint refers to a weight setting such as a target weight required for a weighing sequence. Do"OP3 Ext. I/O" installing before turning on the power , and setting **2.Fn 5** or **2.Fn 6** to 3 or 4 .

The following three methods are available for setting the setpoint:

1. Setting with the key switches (Thumbwheel switch not required)
2. Setting with a 8-digit thumbwheel switch (See 5-3-3)
3. Setting with the RS-232 / RS-485 (See 5-1-4)

If setting with the key switches

1. With the ENTER key pressed and held, press the SET key in normal mode. "1 tGEt" or "1 hihi" is displayed to inform you that the indicator is entering the setpoint mode.
2. Using the Fn , ZERO and TARE keys to select setpoint item and write data.
3. After setting press the ENTER key to confirm or SET key to give up.

2-3-1 BATCH WEIGHING MODE

DISPLAY	SETPOINT NAME
1 tGEt	Target weight
2 SP1	Full-Flow／Full(Hopper Full)
3 SP2	Medium-Flow
4 SP3	Dribble-Flow
5 undr	Under Limit
6 oUEr	Over Limit
7 Zbnd	Zero Band

2-3-2 CHECK WEIGHING MODE

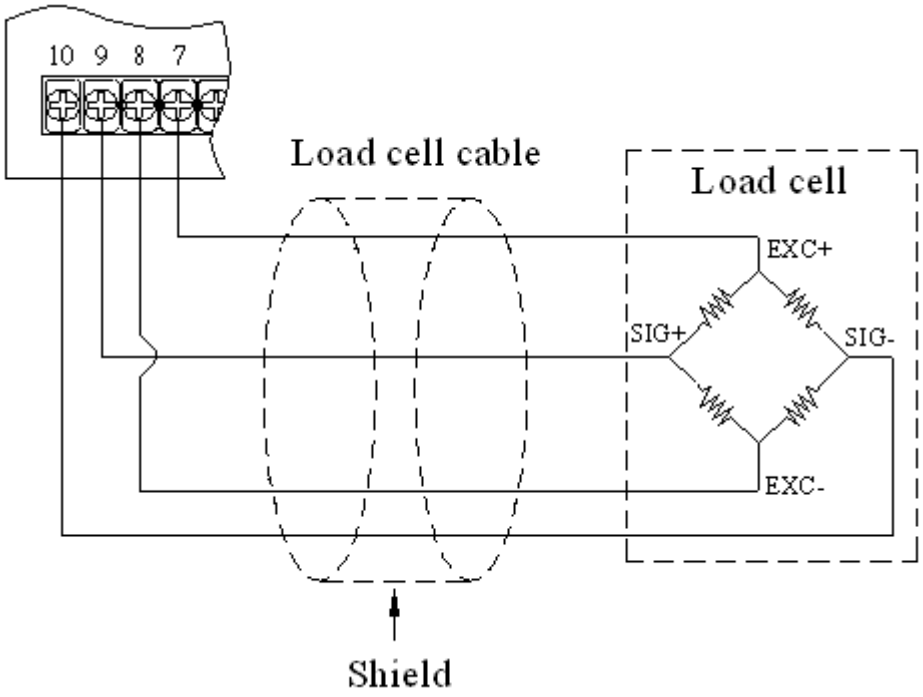
DISPLAY	SETPOINT NAME
1 hihi	Hi-Hi
2 hi	Hi
3 oK	OK
4 Lo	Lo
5 LoLo	Lo-Lo
6 Zbnd	Zero Band

2-3-3 HOLD MODE

DISPLAY	SETPOINT NAME
1. hi	Hi
2. oK	OK
3. Lo	Lo
4. PEAK	Peak Ready
5. -bnd	Zero Band

CHAPTER 3 CALIBRATION

3-1 Load cell connection



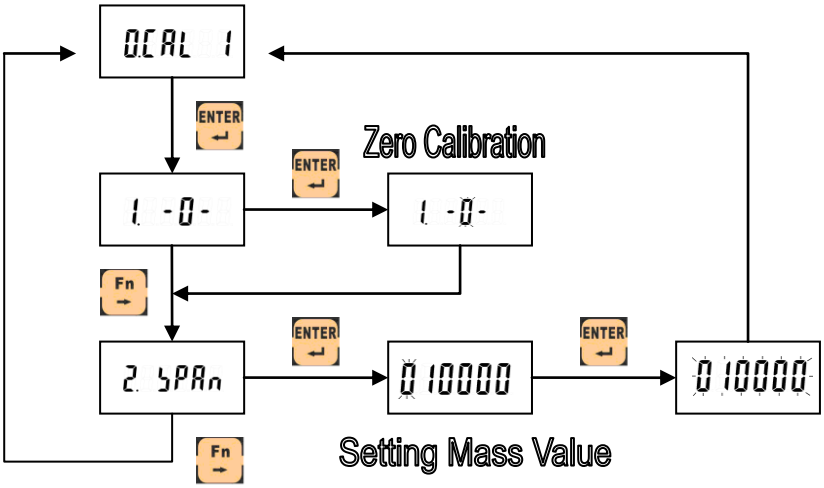
3-2 Calibration Mode

Do load cell wiring before turning on the power. With the ENTER key pressed and held , press the Fn key .“0.CAL” is displayed to inform you that the indicator is entering the function mode.

Using the ZERO and TARE keys to select calibration item.

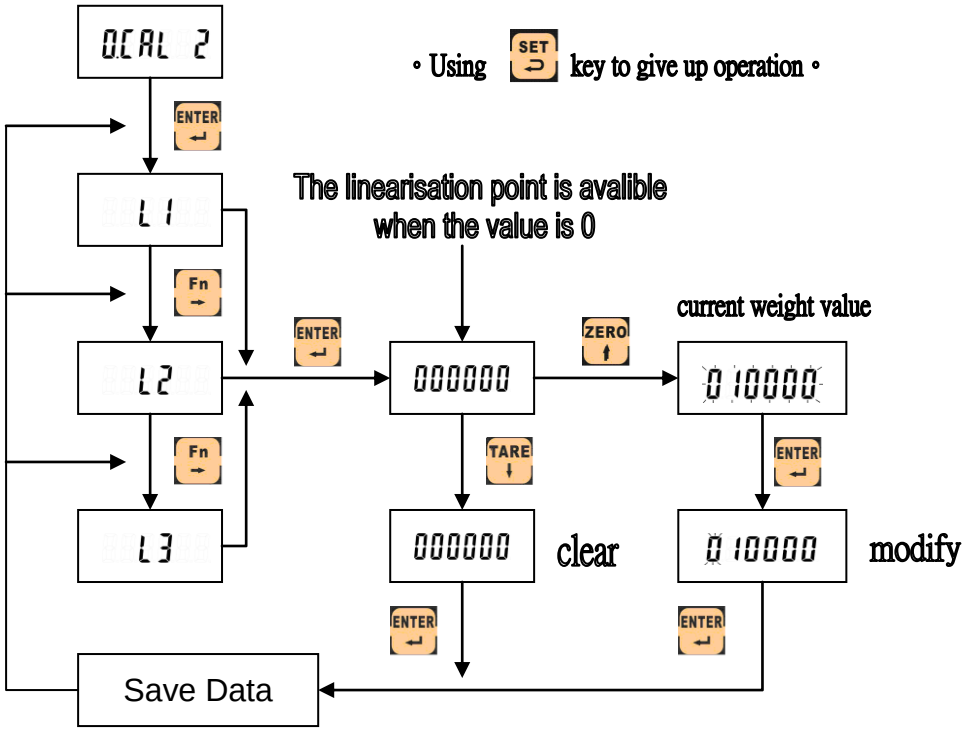
MODE	DISPLAY	FUNCTION
0.CAL 1 Actual load calibration (using a Mass)	1. -0-	Zero Calibration
	2. SPAn	Span Calibration
0.CAL 2 Linearity Calibration (using a Mass)	L1	1st linearization point
	L2	2nd linearization point
	L3	3rd linearization point
0.CAL 3 Digital Calibration (Without a Mass)	1. -0-	Zero Calibration
	2. SPAn	Span Voltage (mV/V)
	3. CAP	Span weight Capacity

3-3 Actual load calibration (Using a Mass)

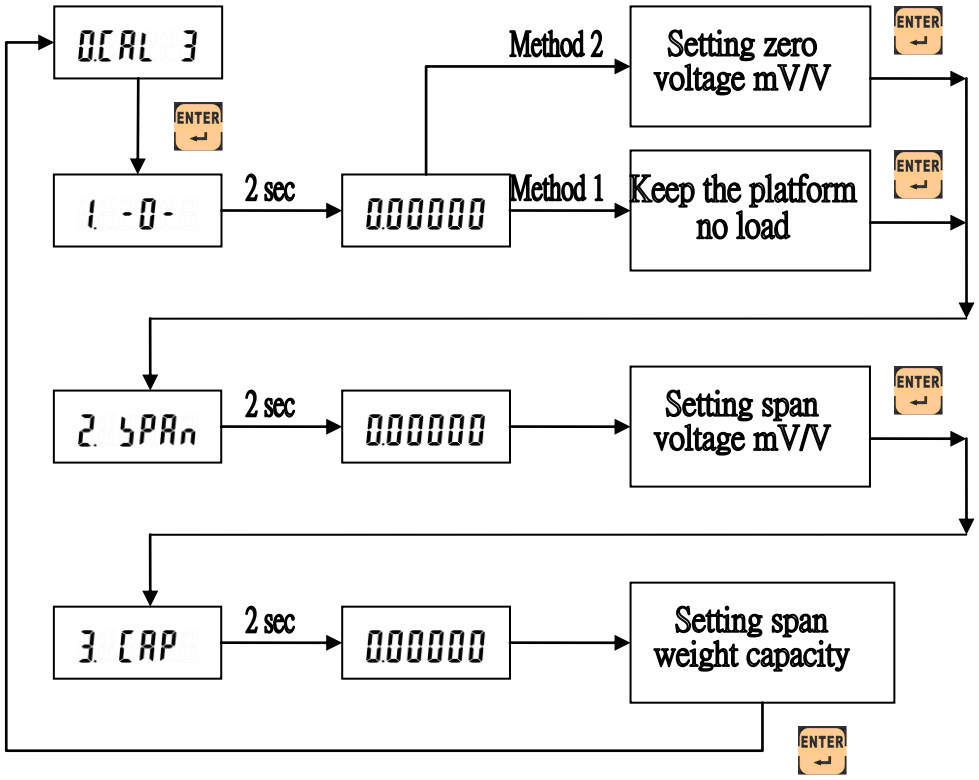


3-4Linearity Calibration

Please complete the Actual load calibration before use Linearity calibration.



3-5 Digital Calibration (Without a Mass)



3-6 Modbus Calibration

1. confirm the function parameters：**2.CFn 12 = 1**
2. Ensuring **Minimum Division** (41001~2) and **Calibration weigh** (41003~4) correct。
3. Zero calibration. With no weight placed on the system and then set the **Zero calibration** bit switch (01014) after the **Weight Stable** (00002) mark is turned on. Wait about one second to the next step.
4. Span calibration. Place the **Calibration weigh** (41003~4) on the system and then set the **Span calibration** bit switch (01015) after the **Weight Stable** (00002) mark is turned on. Wait about one second to the next step.
5. If the process is correct, and then set **save calibration value** bit switch (01016).

