EX2005

OPERATION MANUAL

2 2 2 TABLE OF CONTENTS 2 2 2

SAFETY

- **When the instrument is installed, connect an earth bonding conductor from FG to the earth connection marked " ⏚ ".**

- **Disconnect the mains power supply before opening the instrument housing. NOTE: There are no user serviceable parts inside.**

- **To install the optional interface cards, it is necessary to disconnect the mains power supply and fit a yellow/green earth bonding cable to the rear panel.**

- **Before turning the power on ensure the supply voltage is within the acceptable range, DC12V~DC24V.**

- **The operating ambient temperature range is -10°C ~ +40°C. (+14°F ~ +104°F)**

FEATURES

EX2005 has a wide range of applications from batching to simple weighing.

Features:

Stand alone batching mode or connect to PLC for external system control

Built in batching / dosing functions

Manual / automatic discharge operation

Set cycle times in a batch

Totalise weight and number of cycles

Key in the signal voltage value (mV/V) directly via the keyboard, no need to apply any weight to calibrate the system.

Display load cell output voltage (mV/V) for future maintenance

Adjustable filter

Built-in RS232C bi-directional interface or RS485 one way serial interface

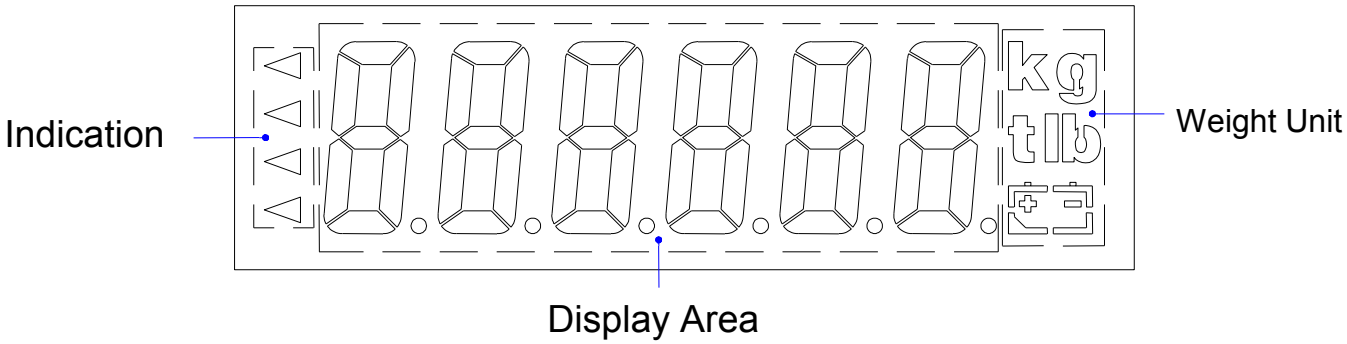
Built-in MODBUS (RTU) format

Interface options:

OP-02-1	BCD parallel output interface (Open collector output)
OP-02-2	BCD parallel output interface (TTL output)
OP-03	16 Bit Analogue current output interface (0 ~ 20 mA)
OP-04	Control I/O (4 In / 4 Out) + Setpoint In (BCD code)
OP-04E	Relay Output (4 In / 4 Out)
OP-04C	Hi, Lo, OK input interface (BCD code)
OP-04F	Setpoint input interface (BCD code)
OP-05	Control I/O (8 In / 8 Out)
OP-05E	Relay Output (8 In / 8 Out)

CHAPTER 1 FRONT AND REAR PANEL SPECIFICATIONS

1-1 Front Panel



Display

- 6 digits, bright red, 7 segment LED display, character height 16mm (0.63”). Display can be switched between Gross Weight / Net Weight / Totalised Weight / Number of transactions in the total.

- Indication icons “◀”

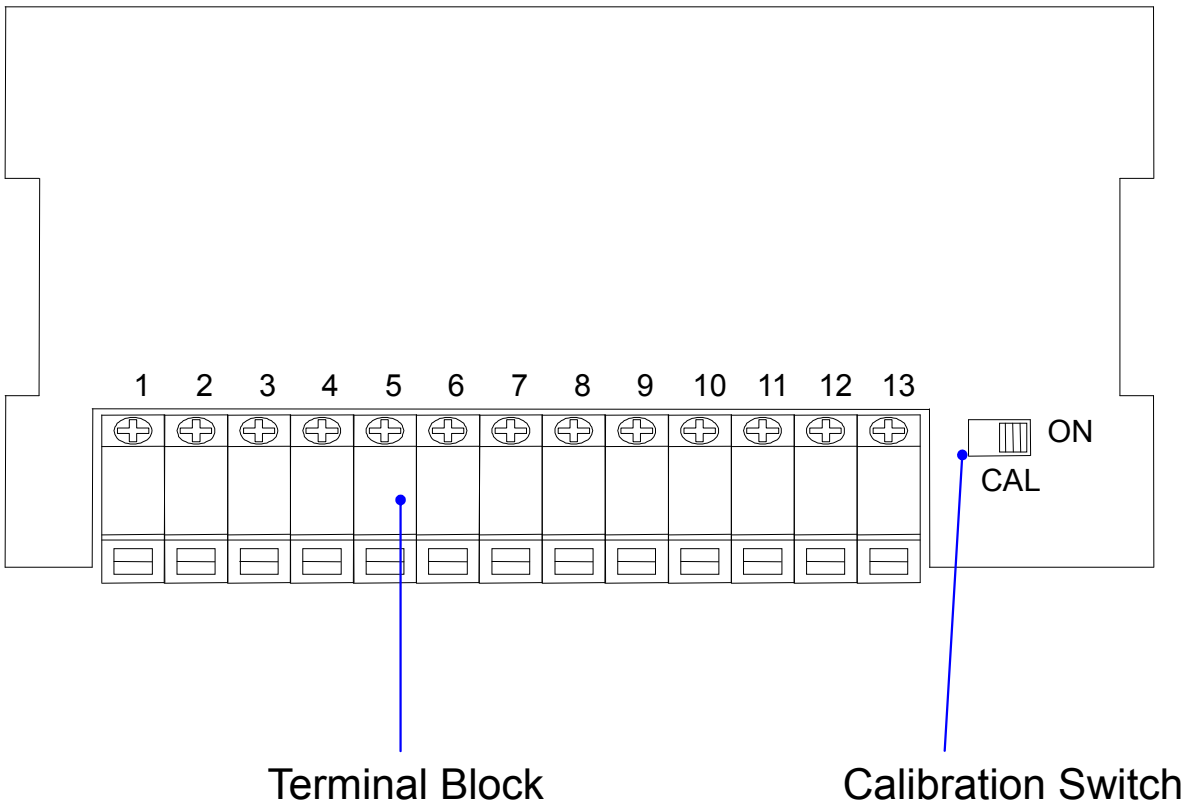
ZERO	◀	:	Zero Indication
MD	◀	:	Unstable weight Indication
GROSS	◀	:	Gross weight Indication
NET	◀	:	Net weight Indication

♦ The indicator is supplied with suitable labels to customise the icon displays. Refer to FNC. 06 ~ FNC.09 for the various options available.

2 Weighing Units

♦ Weighing Units kg / g / t / lb.

1-2 Rear Panel



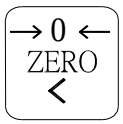
2 Calibration Switch set to the left is “OFF” and to the right is “ON”

2 13 Way Terminal Block

1st : EARTH or GROUND
2nd : DC+
3rd : DC-
4th : Not Used
5th : TXD / DA -
6th : RXD / DA+
7th : SG
8th : EXC+
9th : SEN+
10th : SEN-
11th : EXCITATION -
12th : SIGNAL +
13th : SIGNAL -

1-3 Keyboard Description

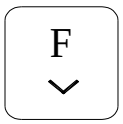
: When entering data or reference setting, it means “ESC”.
In the normal operation, it puts the indicator in standby mode or escape.
Entering standby mode: All of the display (except ZERO “ 3 ” symbol) and serial data output are disabled.
Escape from standby mode: Re-power on mains for normal operation.



: When parameter setting, it moves the flashing digit left.
In the normal mode, it performs a Zero operation.

: When parameter setting, it moves the flashing digit right.
In the normal mode, it performs a semi-auto Tare operation.

: When parameter setting, it increments the flashing digit or steps up the select item.
In the normal mode, it accesses the FNC-05 setting.



: When parameter setting, it decrements the flashing digit or steps down the select item.
In the normal mode, it accesses the FNC-04 setting.

: Confirm / enter key

- **4** Function FNC-03 can be used to selectively disable individual keys.
- **4** Zero operation, will be limited by functions CSP-05 and CSP-10.
- **4** Zero operation, will be limited by functions CSP-10 and CSP-11.

1-4 A/D Conversion

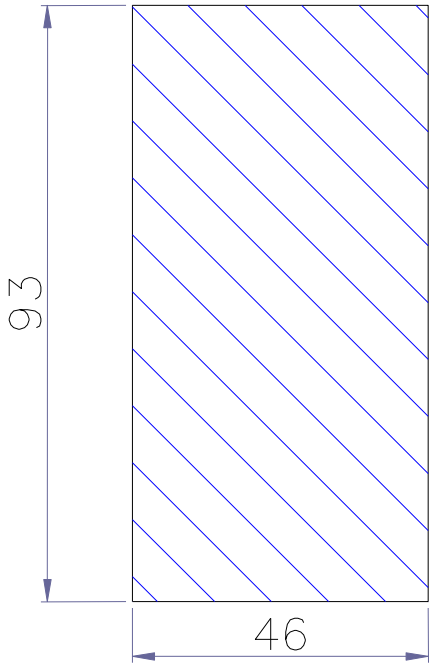
* Input Sensitivity	: Over 0.12μV/D
* Internal Resolution	: 1 / 1,000,000
* Max. Sampling Speed	: 120 times/sec.
* Application Range	: - 0.1 mV/V ~ 4.0 mV/V
* Load Cell Excitation Voltage	: 5 VDC ±5%, 120mA (Up to eight (8) 350 Ω load cells can be connected)