3-7 Error Messages

1. Err 0	Load cell output voltage is out of measuring range
2. Err 1	**Calibration weigh** equivalent zero
3. Err 2	The calibration weight is less than the zero weight
4. Err 3	Sensitivity of the load cell is insufficient
5. Err 4	A/D Converter error
6. Err 5	linearization point confuse
7. Err 6	Span weight capacity value equivalent zero

CHAPTER 4 WEIGHING SEQUENCE

4-1 Weighing Mode

Weighing Mode (8.PFn 1)				Application
0	Normal batching	Batch Weighing Mode	Real-time compared (RT)	Hopper Scale
1	Loss-in-weight			
2	Normal batching		Built-in procedure (BIP)	
3	Loss-in-weight			
4	Check weighing 1	Check Weighing Mode	Real-time compared (RT)	Platform
5	Check weighing 2			
6	Check weighing 3			
7	Check weighing 4			
8	Normal Hold	Hold Mode	Built-in procedure	
9	Peak Hold			

4-2 WEIGHING SEQUENCE FUNCTIONS

PFn	Name	Default	Setting		
			Parameter	Description	Operation
1	Weighing Mode	0	0	Normal Batching (Real-time)	Batch Weighing Mode
			1	Loss-in-weight (Real-time)	
			2	Normal Batching (Built-in procedure)	
			3	Loss-in-weight (Built-in procedure)	
			4	Check weighing 1	Check Weighing Mode
			5	Check weighing 2	
			6	Check weighing 3	
			7	Check weighing 4	
			8	Normal hold	Hold Mode
			9	Peak hold	
2	Batch start wait timer	0.0	0.0 ~ 25.5 (sec)	(blank)	Batch weighing mode (BIP)
3	Auto TARE	0	0	Enable	
			1	Disable	

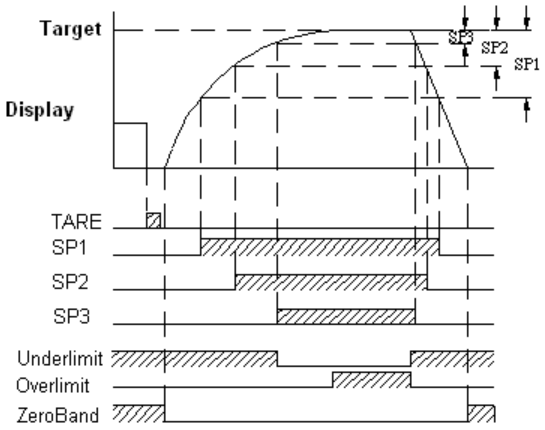
4	Full-flow Comparator Inhibiter timer	0.0	0.0 ~ 25.5 (sec)	(blank)	Normal batching (BIP)
5	Medium-flow Comparator Inhibiter timer	0.0	0.0 ~ 25.5 (sec)	(blank)	Batch weighing mode (BIP)
6	Dribble-flow comparator Inhibiter timer	0.0	0.0 ~ 25.5 (sec)	(blank)	
7	Maximum number of supplementary flow times	0	0 ~ 255	0 : Unused	Normal batching (BIP)
				Non-0 : Set times	
8	Supplementary flow open timer	0.1	0.0 ~ 25.5 (sec)	(blank)	
9	Supplementary flow close timer	0.5	0.0 ~ 25.5 (sec)	(blank)	
10	Judgment wait timer	0.1	0.0 ~ 25.5 (sec)	(blank)	Batch weighing (BIP)
11	Stability at judgment	1	0	Not required	
			1	Required	
12	Batch Finish complete output width	0.0	0.0 ~ 25.5 (sec)	0 : Until next Batch start	
				Non-0: Set time	
13	Discharging time monitor timer	0	0 ~ 255 (sec)	0 : Unused	Normal batching (BIP)
				Non-0: Set time	
14	Discharging start wait timer	0.0	0.0 ~ 25.5 (sec)	(blank)	
15	Discharging valve close wait timer	0.0	0.0 ~ 25.5 (sec)	(blank)	
16	Add the target to zero band setting	0	0	Disable	Loss-in-weight (BIP)
			1	Enable	
17	Add the target to full setting	0	0	Disable	
			1	Enable	

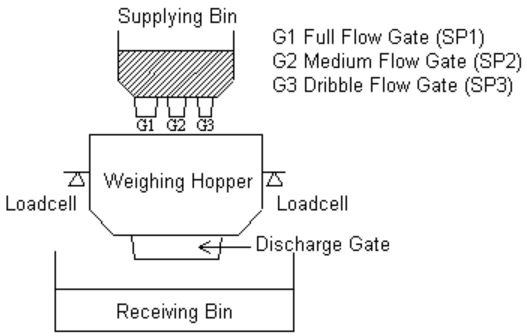
18	Under / Over operation	1	0	Real-time comparison	Batch weighing mode (BIP)
			1	Synchronized with Batch Finish Output	
19	OP4 Interface Setpoint operation	0	0	Unused	
			1	Enable	
20	Hold release operation	0	0	Press key or OP3 input	Hold Mode
			1	Timer(PFn-21)	
			2	Return to Zero Band	
			3	Peak Ready range	
21	Hold release timer	0.0	0.0 ~ 25.5 (sec)	(blank)	
22	Hold value comparator output timer	0	0 ~ 255 (sec)	(blank)	

4-3 Normal Batching (Real-time) (PFn 1 = 0)

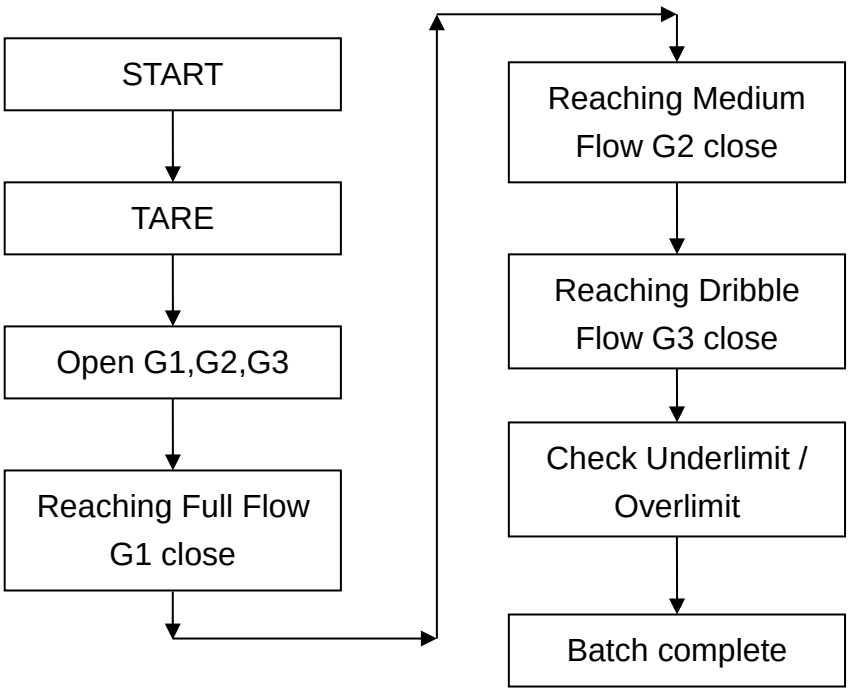
4-3-1 Output condition

Output Terminal	Output Condition
SP1 (Full flow)	Net ≧ Target − SP1
SP2 (Medium flow)	Net ≧ Target − SP2
SP3 (Dribble flow)	Net ≧ Target − SP3
Underlimit	Net < Target − Underlimit
Overlimit	Net > Target + Overlimit
Zero Band	Gross ≦ Zero Band





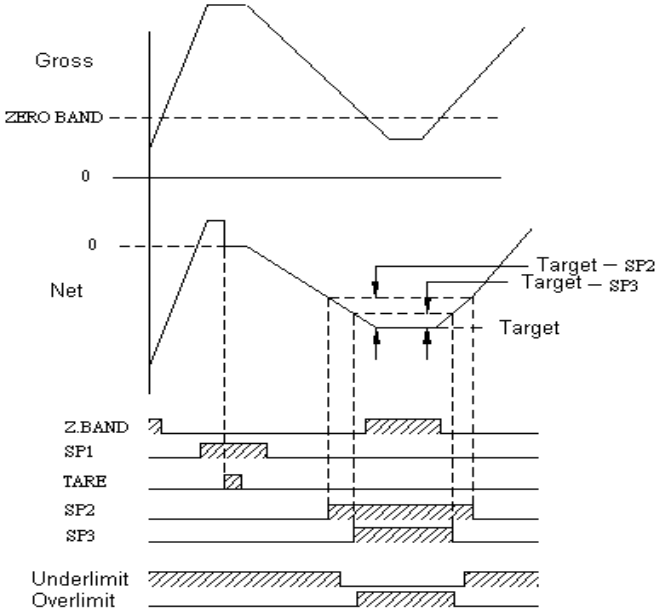
4-3-2 Flowchart

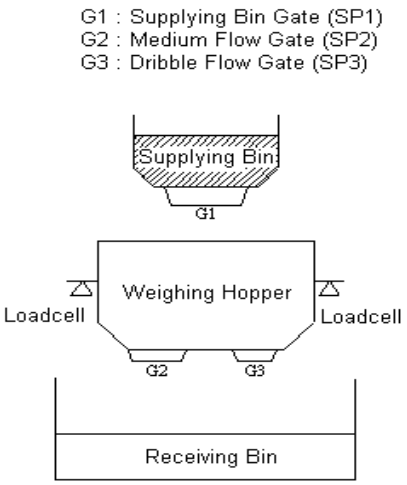


4-4 Loss-in-weight (Real-time) (PFn 1 = 1)

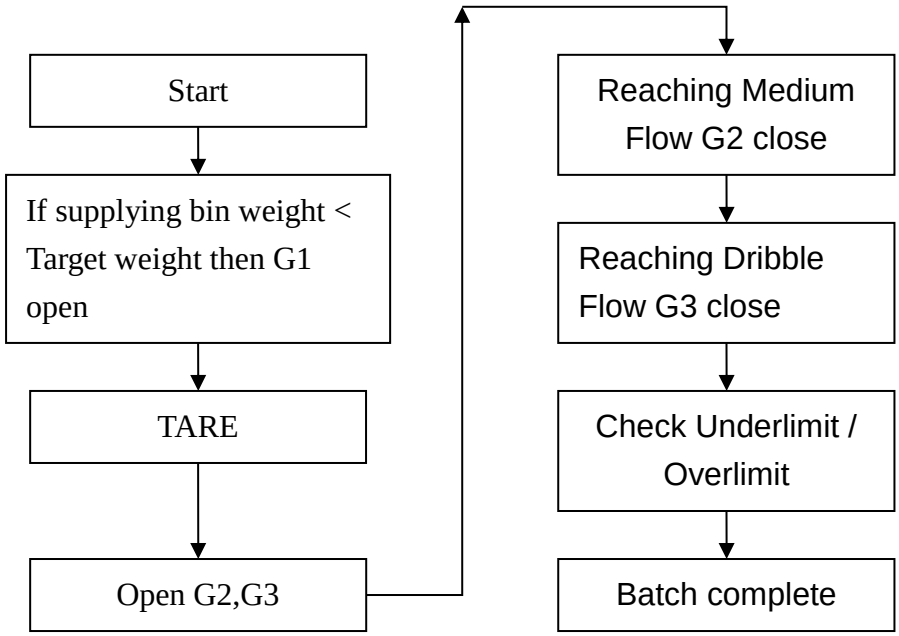
4-4-1 Output condition

Output Terminal	Output Condition
SP1 (Hopper Full)	Gross ≧ SP1
SP2 (Medium flow)	−Net ≧ Target − SP2
SP3 (Dribble flow)	−Net ≧ Target − SP3
Underlimit	−Net < Target − Underlimit
Overlimit	−Net > Target + Overlimit
Zero Band	Gross ≦ Zero Band





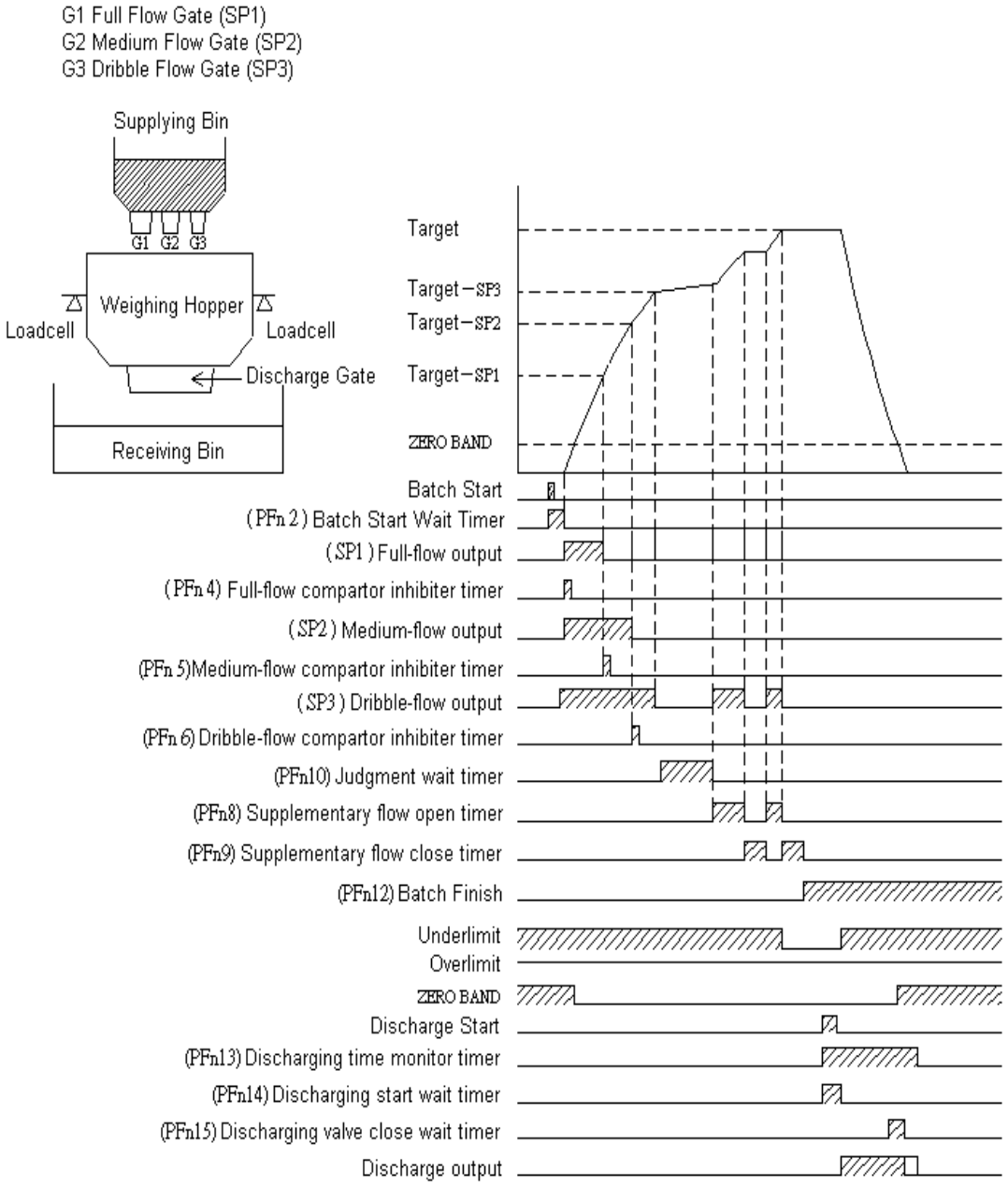
4-4-2 Flowchart



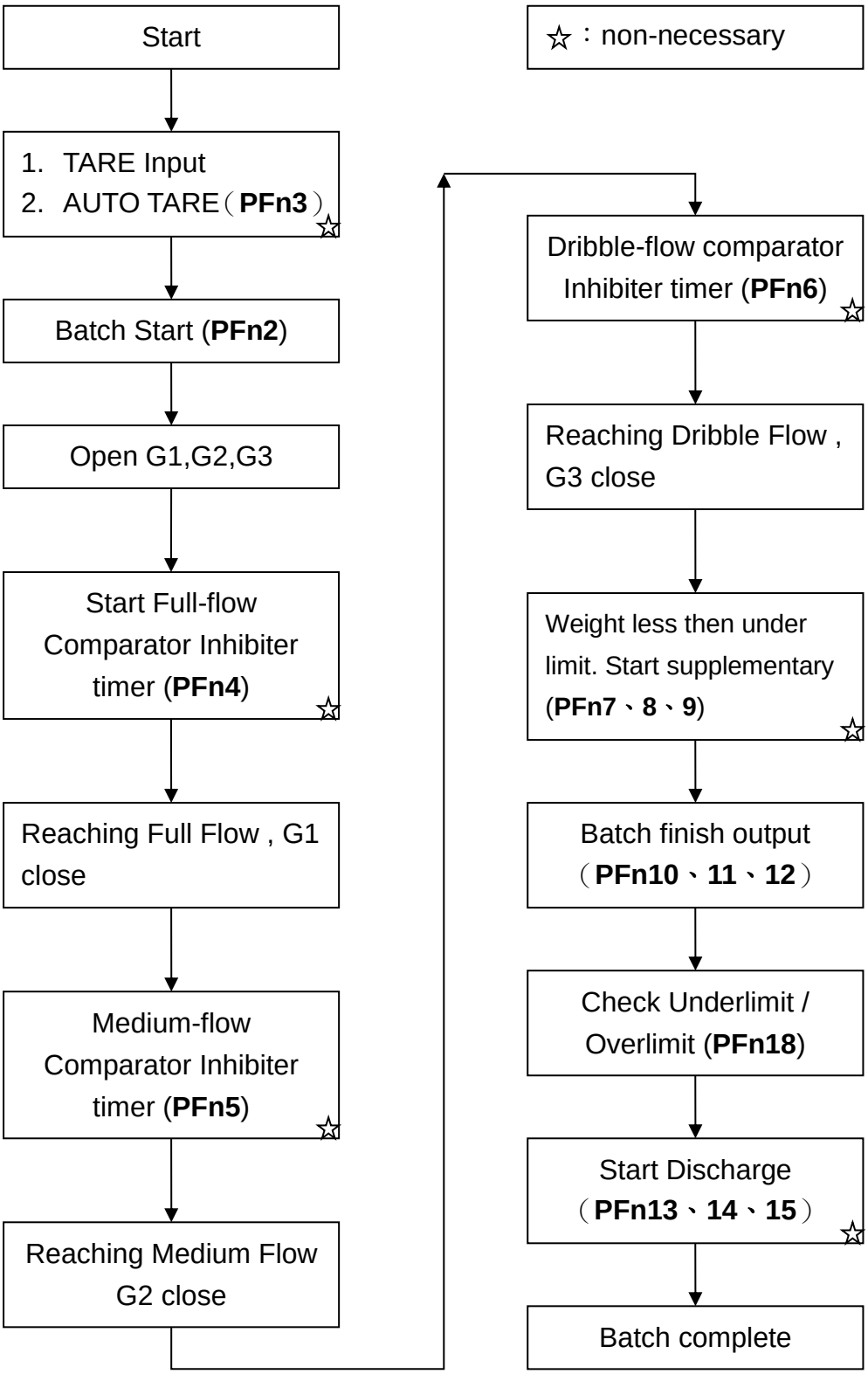
4-5 Normal Batching (Built-in procedure) (PFn 1 = 2)

4-5-1 Output condition

Output Terminal	Output Condition
SP1 (Full flow)	Net ≧ Target − SP1
SP2 (Medium flow)	Net ≧ Target − SP2
SP3 (Dribble flow)	Net ≧ Target − SP3
Underlimit	Net < Target − Underlimit
Overlimit	Net > Target + Overlimit
Zero Band	Gross ≦ Zero Band