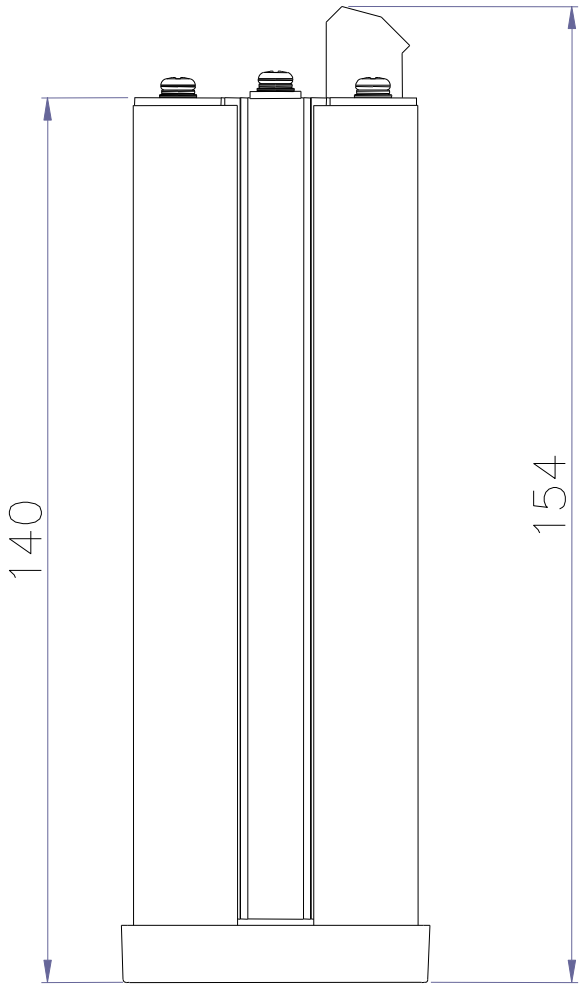
1-5 Power Supply

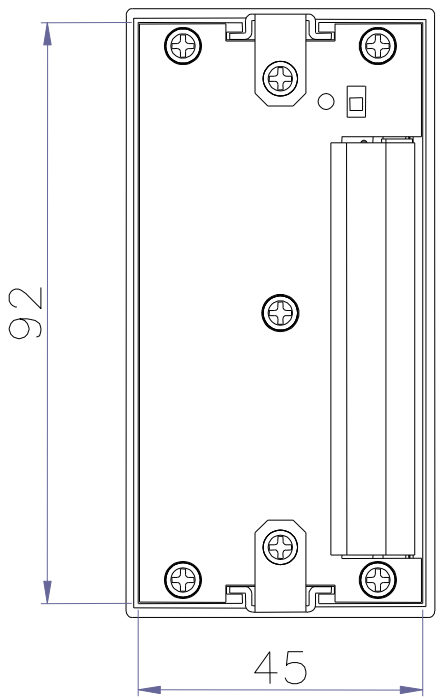
♦ DC12V ~ DC24V

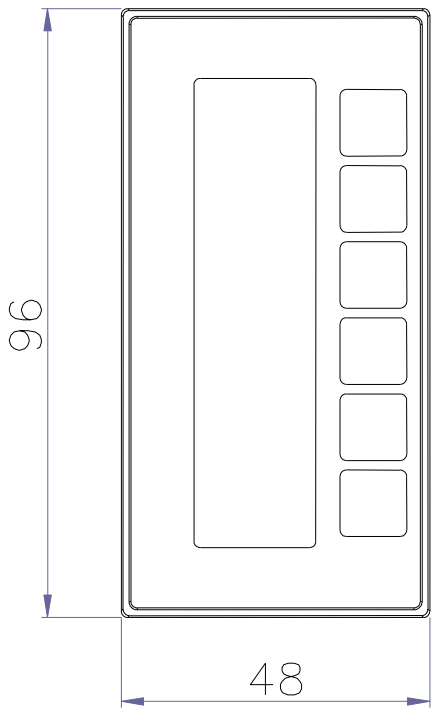
1-6 Dimensions

Panel Cutout





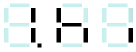




CHAPTER 2 GENERAL FUNCTION GUIDE

2-1 Function Setup and Operation Procedures

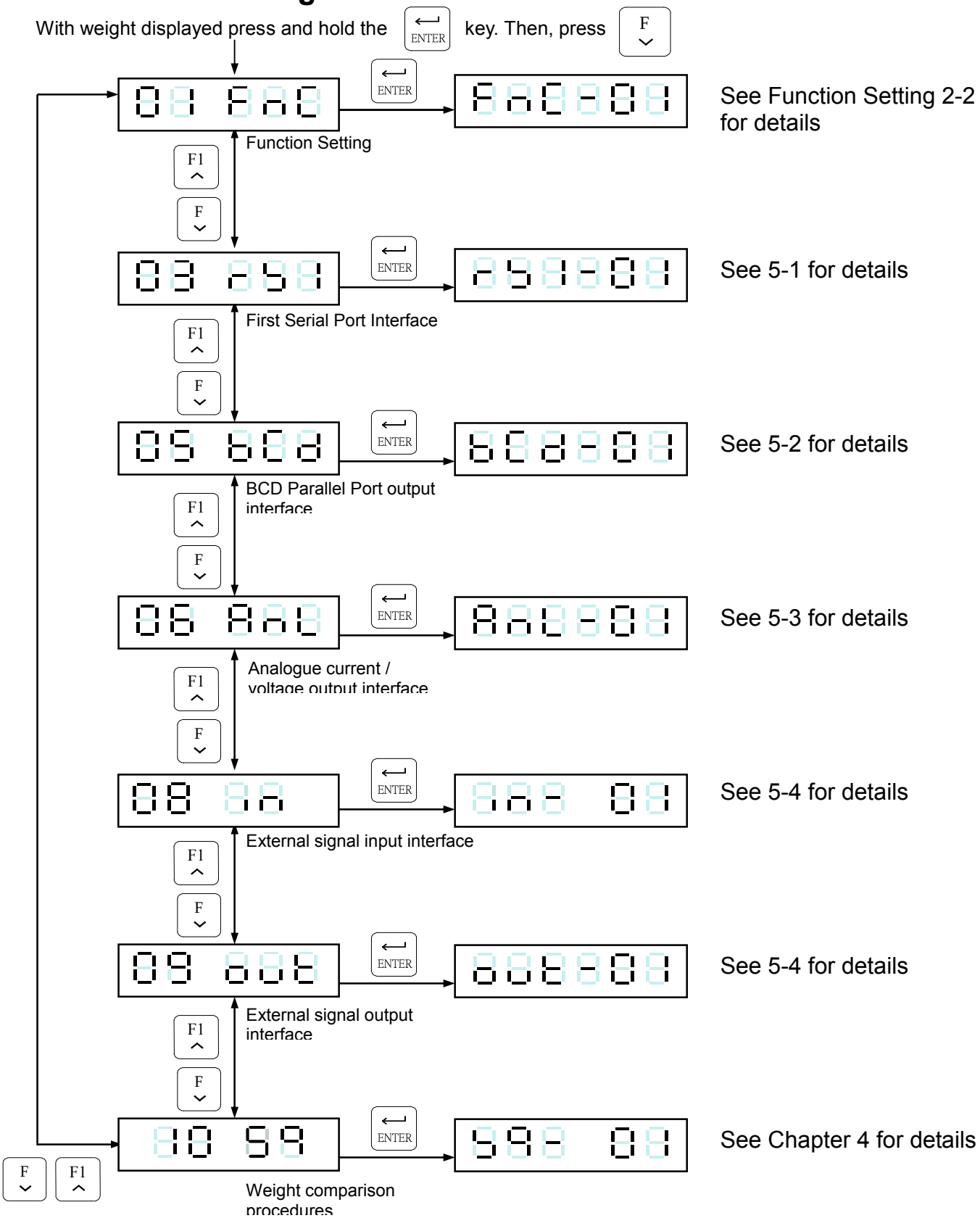
Function	Operation	Display	Description
Enter calibration mode	Turn the calibration switch to “ON”		See 3-2 for details
Enter function setting	Press ENTER not release, then press F key after the power is turned on		See 2-2 for details
Reset all parameters back to default	Turn the power on then turn the calibration switch to “ON” then press and hold the F and ENTER keys during the self-testing sequence		See 6-1 for details
Reset general function parameters back to default	Turn the power on and press F and ENTER keys during self-testing sequence		See 6-2-1 for details
Clear zero point compensation and tare value	Turn the power on and press F and ENTER keys during self-testing sequence, and then press F1		See 6-2-2 for details
Clear setpoint parameter setting	Turn the power on and press F and ENTER keys during self-testing sequence, and then press F1 two times		See 6-2-3 for details
Value of zero point voltage(mV/V)	Turn the power on and Press F and ENTER ,then press F1 three times.		See 6-2-4 for details
Value of Span voltage (mV/V)	Turn the power on and Press F and ENTER , then Press F		See 6-2-5 for details
Entering to test mode	Turn the power on and press I/ESC and ENTER keys during self-testing sequence		See 6-3 for details

Function	Operation	Display	Description
Check weighing setpoint parameter setting	Press the [F ⌄] key to set the parameter of FUNC.4 to 1 in the normal mode	 or 	See 4-2 for details

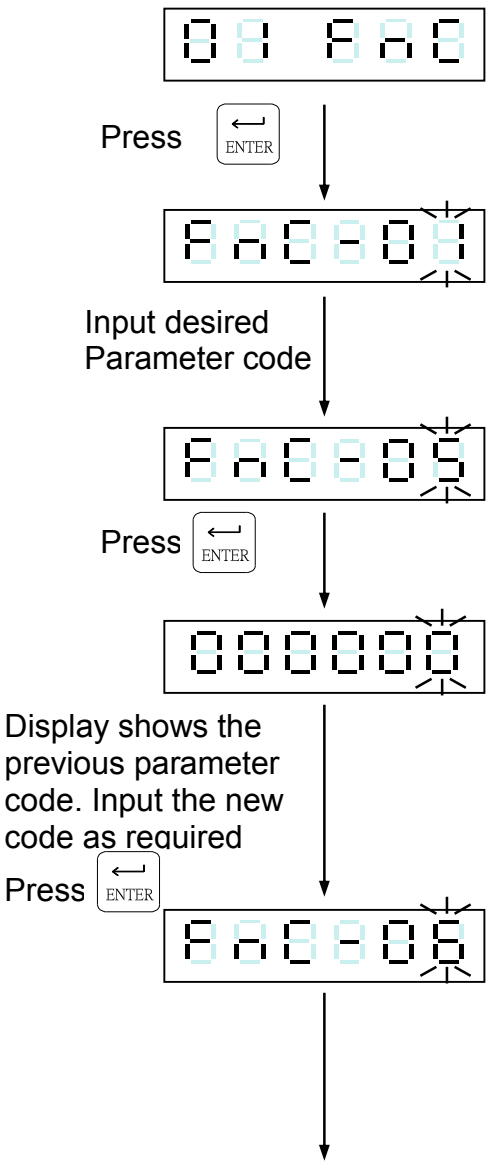
4 Key actions in function set up mode

- [F1 ^] ⇒ Increases the number of the flashing digit
- [F ⌄] ⇒ Decreases the number of the flashing digit
- [→0← ZERO <] ⇒ Moves the flashing digit one space to the left
- [→T← TARE >] ⇒ Moves the flashing digit one space to the right
- [↵ ENTER] ⇒ Saves the configuration
- [I/⏻ ESC] ⇒ Quits set up mode / Escape

4 Function Setting Procedures



2-2 Function Setting



To continue the next function setting
or press I/⏻ ESC to escape

*Function Parameter code

FAC-01	⇒ Digital Filter I
FAC-02	⇒ Digital Filter II
FAC-03	⇒ Lock keypad function
FAC-04	⇒ “F” function setting
FAC-05	⇒ “F1” function setting
FAC-06	⇒ Front panel indication “◀” setting (first)
FAC-07	⇒ Front panel indication “◀” setting (second)
FAC-08	⇒ Front panel indication “◀” setting (third)
FAC-09	⇒ Front panel indication “◀” setting (fourth)
FAC-10	⇒ Terms of back to zero
FAC-11	⇒ Hold
FAC-12	⇒ Rate for display rewrite

F1 ^	⇒ Increment flashing digit
F v	⇒ Decrement flashing digit
→0← ZERO <	⇒ Move flashing point left.
→T← TARE >	⇒ Move flashing point right
ENTER	⇒ Store data in memory
I/⏻ ESC	⇒ Exit / Escape

2 FNC Group Function Setting

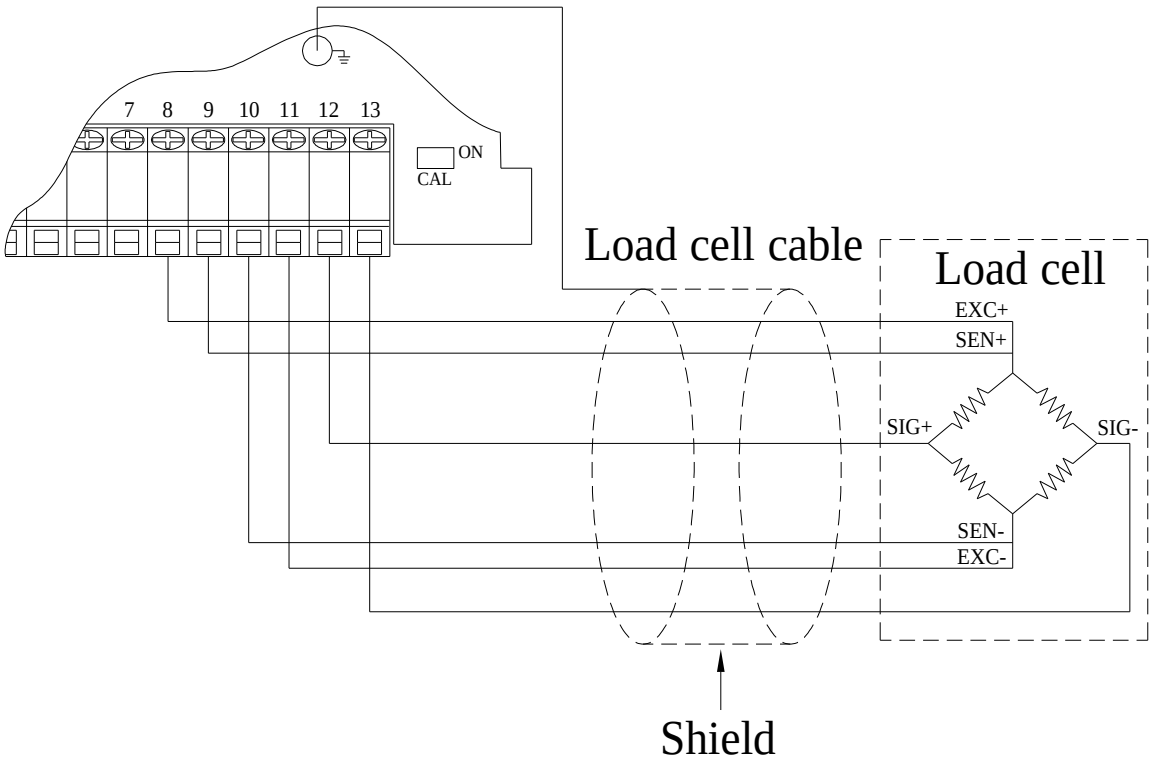
Item	Function	Setting value				Default
		Parameter	Description			
FNC-01	Digital Filter I	0	5 Hz			4
		1	4.17 Hz			
		2	2.5 Hz			
		3	2.08 Hz			
		4	1.25 Hz			
		5	1.04 Hz			
		6	0.63 Hz			
		7	0.52 Hz			
		8	0.31 Hz			
		9	0.26 Hz			
FNC-02	Digital Filter II	0	Disabled			2
		1	Less filter ↕ Greater			
		2				
		3				
		4				
		5				
FNC-03	Key – Locked	000000 ↓ 111111	0	Normal (lock disable)	The bits and front panel key positions are related to each other.	000000
			1	Close (lock enable)		
FNC-04	“F” function setting	Parameter ⇒ Description 0 ⇒ Display Net / Gross weight 1 ⇒ Setpoint parameter setting 2 ⇒ Tare reset 3 ⇒ Manual serial, parallel print output. 4 ⇒ Start load 5 ⇒ Stop load 6 ⇒ Start comparison 7 ⇒ Unload command 8 ⇒ Totalise weight and counts command 9 ⇒ Clear totalised weight and counts 10 ⇒ Hold mode 11 ⇒ Escape Hold mode(I/O DSP) 12 ⇒ Convert to Gross / Net / totalised weight / totalised Count				1
FNC-05	“F1” function setting					0

Item	Function	Setting value		Default
		Parameter	Description	
FNC-06	Front panel indication "◀" setting (top)	Parameter ⇒ Description 0 ⇒ Zero 1 ⇒ MD 2 ⇒ Gross 3 ⇒ Net 4 ⇒ Totalised weight (Accu. V) 5 ⇒ Totalised transactions (Accu. C) 6 ⇒ SP1 7 ⇒ SP2 8 ⇒ SP3 9 ⇒ Hi 10 ⇒ OK 11 ⇒ Lo 12 ⇒ Under 13 ⇒ Over 14 ⇒ Discharge 15 ⇒ Running 16 ⇒ Hold		0
FNC-07	Front panel indication "◀" setting (next to top)			1
FNC-08	Front panel indication "◀" setting (next to bottom)			2
FNC-09	Front panel indication "◀" setting (bottom)			3
FNC-10	Return to zero band	0	5 d	0
		1	10 d	
		2	20 d	
		3	40 d	
		4	60 d	
		5	80 d	
		6	100 d	
		7	150 d	
		8	200 d	
		9	250 d	
FNC-11	Hold	0	Hold	0
		1	Peak hold (positive 1)	
		2	Peak hold (negative)	
		3	Peak hold (absolute value)	
		4	Peak hold (positive 2)	
FNC-12	Rate for display rewrite	0	No limitation	0
		1	20 times/sec	
		2	10 times/sec	
		3	5 times/sec	
		4	1 time/sec	

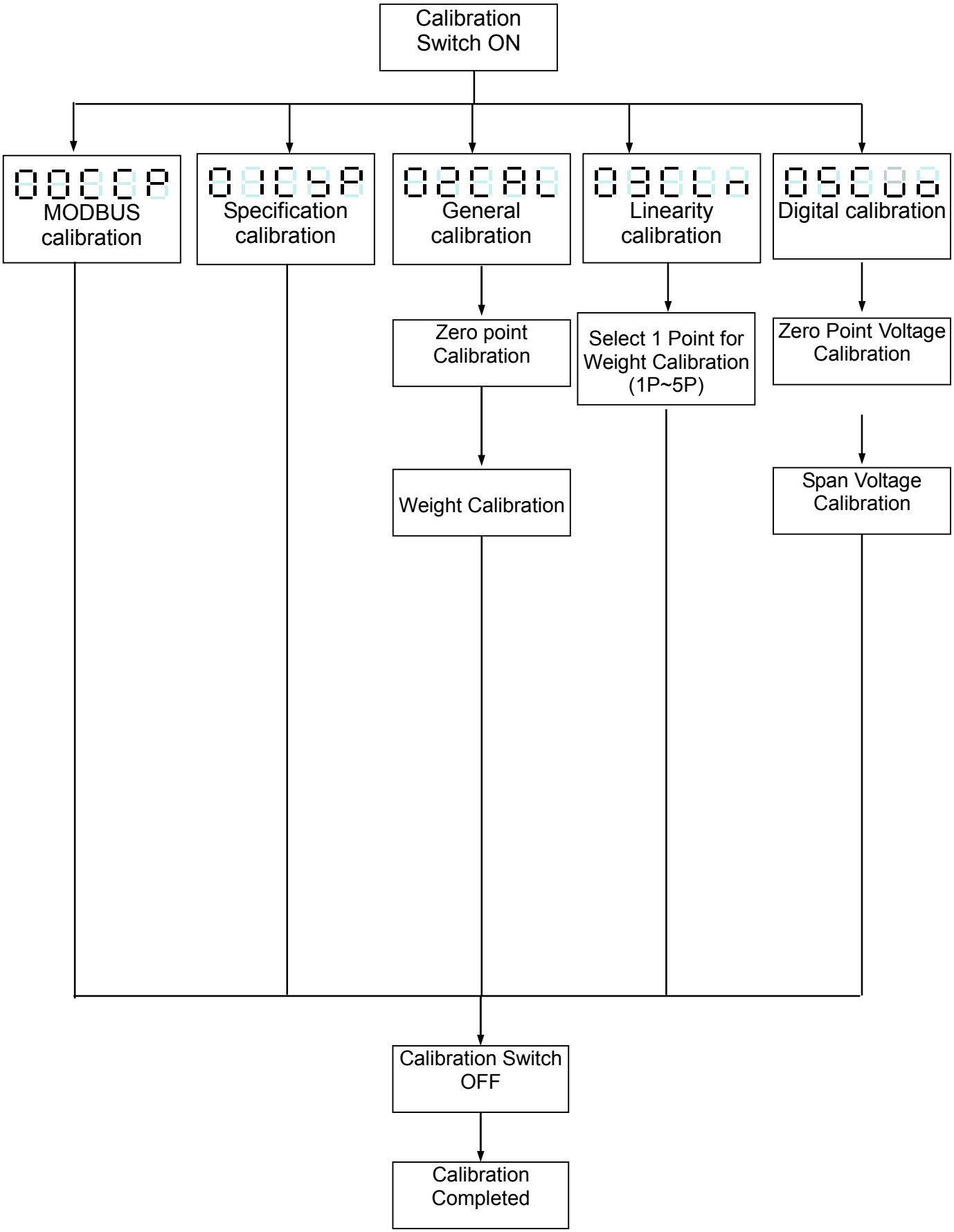
CHAPTER 3 CALIBRATION

3-1 Load Cell Connection

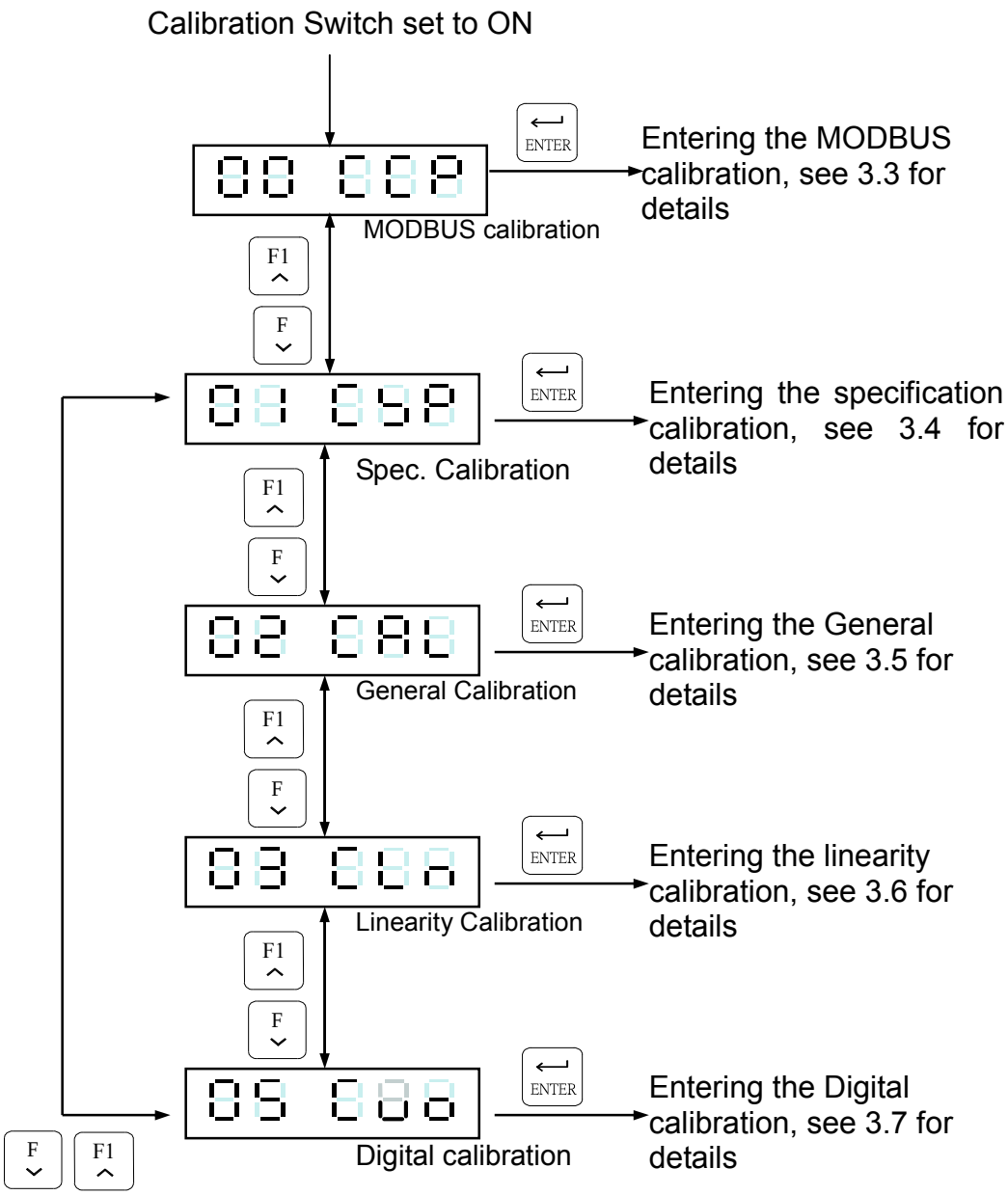
2 When using a 6 wire cable to connect the load cell, the SEN+ and SEN- can be left unconnected (see below diagram)



3-2 Parameter Setting and Calibration Flow Chart



2 Calibration process

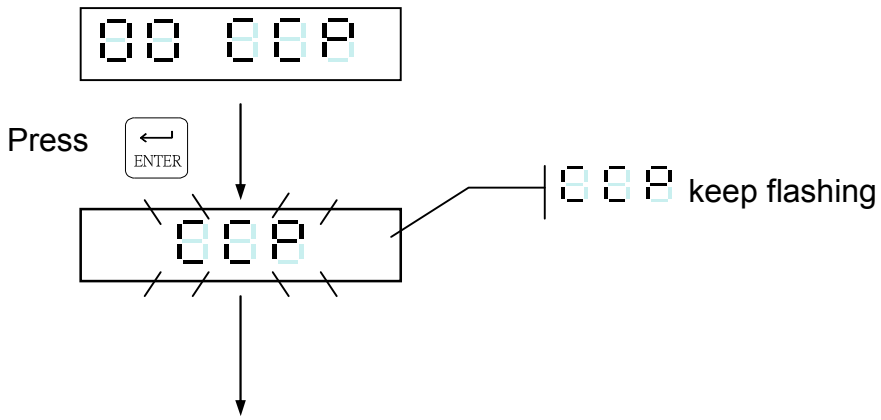


4 Before the Linearity Calibration, the General Calibration should be completed.

3-3 MODBUS Calibration

2 RS1-02 set as “4” (MODBUS RTU mode)

RS1-07 set as “01” (address)



eg:

Zero calibration

Input 01050423FF007CC0← zero calibration

Reading calibration status

Input 0101004100565AC1D ← Refer to “Appendix 3: MODBUS data address table”

The zero calibration is finished, and there should be no Err message appeared.

Span calibration

Input weight calibration value 3000

Input 0110044C0001020BB8EADE ← Input weight calibration value 3000

Put 3kg on the platter

Span calibration

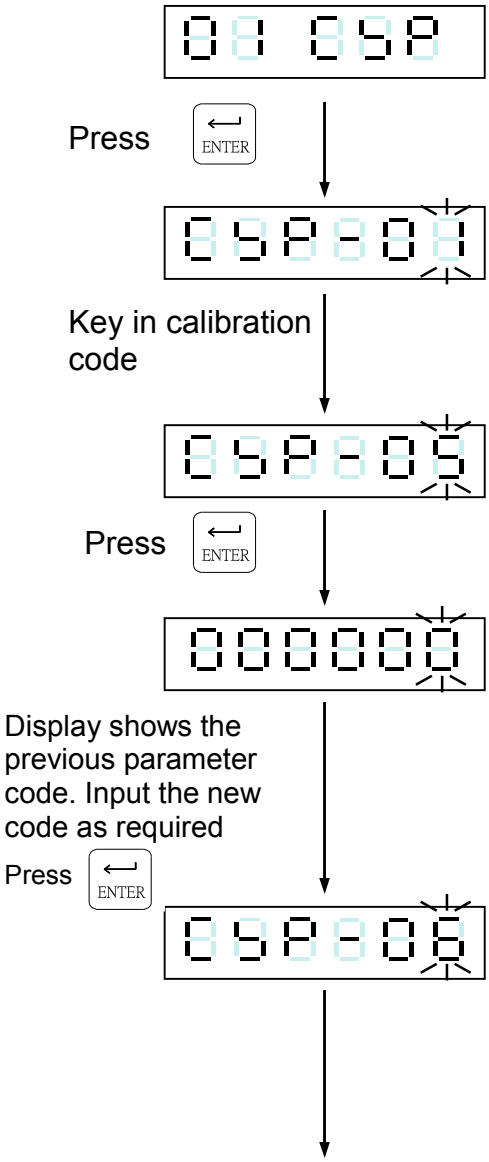
Input 01050424FF00CD01 ← Span calibration

Reading calibration status

Input 0101004100565AC1D ← Refer to “Appendix 3: MODBUS data address table”

The span calibration is finished, and there should be no Err message appeared.