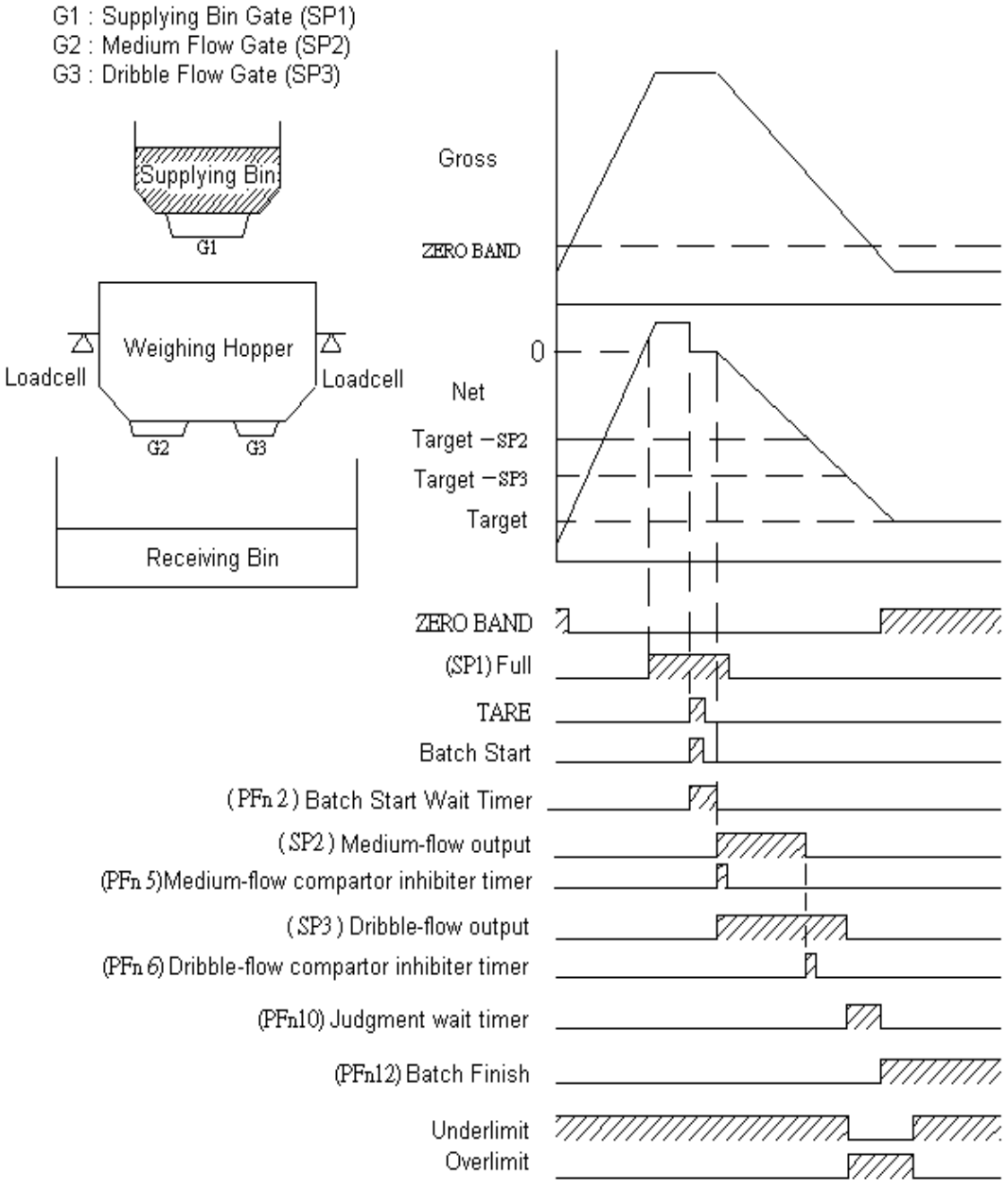
4-5-2 Flowchart



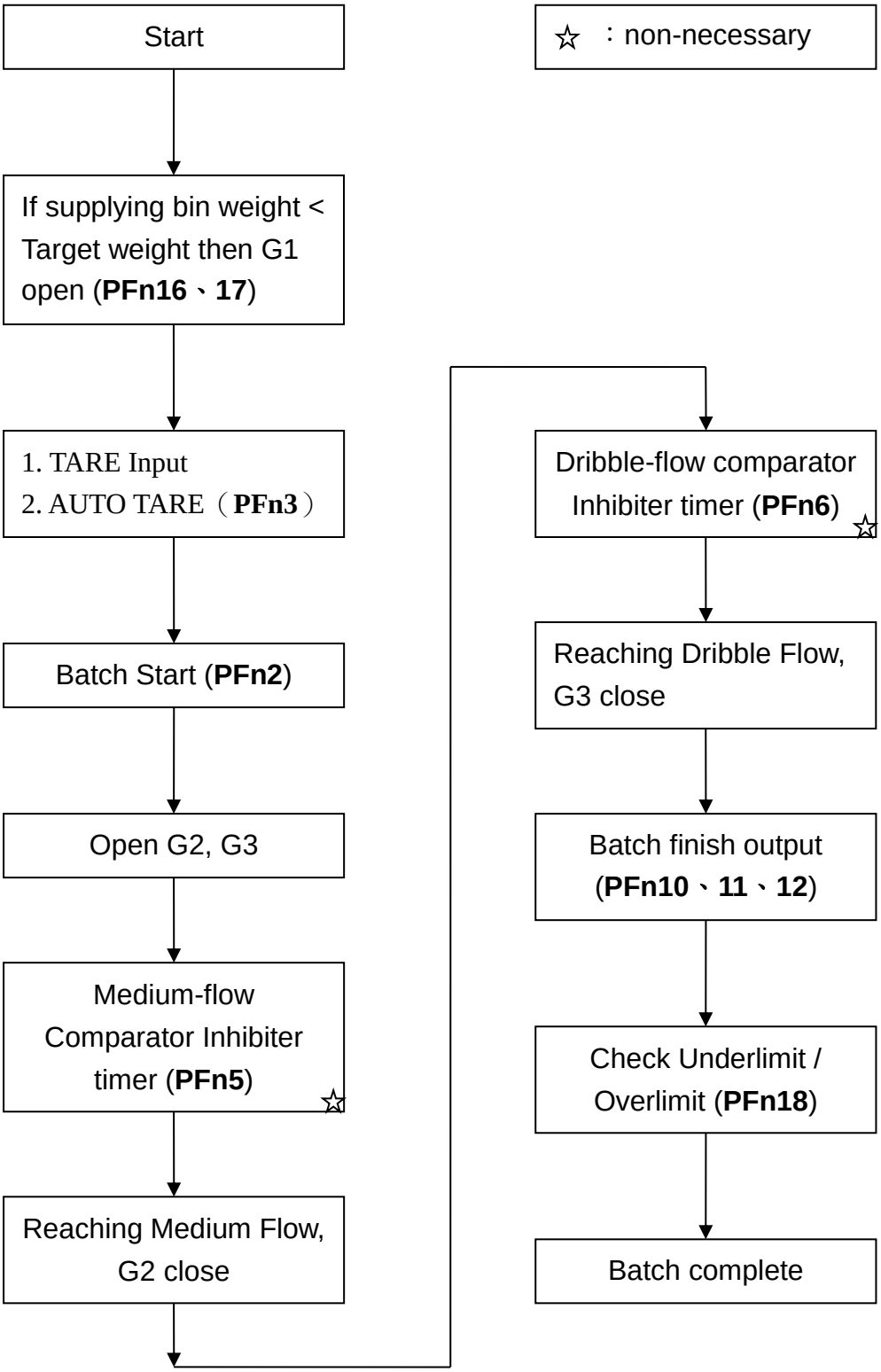
4-6 Loss-in-weight (Built-in procedure) (PFn 1 = 3)

4-6-1 OUTPUT CONDITION

Output Terminal	Output Condition
SP1 (Hopper Full)	Gross ≧ SP1
SP2 (Medium flow)	−Net ≧ Target − SP2
SP3 (Dribble flow)	−Net ≧ Target − SP3
Underlimit	−Net < Target − Underlimit
Overlimit	−Net > Target + Overlimit
Zero Band	Gross ≦ Zero Band



4-6-2 Flowchart



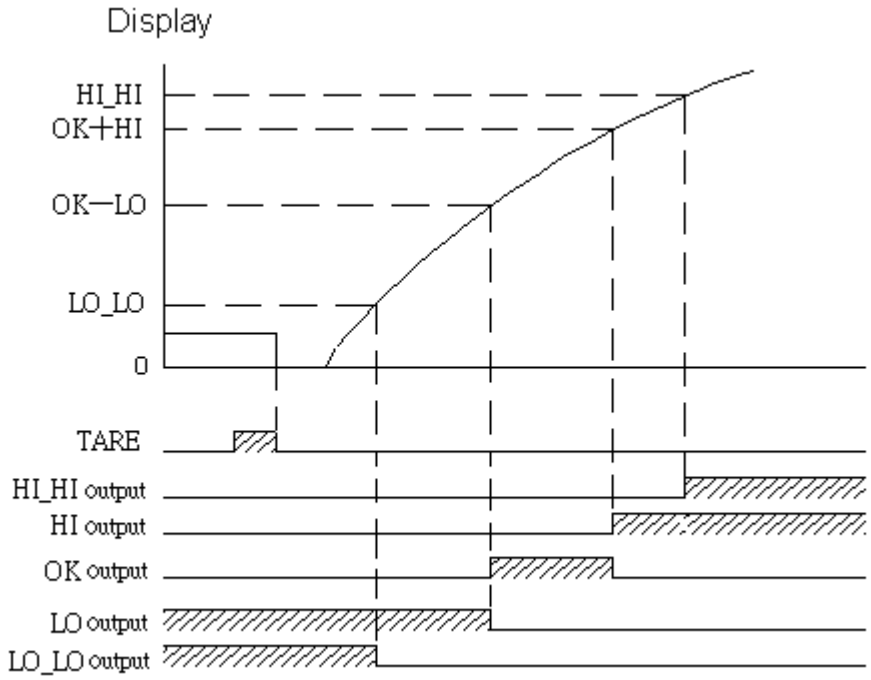
4-7 supplementary description for Batch weighing mode (Built-in procedure)

1. In use batch weighing mode. follow the principles set：
   - SP1：Setting for full-flow (normal batch) / Hopper full (Loss-in-weight)
   - SP2：Setting for medium-flow
   - SP3：Setting for dribble-flow
   - SP1 ＞ SP2 ＞ SP3
2. When SP1、SP2、SP3 all set to 0. After batch start only SP3 is turned on.
3. When the SP3 is turned off, the SP1 and SP2 are also forced to OFF.
4. The start batch signal is ineffective in period of the discharge.
5. When an emergency stop signal is input, all the loading signals and discharging signals are turned off.

4-8 Check weighing 1 (PFn 1 = 4)

4-8-1 OUTPUT CONDITION

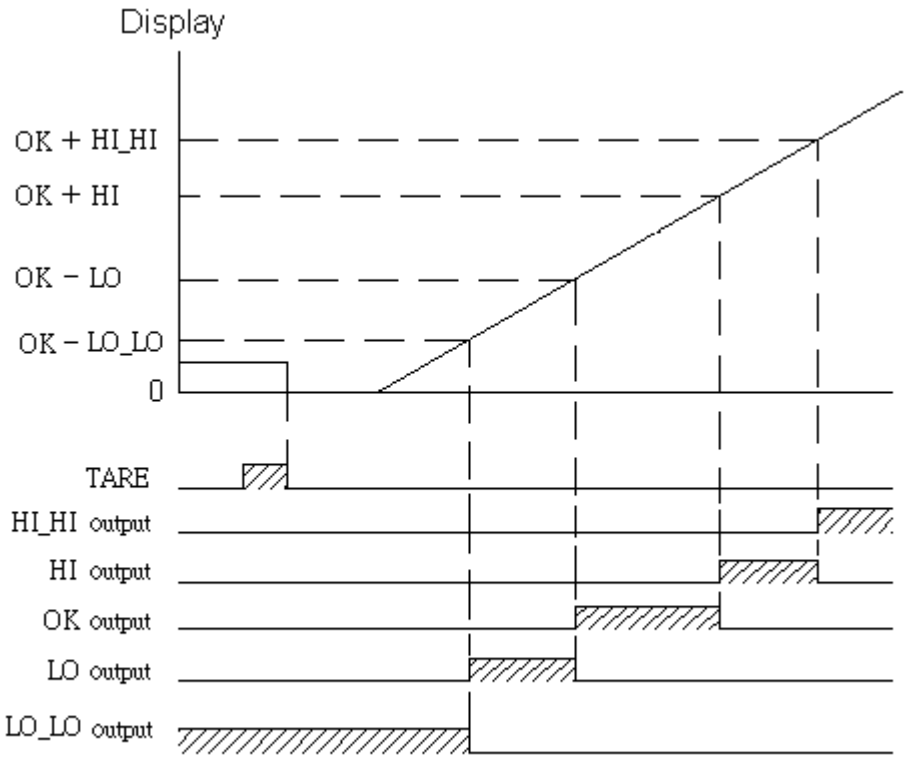
Output Terminal	Output Condition
LO_LO	Net ＜ LO_LO
LO	Net ＜ OK－LO
OK	OK＋HI ≧ Net ≧ OK－LO
HI	Net ＞ OK＋HI
HI_HI	Net ＞ HI_HI
Zero Band	Gross ≦ Zero Band



4-9 Check weighing 2 (PFn 1 = 5)

4-9-1 OUTPUT CONDITION

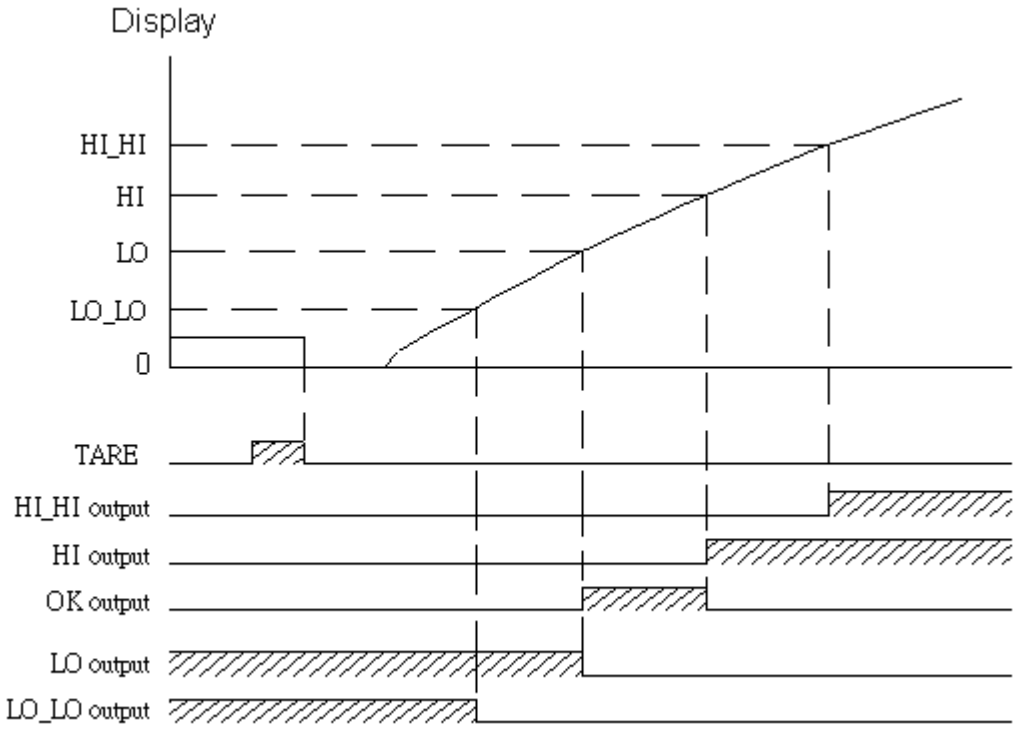
Output Terminal	Output Condition
LO_LO	Net ＜ OK－LO_LO
LO	OK－LO_LO ≦ Net ＜ OK－LO
OK	OK＋HI ≧ Net ≧ OK－LO
HI	OK＋HI_HI ≧ Net ＞ OK＋HI
HI_HI	Net ＞ OK＋HI_HI
Zero Band	Gross ≦ Zero Band