3-4 Specification Calibration



To continue the next function setting or press I/⏻ ESC to escape

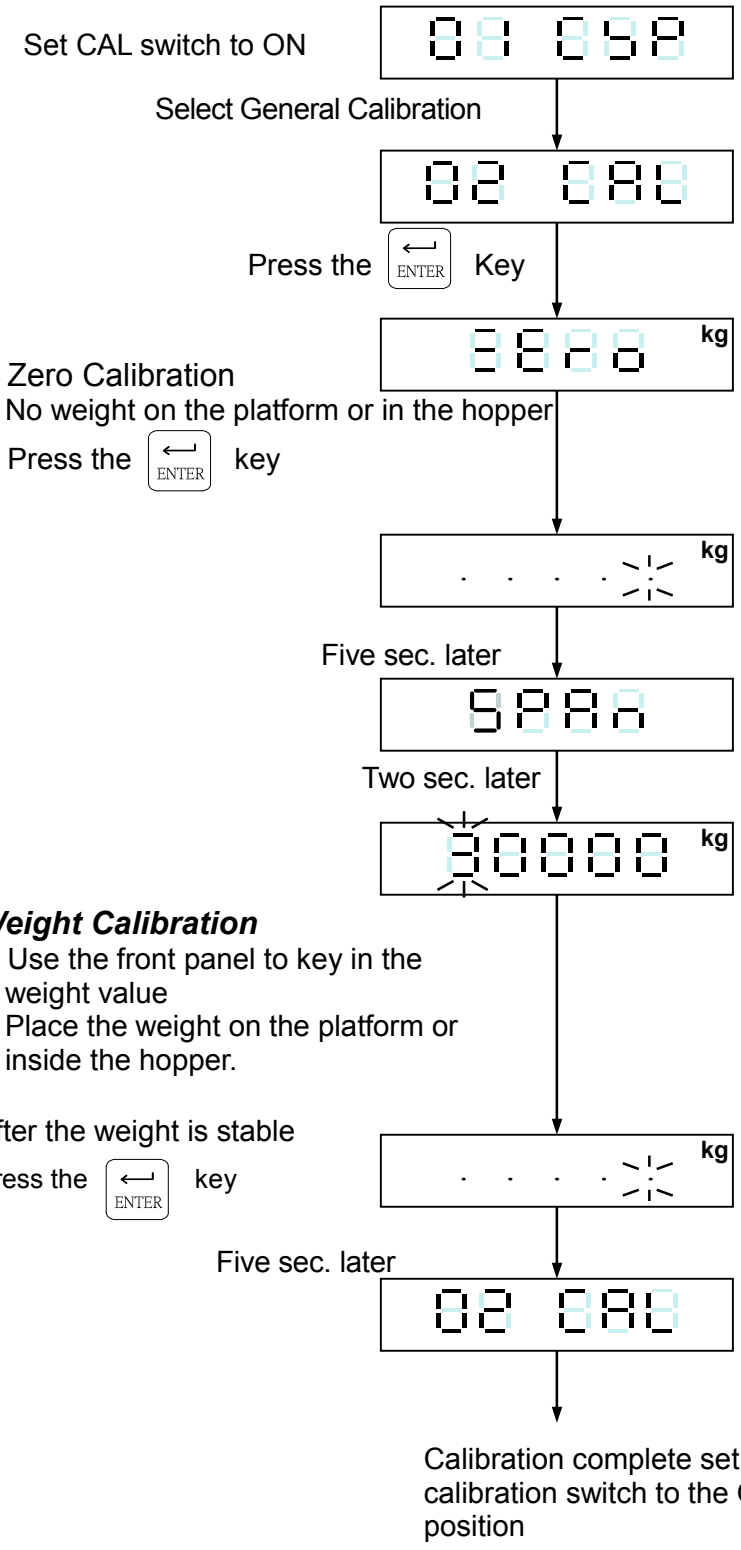
*Calibration parameter code

- CAL-01 ⇒ Unit
- CAL-02 ⇒ Decimal Point
- CAL-03 ⇒ Min. Division
- CAL-04 ⇒ Max. Capacity
- CAL-05 ⇒ Zero Range
- CAL-06 ⇒ Time of Zero tracking
- CAL-07 ⇒ Range of Zero tracking
- CAL-08 ⇒ Investigate period of unstable
- CAL-09 ⇒ Investigate range of unstable
- CAL-10 ⇒ Function Zero and Tare when the weight is unstable.
- CAL-11 ⇒ Tare function availability when gross weight is negative.

F1 ^	⇒ Increment flashing digit
F v	⇒ Decrement flashing digit
→0← ZERO <	⇒ Move flashing point left.
→T← TARE >	⇒ Move flashing point right
ENTER	⇒ Store data in memory
I/⏻ ESC	⇒ Exit / Escape

Item	Function	Setting value		Default
		Parameter	Description	
CSP-01	Unit	0	None	2
		1	g	
		2	Kg	
		3	t	
		4	lb	
CSP-02	Decimal Point	0	None	0
		1	1 Decimal Point	
		2	2 Decimal Point	
		3	3 Decimal Point	
CSP-03	Division	1	Division size	1
		2		
		5		
		10		
		20		
		50		
CSP-04	Max. Capacity	999999 ↓ 000000	Max. capacity	999999
CSP-05	Zero range	0 =full range (±1%~30%)	Zero range = calibration zero point ± (Max. capacity×setting value %)	0
CSP-06	Time of zero tracking	0.0 ~ 5.0 (sec)	Time and range of zero tracking should be use at the same time. If the time is set to 0.0, the zero tracking function is disabled.	1.0
CSP-07	Range of zero tracking	0 ~ 9	Range of zero tracking = (setting value×½)D , D=min. division Range and time of zero tracking should be use at the same time. If the range is set to 0, the zero tracking function is disabled.	2
CSP-08	Investigate time in stable	0.0 ~ 5.0 (sec)	Investigate time and range should be use at the same time. If the time is set to 0.0, the investigate time is disabled.	1.0
CSP-09	Investigate range in stable	0 ~ 9	Investigate time and range should be use at the same time. If the range is set to 0, the investigate range is disabled.	2
CSP-10	Weight unstable, function ZERO and TARE	0	Action	0
		1	None	
CSP-11	Gross Weight is negative, function TARE	0	Action	0
		1	None	

3-5 General Calibration



F1 ⇒ Increment flashing digit

F ⇒ Decrement flashing digit

→0← ZERO ⇒ Move flashing point left.

→T← TARE ⇒ Move flashing point right

ENTER ⇒ Store data in memory

I/⏻ ESC ⇒ Exit / Escape

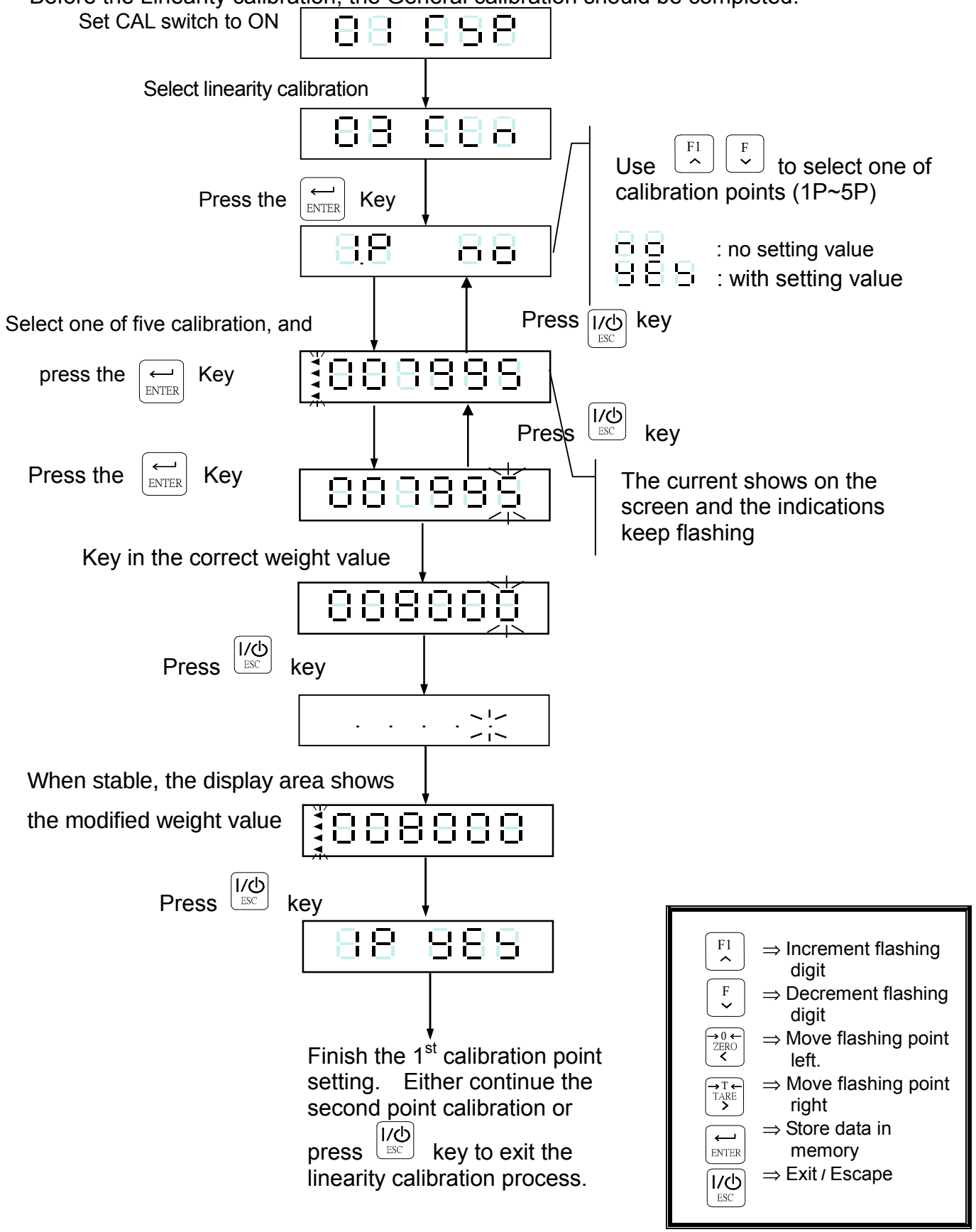
4 Zero calibration only, press I/⏻ ESC key to escape after the display shows SPAn.