4-10 Check weighing 3 (PFn 1 = 6)

4-10-1 OUTPUT CONDITION

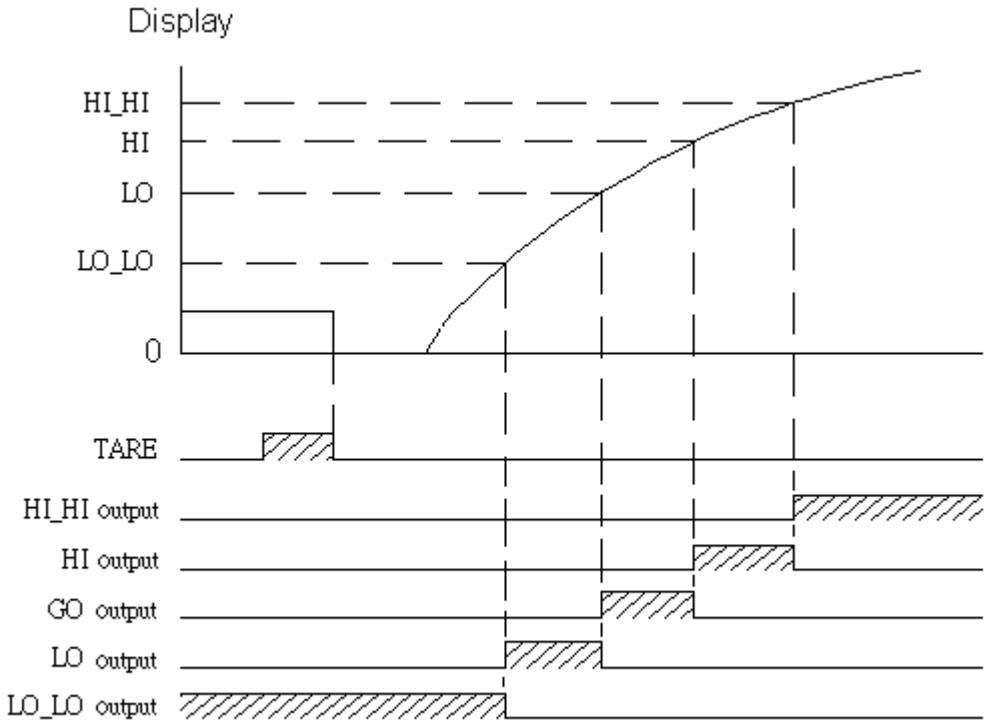
Output Terminal	Output Condition
LO_LO	Net ＜ LO_LO
LO	Net ＜ LO
OK	HI ≧ Net ≧ LO
HI	Net ＞ HI
HI_HI	Net ＞ HI_HI
Zero Band	Gross ≦ Zero Band



4-11 Check weighing 4 (PFn 1 = 7)

4-11-1 OUTPUT CONDITION

Output Terminal	Output Condition
LO_LO	Net ＜ LO_LO
LO	LO_LO ≦ Net ＜ LO
OK	HI ≧ Net ≧ LO
HI	HI_HI ≧ Net ＞ HI
HI_HI	Net ＞ HI_HI
Zero Band	Gross ≦ Zero Band

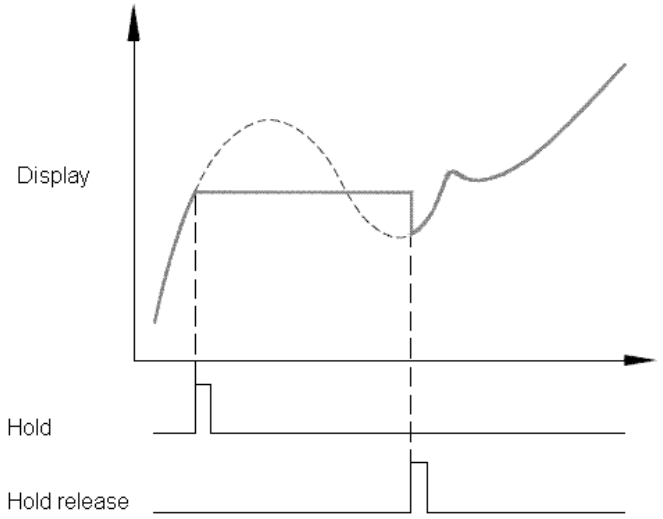


4-12 Normal hold (PFn 1 = 8)

4-12-1 OUTPUT CONDITION

Output Terminal	Output Condition
LO	Net ＜ LO
OK	HI ≧ Net ≧ LO
HI	Net ＞ HI
Zero Band	Gross ≦ Zero Band

4-12-2 Flowchart



Hold start method：
1. [Fn] key
2. OP3 Input
3. RS232 / RS485

↓

HI/OK/LO comparator output (PFn-22)

↓

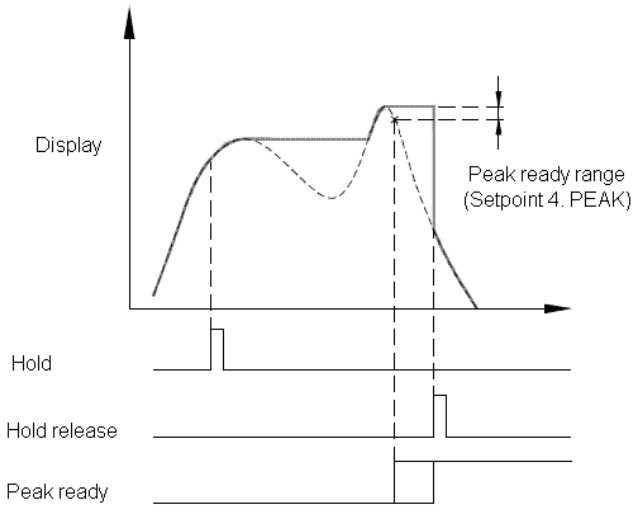
Hold release (PFn- 20)

4-13 Peak hold (PFn 1 = 9)

4-13-1 OUTPUT CONDITION

Output Terminal	Output Condition
LO	Net ＜ LO
OK	HI ≧ Net ≧ LO
HI	Net ＞ HI
Peak Ready	Net ＜ Hold value－Peak ready (setpoint)
Zero Band	Gross ≦ Zero Band

4-13-2 Flowchart



Hold start method：
4. [Fn] key
5. OP3 Input
6. RS232 / RS485

↓

Catch peak value and
hold release (PFn- 20)

↓

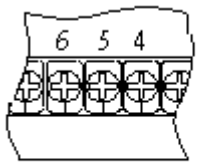
HI/OK/LO comparator
output (PFn-22)

CHAPTER 5 OPTIONS

5-1 Build-in、OP1 RS232/RS485

5-1-1 Pin Assignment

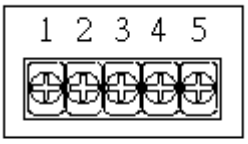
- **Build-in RS232/RS485**



terminal of rear panel

PIN	RS232	RS485
4	SG	SG
5	RxD	D－
6	TxD	D＋

- **OP1 RS232/RS485**



Rear view of option card

PIN	RS232	RS485
1	TxD	D＋
2	RxD	D－
3	SG	SG
4	X	X
5	X	X

5-1-2 FUNCTIONS

UF1(Build-in) UF2(OP1)	Name	Default	Setting	
			Parameter	Description
1	Data transfer mode	0	0	Stream + Command
			1	Command
			2	Manual print+ Command
			3	Auto print + Command
			4	Modbus RTU Slave Mode
2	Output data	0	0	Display Weight
			1	Display Weight (simple)
			2	Gross + Net + Tare
			3	Internal count （00000～f f f f f）
			4	Comparison data＋ Display Weight (simple)

3	Baud rate	2	0	2400 bps	
			1	4800 bps	
			2	9600 bps	
			3	19200 bps	
			4	38400 bps	
			5	57600 bps	
			6	115200 bps	
4	Protocol	0	Mode	Normal	Modbus
			0	N、8、1	N、8、2
			1	E、7、1	E、8、1
			2	O、7、1	O、8、1
5	Transmit times	2	0	20 time/sec	
			1	10 time/sec	
			2	5 time/sec	
			3	2 time/sec	
			4	1 time/sec	
			5	Same as weight sampling ratio (CFn 1)	
6	Modbus response delay time	1	0~255	Setting value X 5mS	
7	Address number	0	1 ~ 99	0 : Unused	
				Non-0: Set number	
8	Output when weight value is overflowing or unstable (Stream mode)	0	0	Output	
			1	Does not output	

5-1-3 TRANSMISSION FORMAT

1. Display Weight Format

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Gross	S	T	,	G	S	,	+	0	1	2	3	4	5	6	k	g	CR (0d)	LF (0a)
Net	S	T	,	N	T	,	−	1	2	3	4	.	5	6		g		
Unstable	U	S	,	N	T	,	+	1	2	3	4	.	5	6		t		
Plus overflow	O	L	,	G	S	,	+	SP	SP	SP	SP	SP	SP	SP	l	b		
Minus overflow	O	L	,	G	S	,	−	SP	SP	SP	SP	SP	SP	SP		g		

2. Display Weight (Simple) Format

	1	2	3	4	5	6	7	8	9
Display weight	+	0	1	2	3	4	5	CR (0d)	LF (0a)
Plus overflow	+	SP	SP	SP	SP	SP	SP		
Minus overflow	−	SP	SP	SP	SP	SP	SP		

3. Gross + Net + Tare format

1	2	3	4	5	6	7	8	9	10	11	12	13
G	+	1	2	3	4	.	5	6	k	g	CR (0d)	LF (0a)
N	+	SP	SP	SP	SP	SP	SP	SP	k	g		
T	−	SP	SP	SP	SP	SP	SP	SP	k	g		

4. Internal count (00000~f f f f f)

1	2	3	4	5	6	7
9	0	f	a	2	CR(0d)	LF(0a)

5. Comparison data＋ Display Weight (simple)

	1	2	3	4	5	6	7	8	9	10	11
Display weight			+	0	1	2	3	4	5	CR (0d)	LF (0a)
Plus overflow			+	SP	SP	SP	SP	SP	SP		
Minus overflow			−	SP	SP	SP	SP	SP	SP		

	1	2
Bit 7 ~ 4	0x0011(3)	
Bit 3	Discharging	SP3/OK
Bit 2	Batch finish	SP2/HI
Bit 1	Over/LO_LO	SP2/FULL/HI_HI
Bit 0	Under/LO	ZERO BAND

5-1-4 Command Mode

1. Command format A

Device	Command
P2-S	command

A Command	Function
MZ	Clears to zero
MT	Subtracts the tare
CT	Clears the tare
MG	Displays the gross
MN	Displays the net
BB	Starts batching
BS	Emergency stop
BD	Starts discharging
HB	Hold
HR	Hold release

2. Command format B

Device	Command
P2-S	Data

B Command	Function
RW	Reads the weight
RB	Reads the weighing sequence status
RF	Reads the weighing (loading) result (UF1(2) – 2 set 0,1)
RH	Reads the hold value
R0	Reads out the Target setpoint
R1	Reads out the SP1 or HIHI setpoint
R2	Reads out the SP2 or HI setpoint
R3	Reads out the SP3 or OK setpoint
R4	Reads out the Underlimit or LO setpoint
R5	Reads out the Overlimit、LOLO or PEAK setpoint
R6	Reads out the ZeroBand setpoint

EX：Device → R0<CR><LF>

P2-S → XXXXXX<CR><LF> (XXXXXX：0 ~999999)

3. Command format C

Device	Command & Data
P2-S	Command

C Command	Function
ST	Sets the Pretare
S0	Sets the Target setpoint
S1	Sets the SP1 or HIHI setpoint
S2	Sets the SP2 or HI setpoint
S3	Sets the SP3 or OK setpoint
S4	Sets the Underlimit or LO setpoint
S5	Sets the Overlimit、LOLO or PEAK setpoint
S6	Sets the ZeroBand setpoint

EX：Device → STXXXXXX<CR><LF> (XXXXXX：0 ~999999)

P2-S → ST<CR><LF>

4. Command format D

Device	Command & Data
P2-S	Command

.