4 Span calibration only, press I/⏻ ESC key entering directly to span calibration after the display shows CAL.

4 Please refer to error message during calibration of the display show Err.**X**

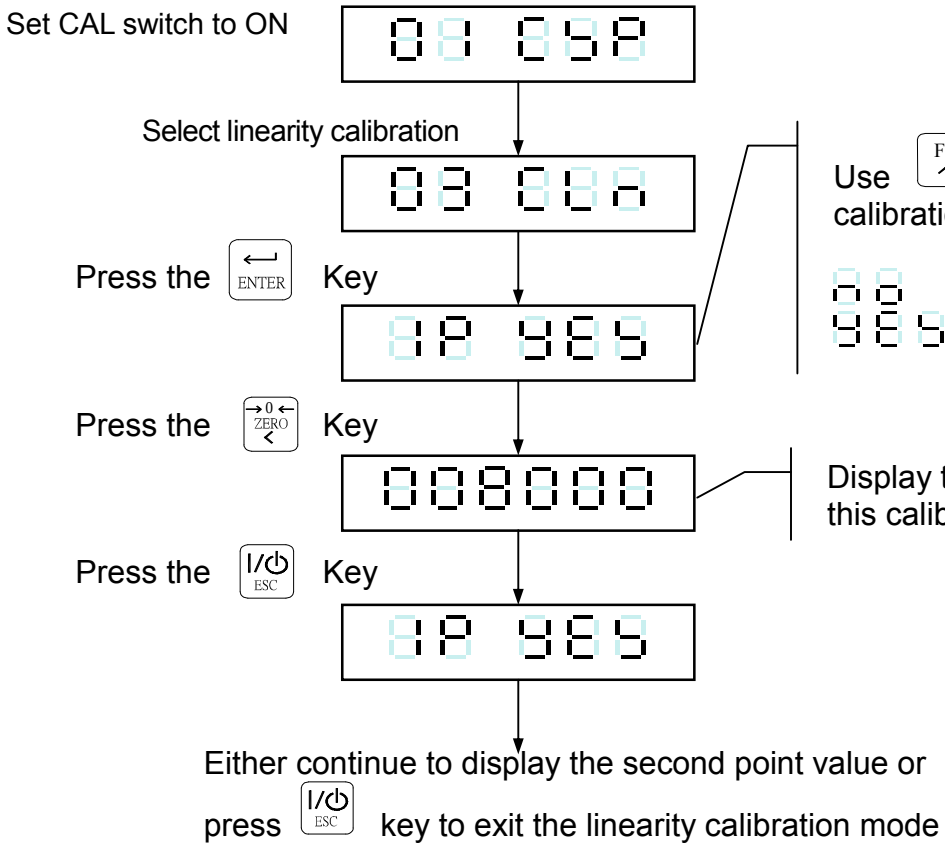
3-6 Linearity Calibration

** Before the Linearity calibration, the General calibration should be completed.

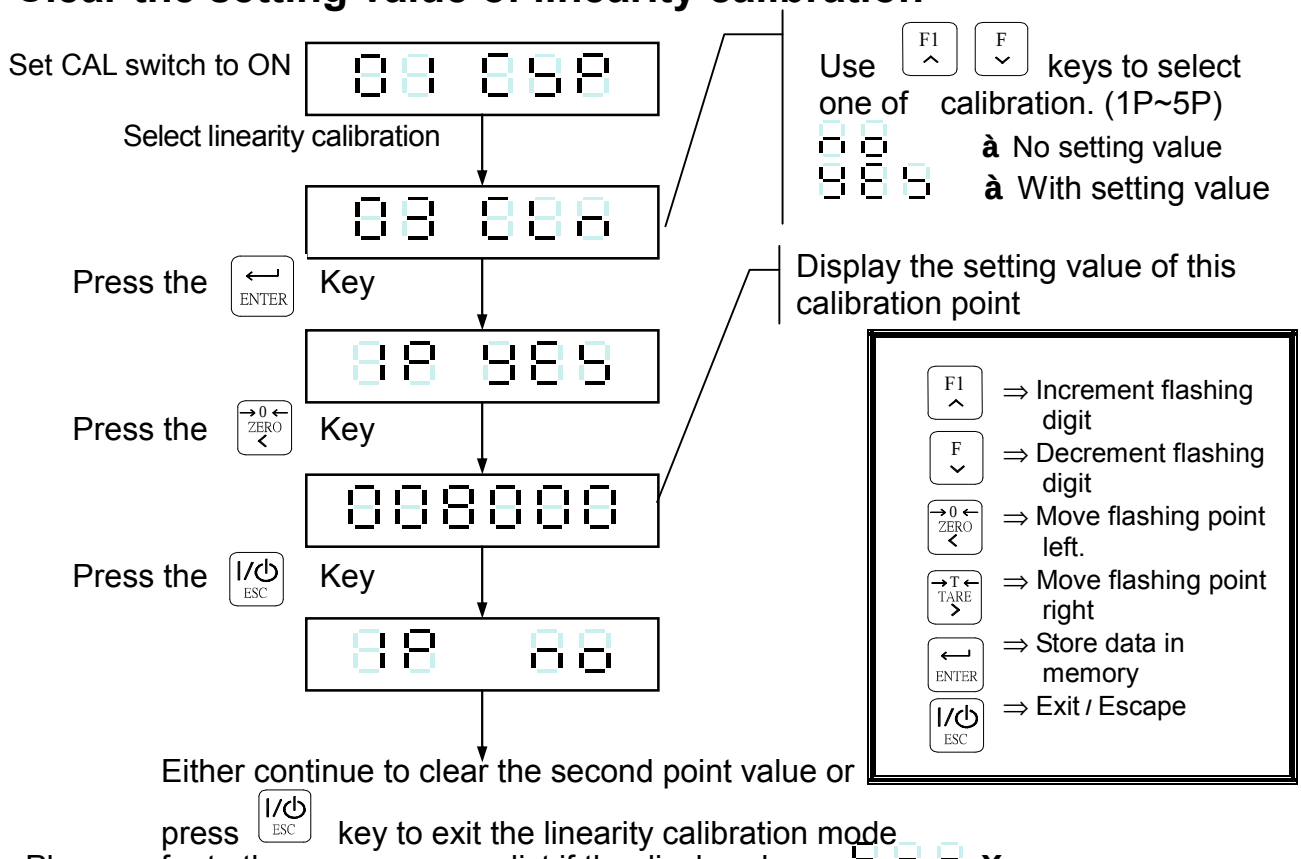


4 Please refer to the error message list if the display shows **Err.X**

2 Display the setting value of linearity calibration



2 Clear the setting value of linearity calibration



4 Please refer to the error message list if the display shows Err. X

3-7 Digital Calibration

Set CAL switch to ON

Select Digital calibration

Press the ENTER Key

Zero voltage calibration.

Two sec. later

Method 1
Input zero voltage

Method 2
With no weight on the platform or in the hopper press the ENTER Key to set zero.

Press the ENTER Key

Two sec. later

Input the span voltage

Span voltage calibration

Press the ENTER Key

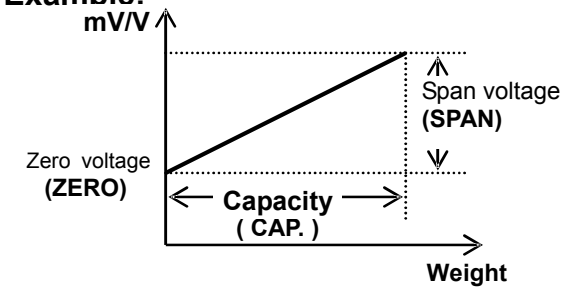
Two sec. later

Enter the weighing capacity

Press the ENTER Key

Calibration completed set calibration switch to the OFF position

Example:

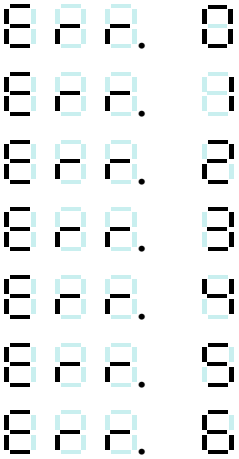


Zero Voltage Þ 0.00036 mV/V(incl. dead load)
Span Voltage Þ 2.90000 mV/V
Capacity Þ 30000 divisions

F1 ⇒ Increment flashing digit
F ⇒ Decrement flashing digit
→0← ZERO ⇒ Move flashing point left.
→T← TARE ⇒ Move flashing point right
ENTER ⇒ Store data in memory
I/⏻ ESC ⇒ Exit / Escape

4 Please refer to the error message list if the display shows **Err.X**

3-8 Calibration Error Messages



⇒ Load Cell output voltage < - 0.1mV/V or > 4mV/V

⇒ Weight value ≤ previous weight value

⇒ Actual measured weight value ≤ previous weight value

⇒ Setting value 0

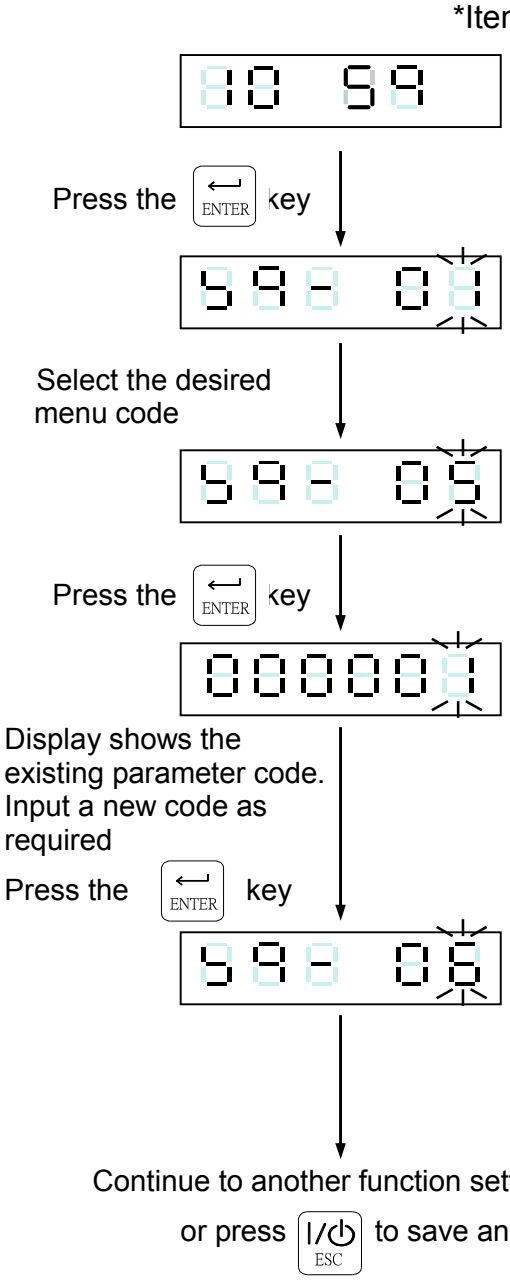
⇒ mV/V value entered > measuring range

⇒ mV/V value entered is too small (SPAN – Zero < 0 mV/V)

⇒ Displayed resolution is less than 0.12μV / division

CHAPTER 4 WEIGHT COMPARISON PROCEDURES

4-1 Function Configuration Menu



*Item code

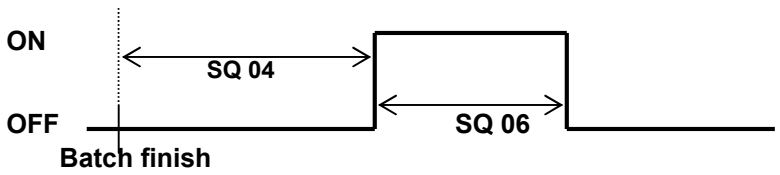
- 59- 01 ⇒ Batching mode
- 59- 02 ⇒ Batching start delay time
- 59- 03 ⇒ Compare SP1 & SP" waiting time
- 59- 04 ⇒ Batch finish output signal delay time
- 59- 05 ⇒ Batch finish condition
- 59- 06 ⇒ Batch finish output signal duration
- 59- 07 ⇒ Supplementary load times
- 59- 08 ⇒ Supplementary loading gate open time
- 59- 09 ⇒ Supplementary loading gate close time
- 59- 10 ⇒ Discharge start delay time
- 59- 11 ⇒ Discharge stop delay time
- 59- 12 ⇒ Discharge time
- 59- 13 ⇒ Restart delay time
- 59- 14 ⇒ Batching times
- 59- 15 ⇒ Weight completed value in Zero band
- 59- 16 ⇒ Hi, OK, Lo action mode
- 59- 17 ⇒ Auto totalise weight / counts
- 59- 18 ⇒ The parameter source for weight comparison
- 59- 19 ⇒ Weight comparison delay time
- 59- 20 ⇒ Tare auto
- 59- 21 ⇒ Discharge auto

F1 ^	⇒ Increment flashing digit
F v	⇒ Decrement flashing digit
→0← ZERO <	⇒ Move flashing point left.
→T← TARE >	⇒ Move flashing point right
ENTER	⇒ Store data in memory
I/⏻ ESC	⇒ Exit / Escape

Functional Parameter Instruction

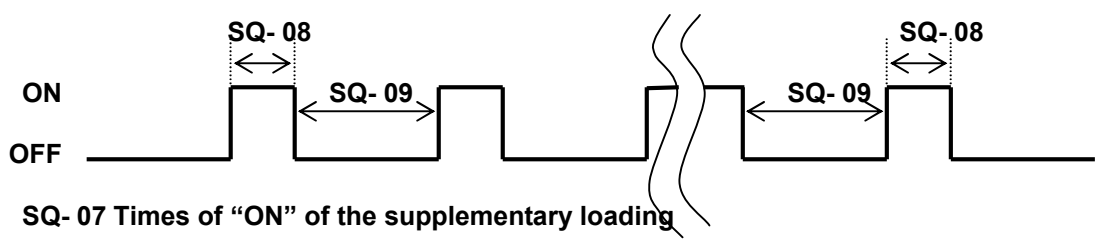
Item	Function	Setting value		Default
		Parameter	Description	
SQ- 01	Batching mode	1	Normal batch	1
		2	Loss-in weight	
		3	Comparison mode	
		4	Normal batch (Built-in program)	
		5	Loss-in weight (Built-in program)	
		6	Hold mode (Built-in program)	
SQ- 02	Batching start delay time	0.0 ~ 25.5 (sec)	The built-in auto-program starts the batch comparison procedure after the input of the batch start signal.	0.0
SQ- 03	SP1,SP2 Waiting time comparison	0.0 ~ 25.5 (sec)	No full flow comparison during this function's set time period. If the set value is 0, indicates this function is not in use.	0.0
SQ- 04	Batch finish output signal delay time	0.0 ~ 25.5 (sec)	Output the batch finished signal after this delay time.	0.5
SQ- 05	Batch finish Condition	0	Wait until the weight is stabilized	0
		1	No need to wait until the weight has stabilized	
SQ- 06	Batch finish Output signal time	0.0 ~ 25.5 (sec)	Batch finished output signal time. If set to 0, the output signal will be off until the next batch start.	1.0

Batch finish signal

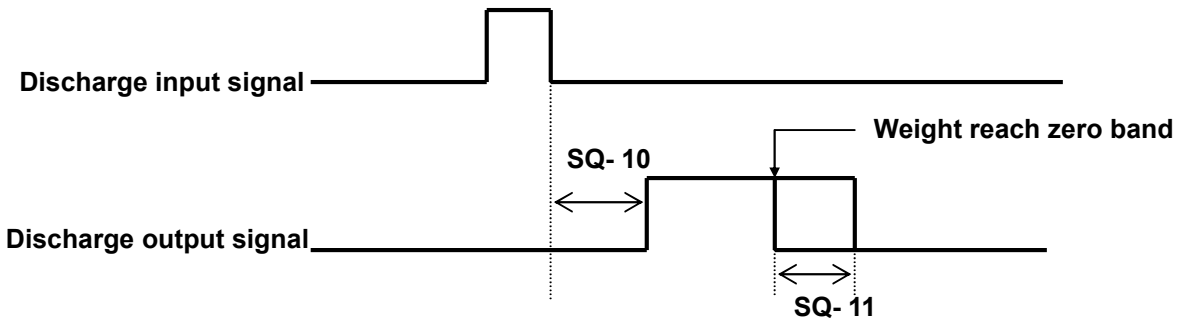


SQ- 07	Number of Times the supplementary loading function operates	0 ~ 255	If the set value is 0, this function is not in use.	0
SQ- 08	Supplementary loading gate open time	0.0 ~ 25.5 (sec)	Must be coordinate with times of supplementary loading, (SQ- 07)	0.1
SQ- 09	Supplementary loading gate close time	0.0 ~ 25.5 (sec)	Must be coordinate with times of supplementary loading, (SQ- 07)	1.0

Supplementary loading signal



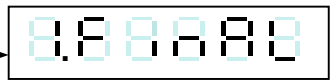
SQ- 07 Times of "ON" of the supplementary loading

Item	Function	Setting value		Default
		Parameter	Description	
SQ- 10	Discharge start delay time	0.0 ~ 25.5 (sec)	Delay time before Discharge signal is ON.	0.0
SQ- 11	Discharge stop delay time	0.0 ~ 25.5 (sec)	Delay time before Discharge signal is OFF.	0.0
SQ- 12	Discharge time	0.0 ~ 25.5 (sec)	Won't activate internal discharge control function, if set to 0.	0
				
SQ- 13	Restart delay time	0.0 ~ 25.5 (sec)	Delay time before Restart signal is ON.	1.0
SQ- 14	Batching counts	0 ~ 255 (times)	Number of batch runs 0 ⇒ one batch only	0
SQ- 15	Set the zero band in to final weighing value	0	No setting	0
		1	Setting	
SQ- 16	Hi, OK, Lo	0	Comparison anytime	0
		1	To compare at batch finish	
		2	To compare at external input signal	
		3	To compare at batching finish and external input signal.	
		4	Comparison auto	
SQ- 17	Auto totalise weight / counts	0	Disabled	0
		1	Enabled	
SQ- 18	The parameter source in weight comparison	0	Key in directly from front keypad	0
		1	Input directly from rear interface	
SQ- 19	Weight comparison delay time	0.0 ~ 25.5 (sec)	Comparison delay time for Hi, OK, Lo	0.5
SQ- 20	TARE auto.	0	Press keypad TARE to TARE	0
		1	TARE auto	
SQ- 21	Discharge auto	0	Input from external input or keypad	0
		1	Discharge auto + manual	

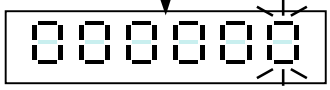
4-2 Check Weighing Configuration

1. FNC-04 = 1, SQ-01 = 1,2,4 or 5

Press the F Key

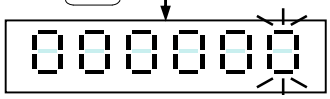


ENTER



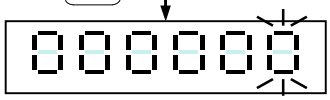
Display shows the existing **Final value** setting, Input new value as required.
Press ENTER

ENTER

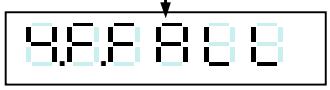


Display shows the existing **SP1 value** setting, Input new value as required.
Press ENTER

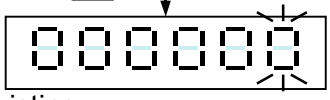
ENTER



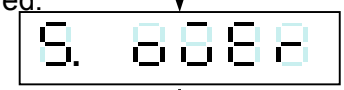
Display shows the existing **SP2 value** setting, Input new value as required.
Press ENTER



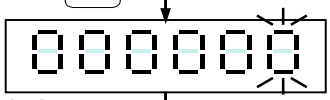
ENTER



Display shows the existing **Free Fall value** setting, Input new value as required.
Press ENTER

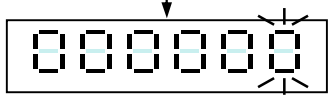


ENTER



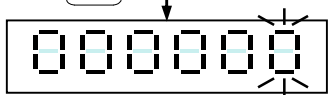
Display shows the existing **Over value** setting, Input new value as required.
Press ENTER

ENTER



Display shows the existing **Under value** setting. Input new value as required.
Press ENTER

ENTER



Display shows the existing **Zero Band**. setting. Input new value as required.
Press ENTER

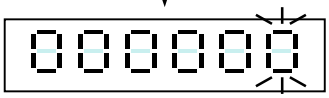
F1	⇒ Increment flashing digit
F	⇒ Decrement flashing digit
→0← ZERO	⇒ Move flashing point left.
→T← TARE	⇒ Move flashing point right
ENTER	⇒ Store data in memory
I/⏻ ESC	⇒ Exit / Escape

2. FNC-04 = 1, SQ-01 = 3

Press the F Key

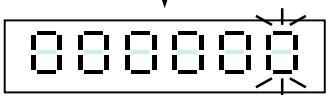
In the normal status

ENTER



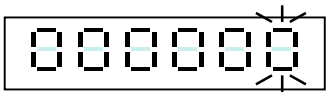
Display shows the existing **Hi value** setting,
Input new value as required.
Press ENTER

ENTER



Display shows the existing **Lo value** setting,
Input new value as required.
Press ENTER

ENTER



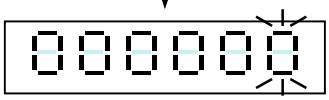
Display shows the existing **Zero Band** setting. Input new value as required.
Press ENTER

F1	⇒ Increment flashing digit
F	⇒ Decrement flashing digit
→0← ZERO	⇒ Move flashing point left.
→T← TARE	⇒ Move flashing point right
ENTER	⇒ Store data in memory
I/⏻ ESC	⇒ Exit / Escape

3. FNC-04 = 1, SQ-01 = 6

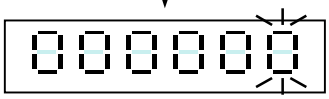
Press the F Key →

ENTER ↓



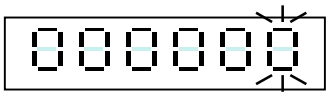
Display shows the existing **Hi value** setting, Input new value as required.
Press ENTER

ENTER ↓

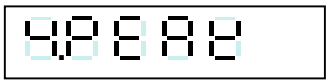


Display shows the existing **Lo value** setting, Input new value as required.
Press ENTER

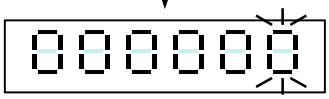
ENTER ↓



Display shows the existing **Zero Band** setting, Input new value as required.
Press ENTER



ENTER ↓



Display show the existing **Peak Ready value** setting. Input new value as required
Press ENTER

F1 ^	⇒ Increment flashing digit
F v	⇒ Decrement flashing digit
→0← ZERO <	⇒ Move flashing point left.
→T← TARE >	⇒ Move flashing point right
ENTER	⇒ Store data in memory
I/⏻ ESC	⇒ Exit / Escape

4-3 Batching Signal Outputs

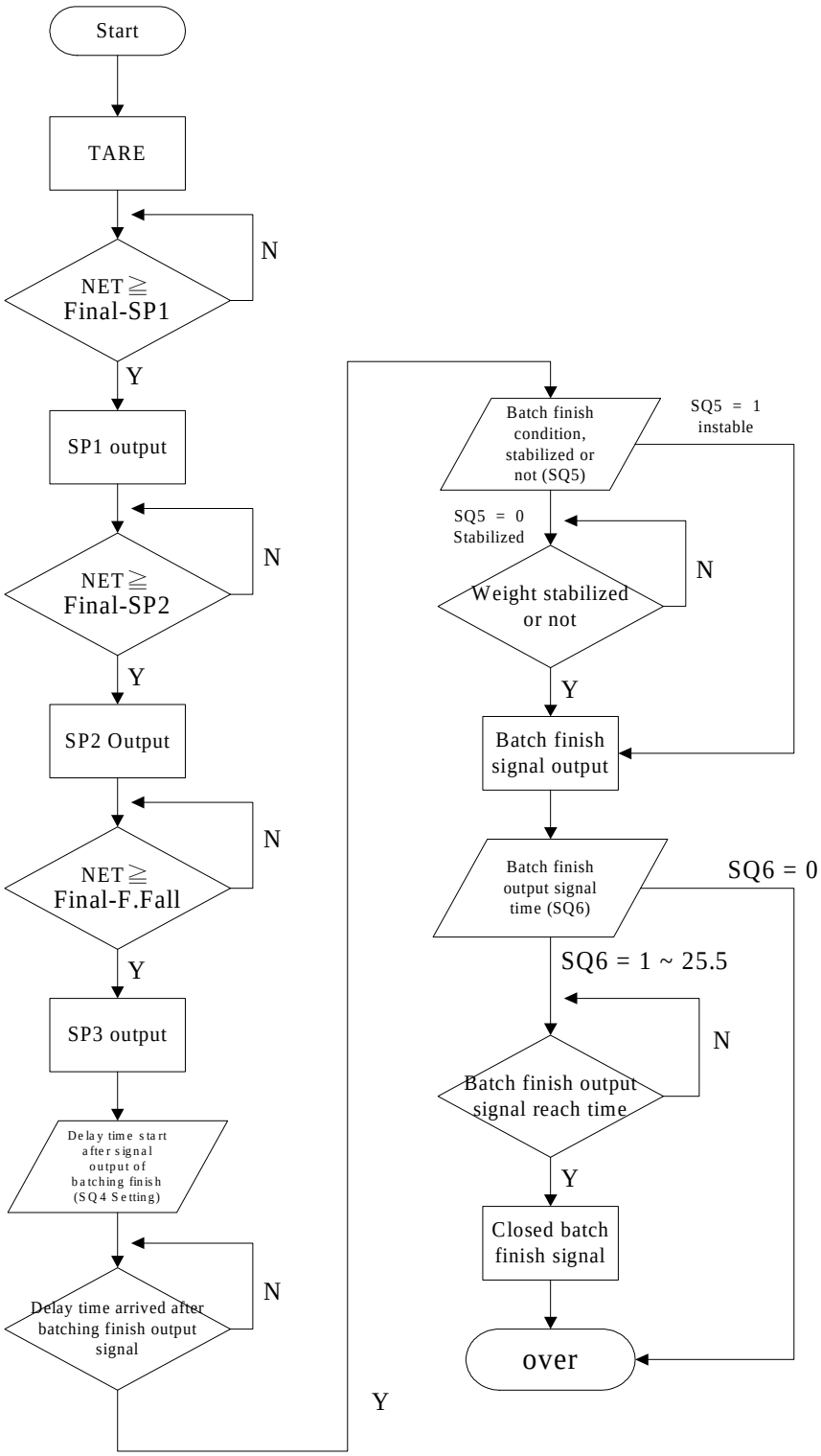
2 Normal batching signal outputs

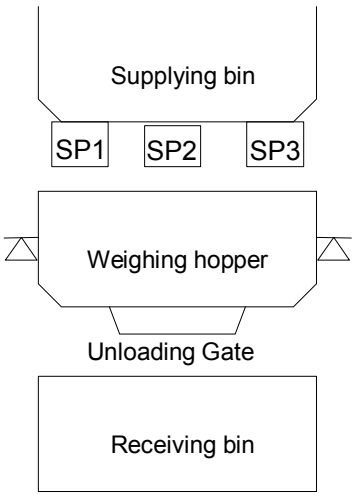
Signal	Output condition
SP1	Net ≥ Final - SP1
SP2	Net ≥ Final - SP2
SP3	Net ≥ Final – Free Fall (in-flight)
Under	Net < Final – Under
Over	Net > Final + Over
Zero Band	Gross ≤ Zero Band

2 Loss-in-weight signal outputs

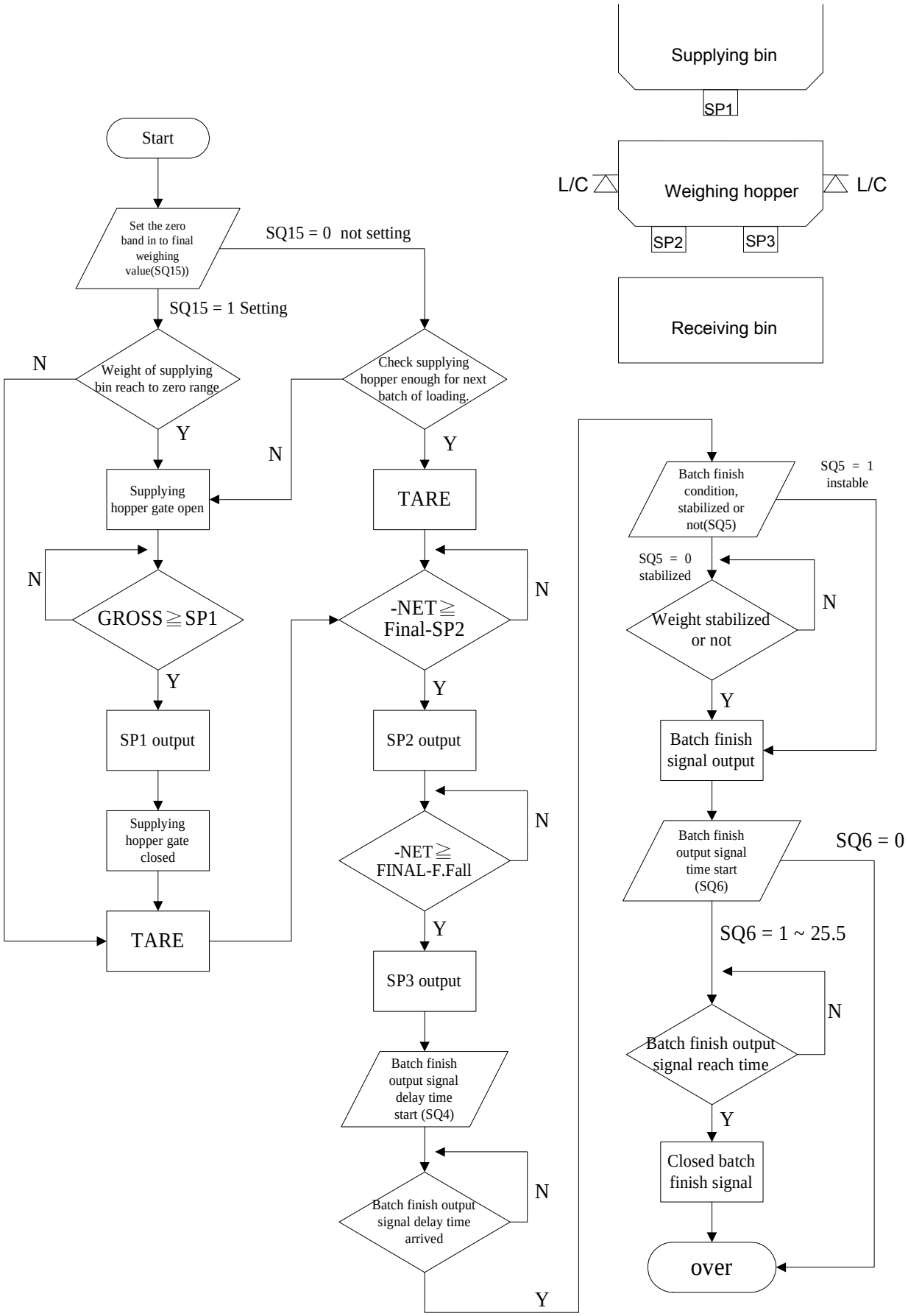
Signal	Output condition
SP1	Gross ≥ SP1
SP2	- Net ≥ Final – SP2
SP3	- Net ≥ Final – Free Fall (in-flight)
Under	- Net < Final – Under
Over	- Net > Final + Over
Zero Band	Gross ≤ Zero Band