D Command	Function
OS	OP3 Ext. OUTPUT Bit setting

OS＃％<CR><LF>

Output	#	％
Bit 7~4	0x0011(3)	
Bit 3	output 7	output 3
Bit 2	output 6	output 2
Bit 1	output 5	output 1
Bit 0	output 4	output 0

5. Error Messages

？，Command ：unknown command

6. “With address” mode

When the function **UF1(2) - 7** set to 0, do not use the address. So the P2-S received any lawful commands will be executed. When the function **UF1(2) - 7** set to non-zero. P2-S on receiving the command will make sure address is correct, if no problems then the commands will continue. Peripherals (PLC or Computer) control the P2-S.

Place ’@’ and address code in that order before a command.

Example: To request reading display weight from the address @**01** unit.

@01RW<CR><LF>

5-1-5 Modbus Address Table

Data Registers					
Address	**Function**	**R/W**	**Address**	**Function**	**R/W**
40001~2	Display weight	R	40003~4	Gross weight	R
40005~6	Net weight	R	40007~8	Tare Value	R
40009~10	Internal count	R	40011~12	loading result	R
40013~14	OP3 Ext. input	R	40015~16	Hold value	R
41001~2	Minimum Division	R/W	41003~4	Calibration weigh	R/W
41005~6	Pretare value	R/W	41007~8	Target setpoint	R/W
41009~10	SP1/Hi-Hi setpoint	R/W	41011~12	SP2/Hi setpoint	R/W
41013~14	SP3/Ok setpoint	R/W	41015~16	Under/Lo setpoint	R/W
41017~18	Over / Lo-Lo / Peak setpoint	R/W	41019~20	ZeroBand setpoint	R/W
41021~22	OP3 Ext. output	R/W			
Bit I/O					
Address	**Function**	**R/W**	**Address**	**Function**	**R/W**
00001	Center Zero	R	00002	Weight Stable	R
00003	Overflow	R	00008	ZeroBand	R
00009	SP1/HI_HI	R	00010	SP2/HI	R
00011	SP3/OK	R	00012	Under/LO	R
00013	Over/LO_LO	R	00014	Batch finish	R
00015	Discharging	R	00016	Running	R
00017	Holding	R	00018	Peak ready	R
00027	Calibration Err 0	R	00028	Calibration Err 1	R
00029	Calibration Err 2	R	00030	Calibration Err 3	R
00032	System ready	R			
01001	Zero	R/W	01002	Clear Zero Compensation	R/W
01003	Tare	R/W	01004	Clear Tare	R/W
01008	Batch Start	R/W	01009	Emergency Stop	R/W
01010	Discharge Start	R/W	01011	Hold	R/W
01012	Hold release	R/W	01014	Zero Calibration	R/W
01015	Span Calibration	R/W	01016	Save calibration value	R/W

R : Read only **R/W : Read / Write**

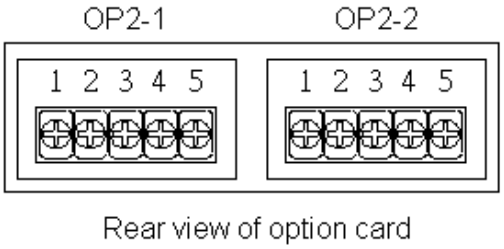
Modbus mode only for buid-in RS232/RS485. Does not apply to OP1.

5-2 OP2 Analog Output Interface

5-2-1 Specification

- Resolution：16 bits
- Current output：4 ~ 20mA / 0 ~ 24mA
- Voltage output：0 ~ 5V / 0 ~ 10V / －5V ~ ＋5V / －10V ~ ＋10V

5-2-2 Pin Assignment



Rear view of option card

PIN	Current	Voltage
1	A＋	
2		V＋
3	A－	V－
4	ZERO	ZERO
5	COM	COM

- ZERO Input is Option function

5-2-3 FUNCTIONS

AF1(OP2-1) AF2(OP2-2)	Name	Default	Setting	
			Parameter	Description
1	Output Mode	1	0	4 ~ 20mA
			1	0 ~ 24mA
			2	0 ~ 5V
			3	0 ~ 10V
			4	－5V ~ ＋5V
			5	－10V ~ ＋10V
2	Output Data	0	0	Same as display
			1	Gross
			2	Net
3	Weight value of P1	0	0 ~ 999999	
4	Current/Voltage of P1	4.00/0.000	00.00 ~ 24.00mA －10.000 ~ 10.000V	
5	Weight value of P2	10000	0 ~ 999999	
6	Current/Voltage of P2	20.00/5.000	00.00 ~ 24.00mA －10.000 ~ 10.000V	

7	Output signal adjustment	0	0	Unused
			1	Internal Counts adjustment
			2	Measured adjustment
8	ZERO / Measurement 1	0	(blank)	
9	SPAN / Measurement 2	0	(blank)	

5-2-4 Output Signal Adjustment

1. Internal Count adjustment（AFn 7＝1）

- Do peripherals (PLC or Current/Voltage meter) connecting with **P2-S OP2** before internal count adjustment.
- **Zero Adjustment（AFn 8）**

  With no weight placed on the system and use ZERO ‘ TARE keys. By adjusting the analog output signal to reach agreement with the peripherals. Press ENTER key to confirm or SET key to give up.
- **Span Adjustment（AFn 9）**

  Place the calibration weight on the system and use ZERO ‘ TARE keys. By adjusting the analog output signal to reach agreement with the peripherals. Press ENTER key to confirm or SET key to give up.
- The function AFn 3 ~ 6 will be ignored , when using the internal count adjust OP2 output.

2. Measured adjustment (AFn 7＝2)

- **Measurement 1(AFn 8)**

  Please enter a precision meter measured value.

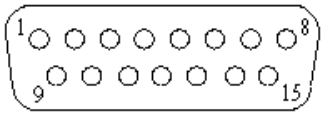
  Press ENTER key to confirm or SET key to give up.
- **Measurement 2(AFn 9)**

  Please enter a precision meter measured value.

  Press ENTER key to confirm or SET key to give up.

5-3 OP3、OP4 External I/O Internal

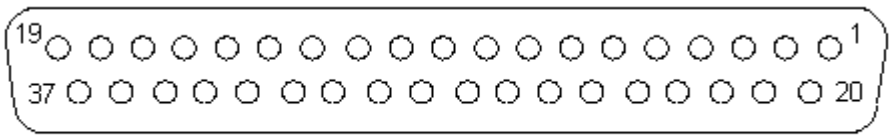
5-3-1 OP3 Pin Assignment



Rear view of option card

PIN	Ext. I/O	PIN	Ext. I/O
1	OUT 1	9	OUT 2
2	OUT 3	10	OUT 4
3	OUT 5	11	OUT 6
4	OUT 7	12	OUT 8
5	COM	13	COM
6	IN 1	14	IN 2
7	IN 3	15	IN 4
8	IN 5		

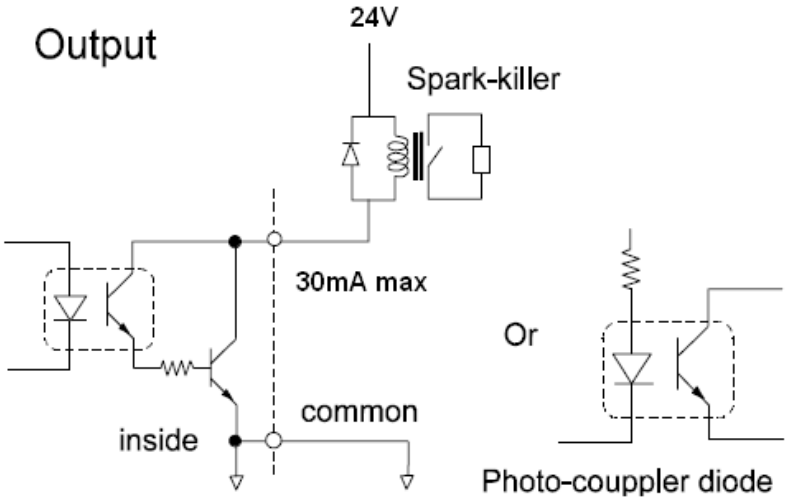
5-3-2 OP4 Pin Assignment

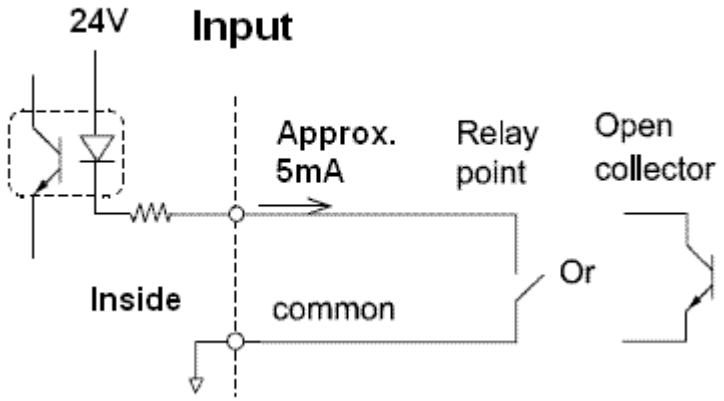


Rear view of option card

PIN	Signal	PIN	Signal		PIN	Ext. I/O	PIN	Ext. I/O
1	10 ^ 0	20	10 ^ 1		7	OUT 1	26	OUT 2
2	10 ^ 2	21	10 ^ 3		8	OUT 3	27	OUT 4
3	10 ^ 4	22	10 ^ 5		9	OUT 5	28	OUT 6
4	10 ^ 6	23	10 ^ 7		10	OUT 7	29	OUT 8
5	10 ^ 8	24	10 ^ 9		11	COM	30	COM
6	10 ^ 10	25	10 ^ 11		12	COM	31	COM
18	Code 2	36	Code 1		13	COM	32	COM
19	Code 8	37	Code 4		14	IN 1	33	IN 2
					15	IN 3	34	IN 4
					16	IN 5	35	IN 6
					17	IN7		

5-3-3 Equivalent Circuits





5-3-4 FUNCTIONS

Input Functions

iFn	Name	Default	Setting Description
1	INPUT 1	1	0：No capability 1：Batch Start 2：Emergency Stop 3：Discharge start 4：Print command for manual print 5：KEY：ZERO/↑ 6：KEY：TARE/↓ 7：KEY：Fn/→ 8：KEY：ENTER 9：KEY：SET 10：Hold 11：Hold release
2	INPUT 2	2	
3	INPUT 3	3	
4	INPUT 4	4	
5	INPUT 5	5	
6	INPUT 6	6	
7	INPUT 7	0	

- INPUT 6、7 for OP4

Output Functions

oFn	Name	Default	Setting Description	
1	OUTPUT1	1	0 ： No capability 1 ：Zero Band 2 ：SP1 Full Flow / Full / HI_HI 3 ：SP2 Medium Flow / HI 4 ：SP3 Dribble Flow / OK 5 ：Underlimit / LO 6 ：Overlimit / LO_LO 7 ：Discharging 8 ：Batch finish 9 ：Stable 10：Running 11：RS232/RS485 command control 12：Holding 13：Peak ready 14：System ready	
2	OUTPUT2	2		
3	OUTPUT3	3		
4	OUTPUT4	4		
5	OUTPUT5	5		
6	OUTPUT6	6		
7	OUTPUT7	7		
8	OUTPUT8	8		
9	OUT4~1 Logic	0000	0	Positiv Logic
			1	Negative Logic
10	OUT8~5 Logic	0000	0	Positiv Logic
			1	Negative Logic

5-3-5 Thumbwheel Switches（OP4）

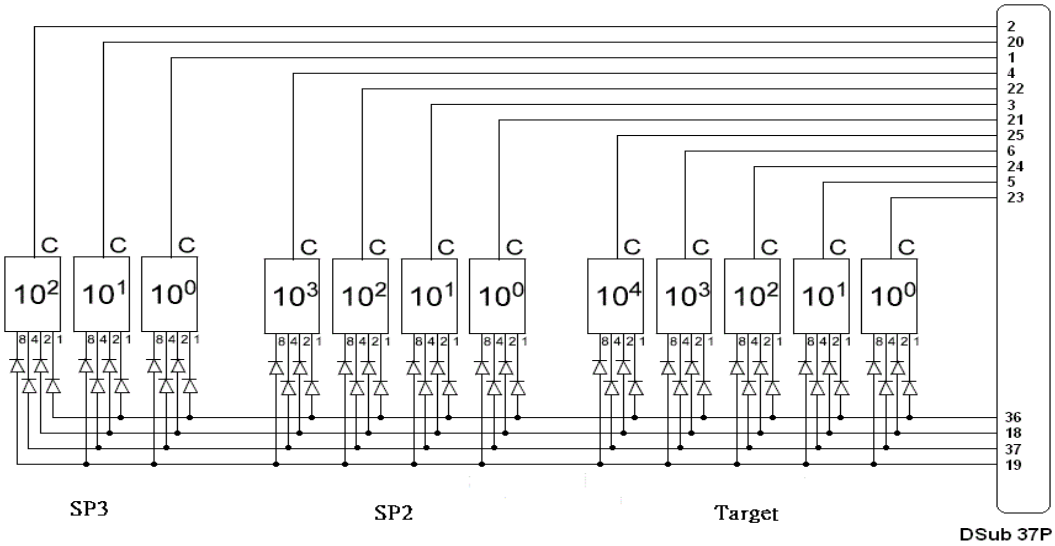
This method assigns an exclusive thumbwheel switch to each setpoint. Some setpoints are set with the front panel keys without using the thumbwheel switch. Assignment of the thumbwheel switch and the front panel keys differs depending on the weighing mode (PFn-19). The following shows assignment of the setpoints.

Batch weighing mode：Target (5 digits) , SP2 (4 digits) , SP3 (3 digits).

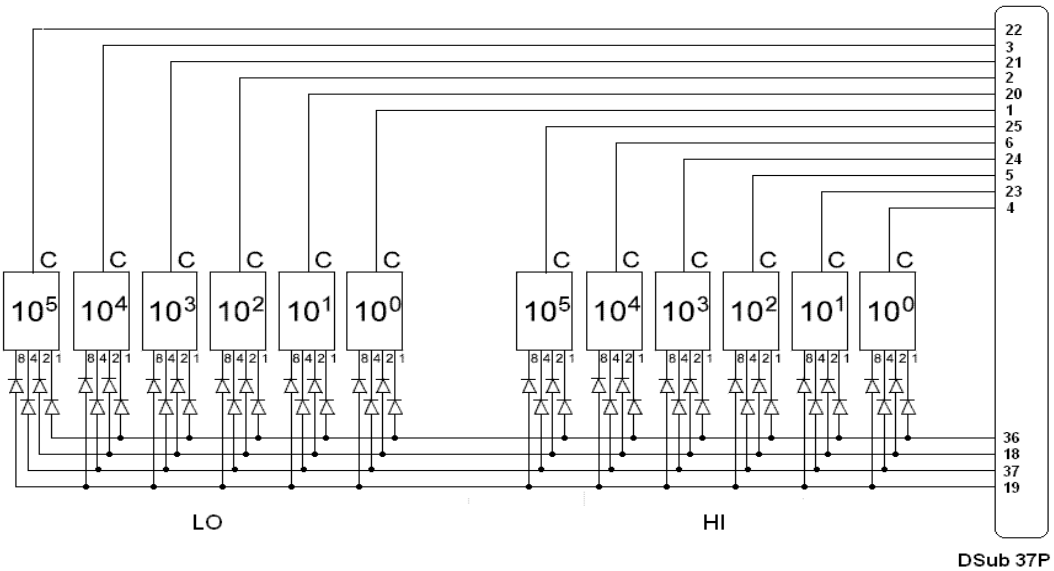
Check weighing mode：HI (6 digits) , LO (6 digits)

Connection

1. **Batch weighing mode**（PFn 1 = 0、1、2、3）

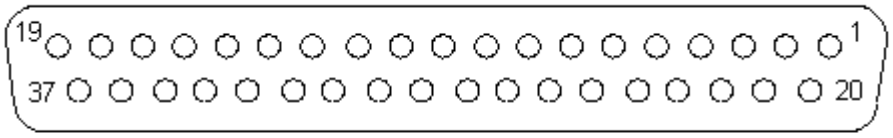


2. **Check weighing mode** （PFn 1 = 4、5、6、7、8、9）



5-4 OP5 Parallel BCD Output

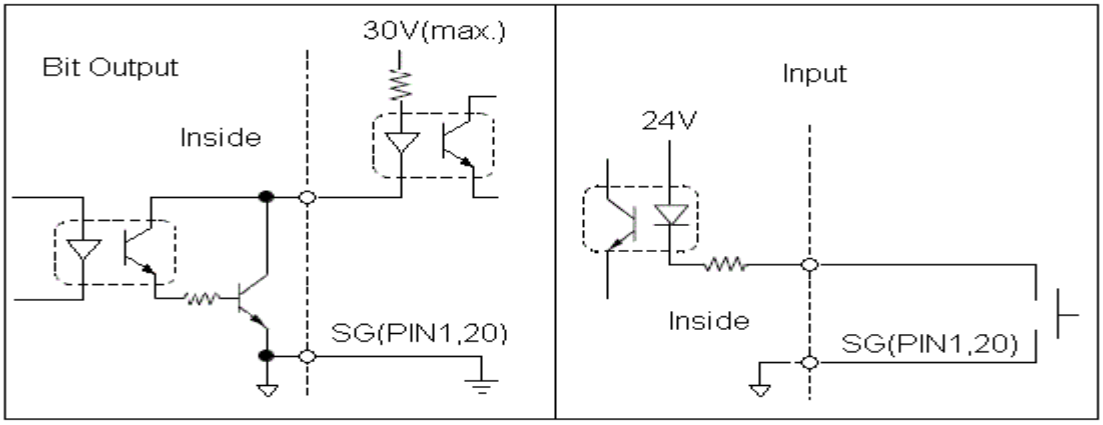
5-4-1 Pin Assignment



Rear view of option card

PIN	Signal	PIN	Signal
1	SG	20	SG
2	1X10^0	21	2X10^0
3	4X10^0	22	8X10^0
4	1X10^1	23	2X10^1
5	4X10^1	24	8X10^1
6	1X10^2	25	2X10^2
7	4X10^2	26	8X10^2
8	1X10^3	27	2X10^3
9	4X10^3	28	8X10^3
10	1X10^4	29	2X10^4
11	4X10^4	30	8X10^4
12	1X10^5	31	2X10^5
13	4X10^5	32	8X10^5
14	Gross（＋）／ Net（－）	33	Stable（＋）／Unstable（－）
15	Plus Wt.(＋)／Minus Wt.(－)	34	Decimal Point 1
16	Decimal Point 2	35	Decimal Point 3
17	Decimal Point 4	36	Over（＋）／Normal（－）
18	Data Ready	37	INPUT（bFn 10）
19			

5-4-2 Equivalent Circuits

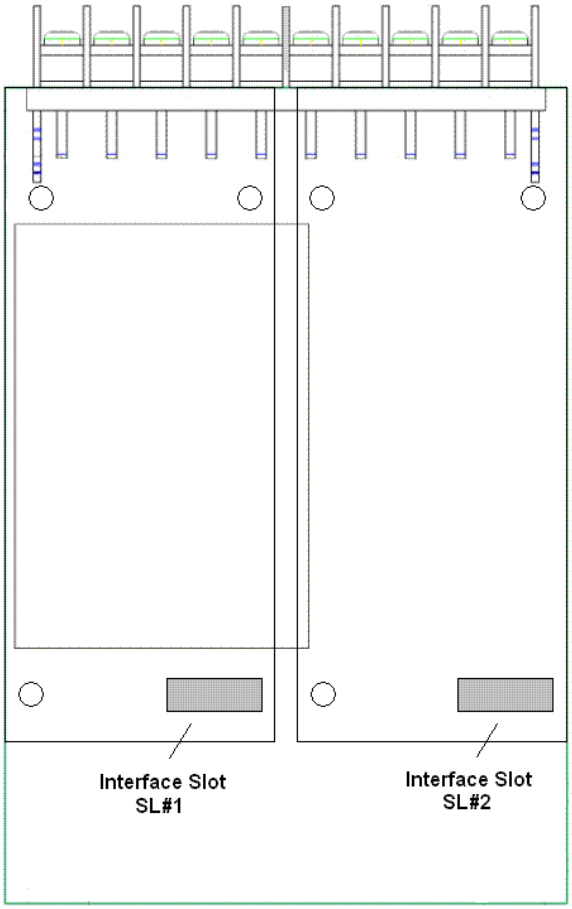


5-4-3 FUNCTIONS

bFn（OP5）	Name	Default	Setting	
			Parameter	Description
1	Output Data	0	0	Same as display
			1	Gross
			2	Net
2	Data transfer mode	0	0	Stream
			1	Auto print
			2	Manual print
3	Output Code	0	0	BCD Code
			1	HEX Code
4	O.L. Output Code	0	0	FFFFFF
			1	999999
5	Output Logic	0	0	Positiv Logic
			1	Negative Logic
6	Data Ready Output Logic	0	0	Positiv Logic
			1	Negative Logic
7	10^3 Remap	0	0	None
			1	10^0
			2	10^1
			3	10^2
8	10^4 Remap	0	0	None
			1	10^0
			2	10^1
			3	10^2
			4	10^3
9	10^5 Remap	0	0	None
			1	10^0
			2	10^1
			3	10^2
			4	10^3
			5	10^4
10	INPUT Signal	0	0	HOLD Input
			1	ZERO Input

5-5 Option cards installation and setting

- Interface slot



- The following shows assignment of the option cards.
  1. OP3 interface installed in **SL#1** first,
  2. OP1,OP2 interface installed in **SL#2** first,
- When the selected slot position. First use screw fixed three plastic threaded spacer on the main board. Then placed the option card and fixed it with screw.
- Setting function **2.Fn 5** (SL#1) or **2.Fn 6** (SL#2). Do it complete and make sure to save the settings. You can start the operation of the interface.
- If displays error messages symbol **Er.oP2**、**Er.oP3**、**Er.oP3.1**, that the system can not detect this option card.
  the problem maybe
  1. Function **2.Fn 5** (SL#1) or **2.Fn 6** (SL#2) setting error.
  2. Hardware problems

CHAPTER 6 MAINTENANCE

6-1 Initialization Mode

When the power is turned on and during the display down count.