4-4 Normal Batching Flow Chart (SQ-01=1)

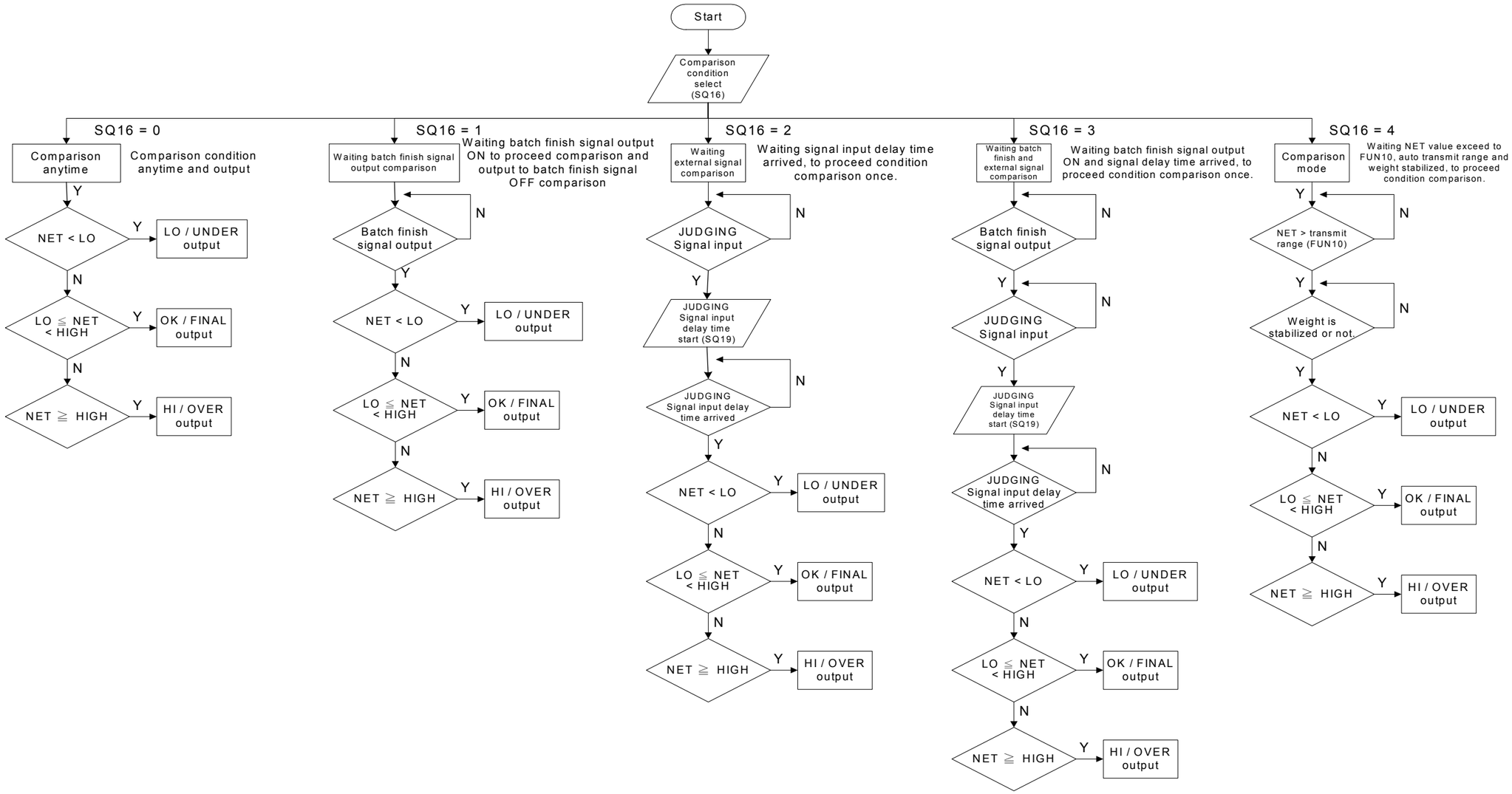




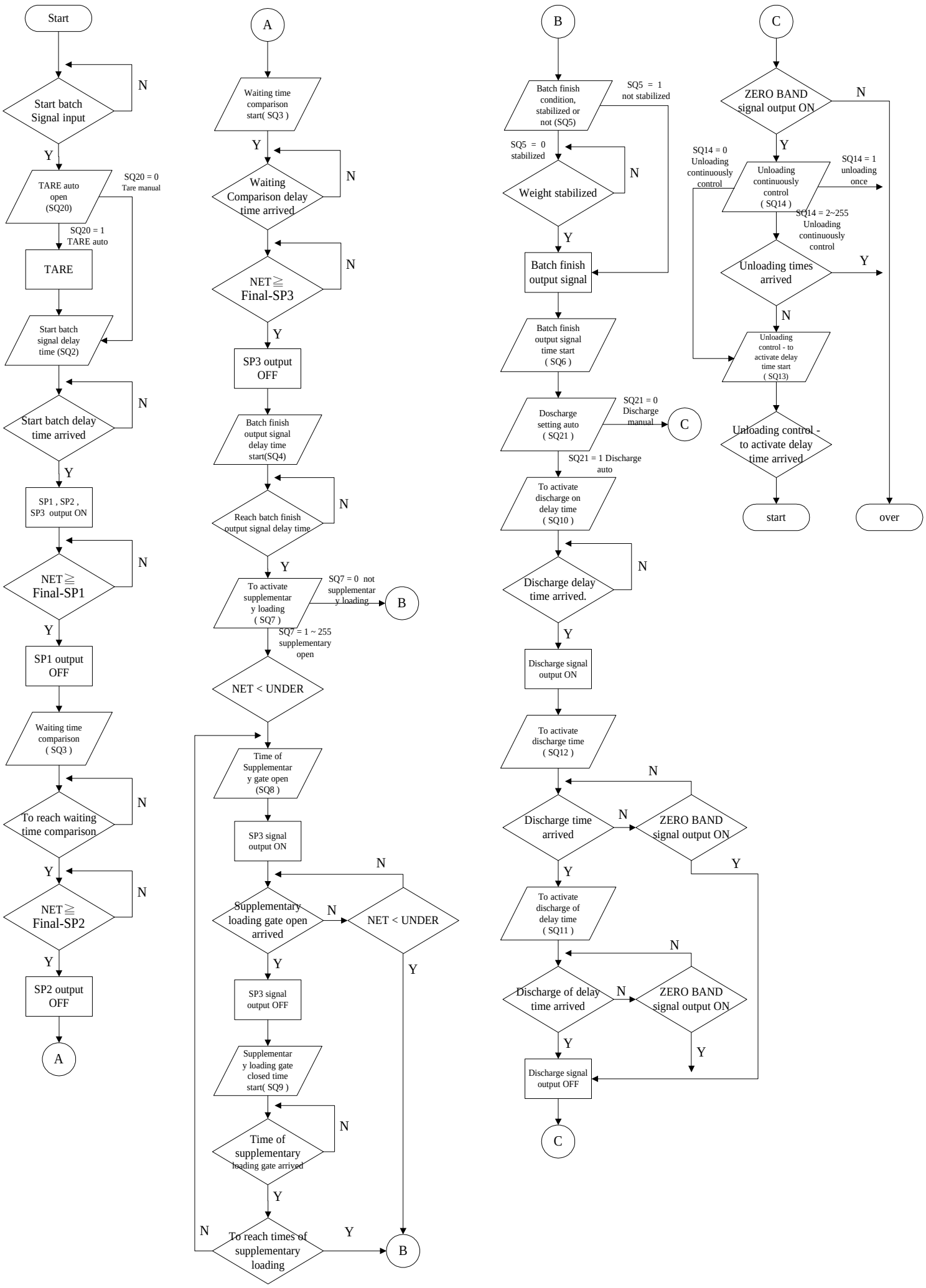
4-5 Loss-in Weight Flow Chart (SQ1 = 2)



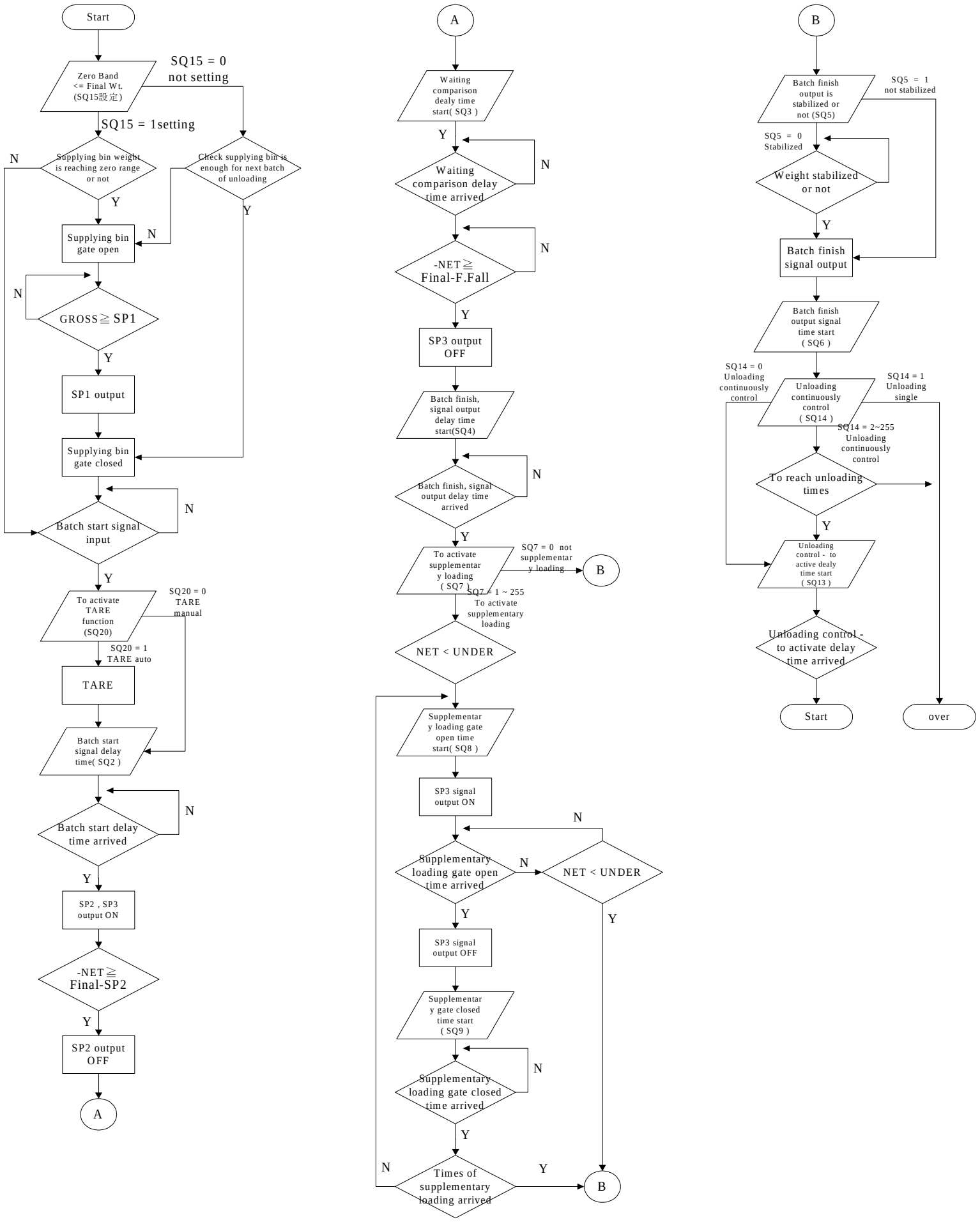
4-6 Hi, OK, Lo Output Flow Chart



4-7 Normal Batching (Built-in Program) Flow Chart (SQ-01=4)