Press ZERO key and ENTER key together. You will enter the initialization mode.

Use ZERO or TARE keys select initialization item.

Display	Operation	Initial item
1 iALL	With the ENTER key pressed and held about 3 second.	All data initialization
2 iFnC		function initialization
3 CLr5		Setpoint initialization
4 CLrb		Clear zero compensation value, tare value.

6-2 Self-test Mode

When the power is turned on and during the display down count.

Press SET key and ENTER key together. You will enter the self-test mode.

Use ZERO or TARE keys select test item.

Display	Test Item
1 dSP	7 segment LED and status LED
2 KEY	Key switch
3 A-d	Internal count
4 EEP	EEPROM
5 ir5	Build-in RS232/RS485
6 E io	OP3 External I/O
7 d-A	OP2 Analog output
8 EnC	Reservation
9 or5	OP1 RS232/RS485
10 Etb	OP3 Thumbwheel switche
11 Con	Reservation

APPENDIX A SETTING LISTS

1. CALIBRATION RELATED FUNCTIONS

CFn	Name	Default	Setting	
			Parameter	Description
1	weight sampling ratio	3	0	120times/sec
			1	100 times/sec
			2	60 times/sec
			3	50 times/sec
			4	30 times/sec
			5	25 times/sec
			6	15 times/sec
			7	12.5 times/sec
			8	7.5 times/sec
			9	6.25 times/sec
2	Digital filter	1	0	None
			1~5	weak ← → strong
3	Weighing Unit	2	0	None
			1	G
			2	Kg
			3	T
			4	Lb
4	Decimal Point Position	0	0	None
			1	10^1
			2	10^2
			3	10^3
5	Minimum Division	1	Minimum division for the weight value 1、2、5、10、20、50	
6	Capacity	999999	－99999 ～ 999999	
7	Zero Range	0	0	Full range
			1~30	±1% ~ ±30%
8	Zero Tracking Time	1.0	0.0 ~ 9.9s	Set 0.0 , disable zero tracking function
9	Zero Tracking Width	1.0	0.0 ~ 9.9d	
10	Stable Detection Time	1.0	0.0 ~ 9.9s	Set 0.0 , disable stable detection

11	Stable Detection Range	1.0	0.0 ~ 9.9d	
12	Calibration in Modbus	1	0	Disable
			1	Enable

2. BASIC FUNCTIONS

Fn	Name	Default	Setting	
			Parameter	Description
1	Key switch disable	00000	0	Not disable
			1	Disable
2	Fnnctions of [Fn] Key	0	0	None
			1	NET/GROSS
			2	Print command for manual print
			3	Clear Tare
			4	Clear to zero
			5	Batch Start
			6	Emergency stop
			7	Discharge Start
			8	Hold / Hold release
3	Display Update Rate	0	0	20 times/sec
			1	10 times/sec
			2	5 times/sec
			3	1 times/sec
4	auto zero after power on	0	0	Disable
			1	Enable
5	Interface Slot 1 (SL#1)	0	0	None
			1	OP1 RS232/RS485
			2	OP2 Analog output
			3	OP3 External I/O
6	Interface Slot 2 (SL#2)	0	4	OP3 Thumbwheel Switches
7	Memory the value of zero and tare before P2-S shutdown	1	0	None
			1	Memory
8	Password of enter function mode	0000	Do not use this function if set ‘0000'	

3. RS232 / RS485 FUNCTIONS

UF1(Build-in) UF2(OP1)	Name	Default	Setting	
			Parameter	Description
1	Data transfer mode	0	0	Stream + Command
			1	Command
			2	Manual print+ Command
			3	Auto print + Command
			4	Modbus RTU Slave Mode
2	Output data	0	0	Display Weight
			1	Display Weight (simple)
			2	Gross + Net + Tare
			3	Internal count（00000～f f f f f）
			4	Comparison data＋ Display Weight (simple)
3	Baud rate	2	0	2400 bps
			1	4800 bps
			2	9600 bps
			3	19200 bps
			4	38400 bps
			5	57600 bps
			6	115200 bps
4	Protocol	0	Mode	Normal / Modbus
			0	N、8、1 / N、8、2
			1	E、7、1 / E、8、1
			2	O、7、1 / O、8、1
5	Transmit times	2	0	20 time/sec
			1	10 time/sec
			2	5 time/sec
			3	2 time/sec
			4	1 time/sec
			5	Same as weight sampling ratio (CFn 1)

6	Modbus response delay time	1	0~255	Setting value X 5mS
7	Address number	0	1 ~ 99	0 : Unused
				Non-0: Set number
8	Output when weight value is overflowing or unstable (Stream mode)	0	0	Output
			1	Does not output

4. **OP2 ANALOG OUTPUT FUNCTIONS**

AF1(OP2-1) **AF2(OP2-2)**	**Name**	**Default**	**Setting**	
			Parameter	**Description**
1	Output Mode	1	0	4 ~ 20mA
			1	0 ~ 24mA
			2	0 ~ 5V
			3	0 ~ 10V
			4	－5V ~ ＋5V
			5	－10V ~ ＋10V
2	Output Data	0	0	Same as display
			1	Gross
			2	Net
3	Weight value of P1	0	0 ~ 999999	
4	Current/Voltage of P1	4.00/0.000	00.00 ~ 24.00mA －10.000 ~ 10.000V	
5	Weight value of P2	10000	0 ~ 999999	
6	Current/Voltage of P2	20.00/5.000	00.00 ~ 24.00mA －10.000 ~ 10.000V	
7	Output signal adjustment	0	0	Unused
			1	Internal Counts adjustment
			2	Measured adjustment
8	ZERO / Measurement 1	0	(blank)	
9	SPAN / Measurement 2	0	(blank)	

5. OP3、OP4 EXTERNAL I/O INPUT FUNCTIONS

iFn	Name	Default	Setting Description
1	INPUT 1	1	0：No capability 1：Batch Start 2：Emergency Stop 3：Discharge start 4：Print command for manual print 5：KEY：ZERO/↑ 6：KEY：TARE/↓ 7：KEY：Fn/→ 8：KEY：ENTER 9：KEY：SET 10：Hold 11：Hold release
2	INPUT 2	2	
3	INPUT 3	3	
4	INPUT 4	4	
5	INPUT 5	5	
6	INPUT 6	6	
7	INPUT 7	0	

- INPUT 6、7 for OP4

6. OP3、OP4 EXTERNAL I/O OUTPUT FUNCTIONS

oFn	Name	Default	Setting Description	
1	OUTPUT1	1	0 ： No capability 1 ：Zero Band 2 ：SP1 Full Flow / Full / HI_HI 3 ：SP2 Medium Flow / HI 4 ：SP3 Dribble Flow / OK 5 ：Underlimit / LO 6 ：Overlimit / LO_LO 7 ：Discharging 8 ：Batch finish 9 ：Stable 10：Running 11：RS232/RS485 command control 12：Holding 13：Peak ready 14：System ready	
2	OUTPUT2	2		
3	OUTPUT3	3		
4	OUTPUT4	4		
5	OUTPUT5	5		
6	OUTPUT6	6		
7	OUTPUT7	7		
8	OUTPUT8	8		
9	OUT4~1 Logic	0000	0	Positiv Logic
			1	Negative Logic
10	OUT8~5 Logic	0000	0	Positiv Logic
			1	Negative Logic

7. WEIGHING SEQUENCE FUNCTIONS

PFn	Name	Default	Setting		
			Parameter	Description	Operation
1	Weighing Mode	0	0	Normal Batching (Real-time)	Batch Weighing Mode
			1	Loss-in-weight (Real-time)	
			2	Normal Batching (Built-in procedure)	
			3	Loss-in-weight (Built-in procedure)	
			4	Check weighing 1	Check Weighing Mode
			5	Check weighing 2	
			6	Check weighing 3	
			7	Check weighing 4	
			8	Normal hold	Hold Mode
			9	Peak hold	
2	Batch start wait timer	0.0	0.0 ~ 25.5 (sec)	(blank)	Batch weighing mode (BIP)
3	Auto TARE	0	0	Enable	
			1	Disable	
4	Full-flow Comparator Inhibiter timer	0.0	0.0 ~ 25.5 (sec)	(blank)	Normal batching (BIP)
5	Medium-flow Comparator Inhibiter timer	0.0	0.0 ~ 25.5 (sec)	(blank)	Batch weighing mode (BIP)
6	Dribble-flow comparator Inhibiter timer	0.0	0.0 ~ 25.5 (sec)	(blank)	
7	Maximum number of supplementary flow times	0	0 ~ 255	0 : Unused	Normal batching (BIP)
				Non-0 : Set times	
8	Supplementary flow open timer	0.1	1.0 ~ 25.5 (sec)	(blank)	
9	Supplementary flow close timer	0.5	0.0 ~ 25.5 (sec)	(blank)	

10	Judgment wait timer	0.1	0.0 ~ 25.5 (sec)	(blank)	Batch weighing (BIP)
11	Stability at judgment	1	0	Not required	
			1	Required	
12	Batch Finish complete output width	0.0	0.0 ~ 25.5 (sec)	0 : Until next Batch start	
				Non-0: Set time	
13	Discharging time monitor timer	0	0 ~ 255 (sec)	0 : Unused	Normal batching (BIP)
				Non-0: Set time	
14	Discharging start wait timer	0.0	0.0 ~ 25.5 (sec)	(blank)	
15	Discharging valve close wait timer	0.0	0.0 ~ 25.5 (sec)	(blank)	
16	Add the target to zero band setting	0	0	Disable	Loss-in-weight (BIP)
			1	Enable	
17	Add the target to full setting	0	0	Disable	
			1	Enable	
18	Under / Over operation	1	0	Real-time comparison	Batch weighing mode (BIP)
			1	Synchronized with Batch Finish Output	
19	OP4 Interface Setpoint operation	0	0	Unused	
			1	Enable	
20	Hold release operation	0	0	Press key or OP3 input	Hold Mode
			1	Timer(PFn-21)	
			2	Return to Zero Band	
			3	Peak Ready range	

21	Hold release timer	0.0	0.0 ~ 25.5 (sec)	(blank)	
22	Hold value comparator output timer	0	0 ~ 255 (sec)	(blank)	

8. OP5 BCD OUTPUT FUNCTIONS

bFn（OP5）	Name	Default	Setting	
			Parameter	Description
1	Output Data	0	0	Same as display
			1	Gross
			2	Net
2	Data transfer mode	0	0	Stream
			1	Auto print
			2	Manual print
3	Output Code	0	0	BCD Code
			1	HEX Code
4	O.L. Output Code	0	0	FFFFFF
			1	999999
5	Output Logic	0	0	Positiv Logic
			1	Negative Logic
6	Data Ready Output Logic	0	0	Positiv Logic
			1	Negative Logic
7	10^3 Remap	0	0	None
			1	10^0
			2	10^1
			3	10^2
8	10^4 Remap	0	0	None
			1	10^0
			2	10^1
			3	10^2
			4	10^3
9	10^5 Remap	0	0	None
			1	10^0
			2	10^1
			3	10^2
			4	10^3
			5	10^4
10	INPUT Signal	0	0	HOLD Input
			1	ZERO Input

~ The End ~