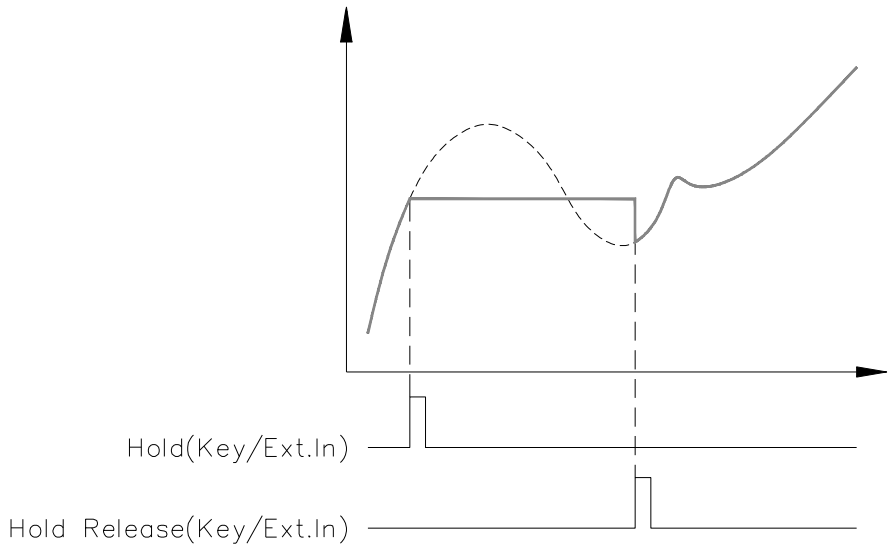


4-8 Loss-in Weight (Built in Program) (SQ-01=5)

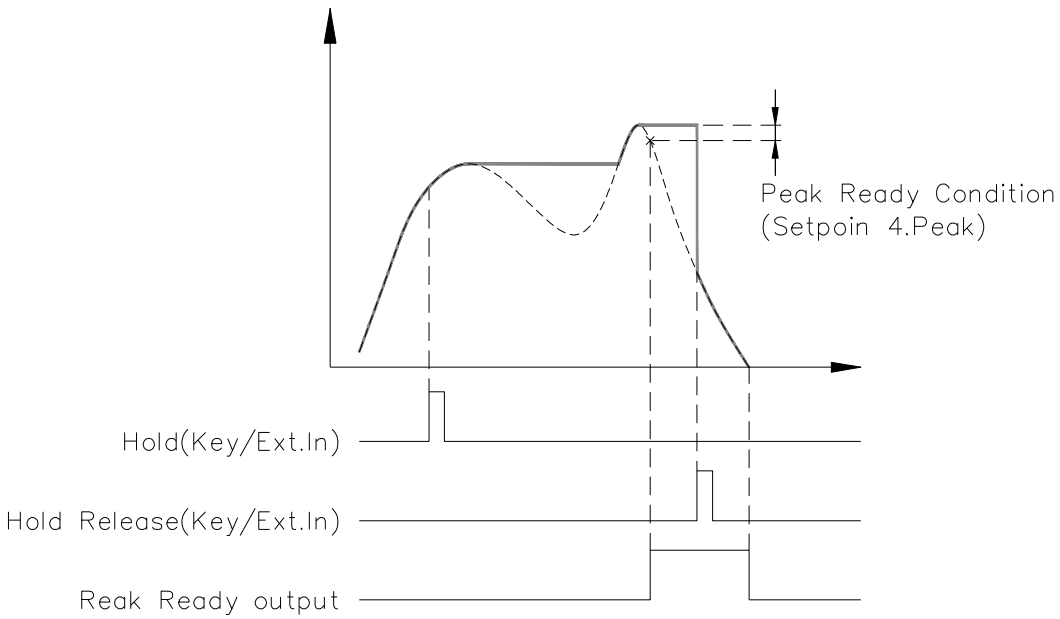


4-9 Hold Mode (SQ-01 = 6)

1. General hold mode (FNC-11 = 0)

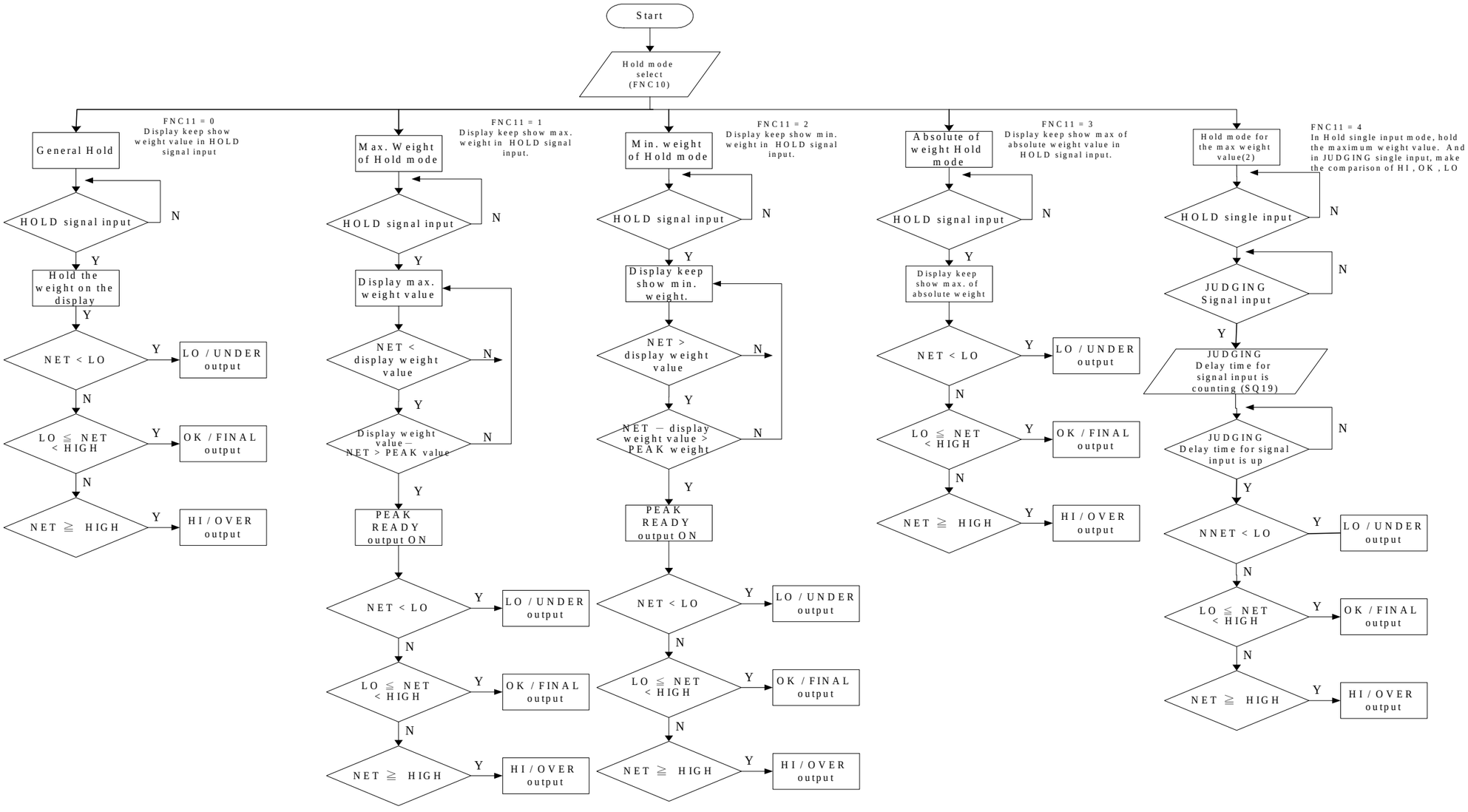


2. Peak hold mode (FNC-11 = 1, 2)



Peak hold mode with four different states (FNC-11 = 1,2,3,4), positive peak weight(1), negative peak weight, absolute value of peak weight and positive peak weight(2) . The peak holds of absolute value and positive peak weight (2) both have no peak ready signal output.

4-9-1 Hold Mode Flow Chart



4-9-2 Hi, OK, Lo Comparison

1. Normal HOLD (FNC-11 = 0)
Entering the Hold mode, Hi, OK, Lo comparison output. Escape Hold mode will switch off the outputs.

2. Peak HOLD (FNC-11 = 1, 2)
If Peak Ready is ON, Hi, OK, Lo comparison output. Escape Hold mode will switch off the outputs.

3. The absolute value of peak HOLD (FNC-11 = 3)
Entering the Hold mode, Hi, OK, Lo will refer to Peak value to do the comparison.

4. FNC-11 = 4
When the external input single Judgement is ON, Hi, OK, Lo will refer to Peak value to do the comparison.

4-10 Totalizing (ACCU.) Auto / Transmit

With automatic totalising active (SQ-17) or RS232 / RS485 or BCD output set to auto transmit.

1. SQ-01 = 1, 2, 4 or 5 batch / loss-in weight

a) When the weight reaches the Final weight and the batch finish signal is ON the net weight will be added to the totaliser and number of additions is incremented. The RS232 / RS485 and BCD outputs transmit data.
b) When the net weight returns to the zero range (FNC-10), then the sequence in a) above can be repeated.

2. SQ-01 = 3 Comparison mode

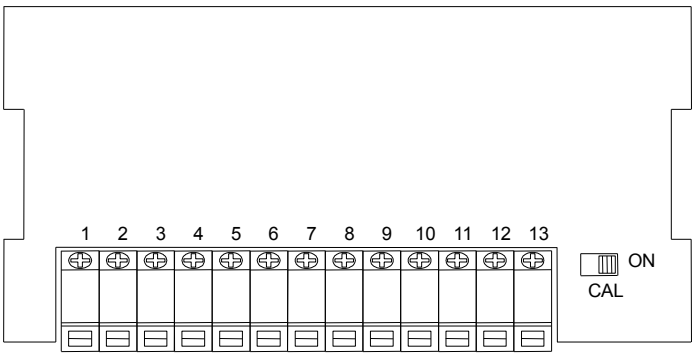
a) When the net weight exceeds the zero range and the weight has stabilized it will be added to the totaliser and number of additions is incremented. The RS232 / RS485 and BCD outputs transmit data.

CHAPTER 5 INTERFACE

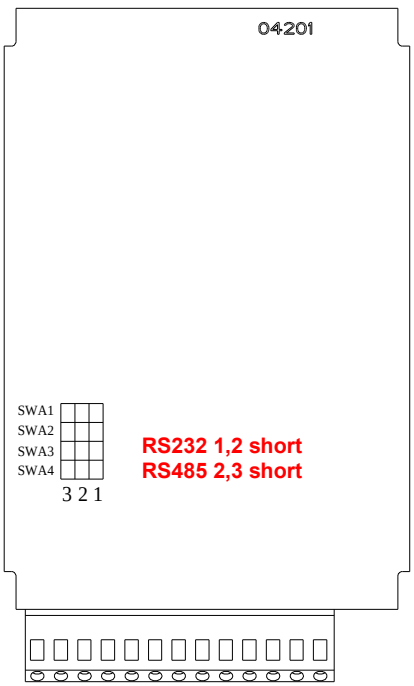
5-1 Serial Input/Output Interface (Built-in)

2 Pin location and setting

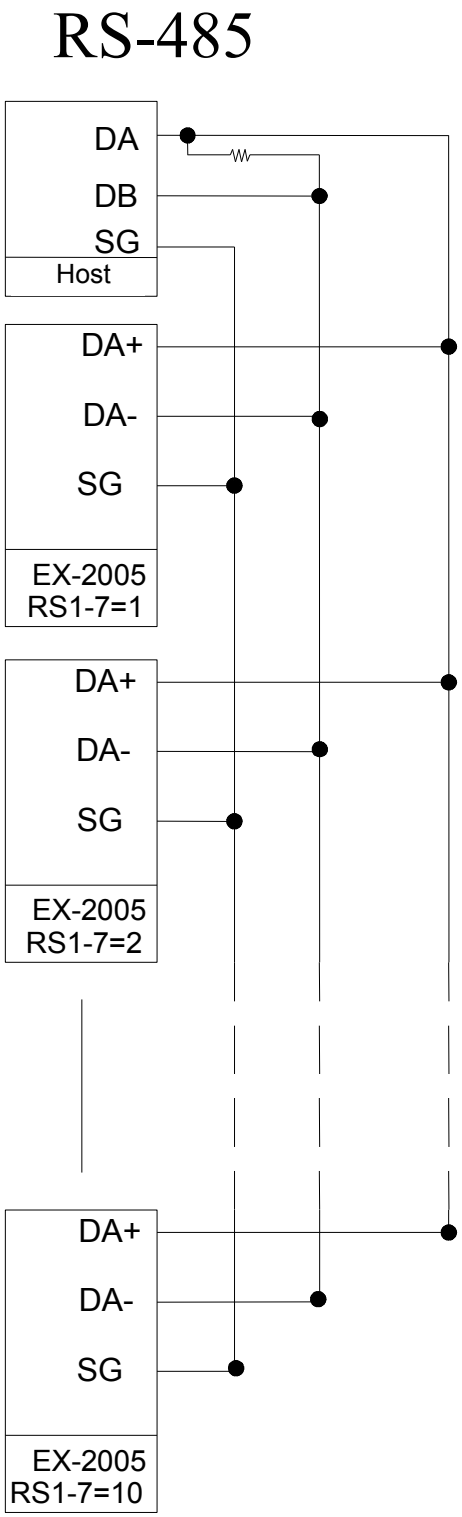
1. Built-in RS232 or RS485



PIN	Function
5	TXD / DA -
6	RXD / DA +
7	SG



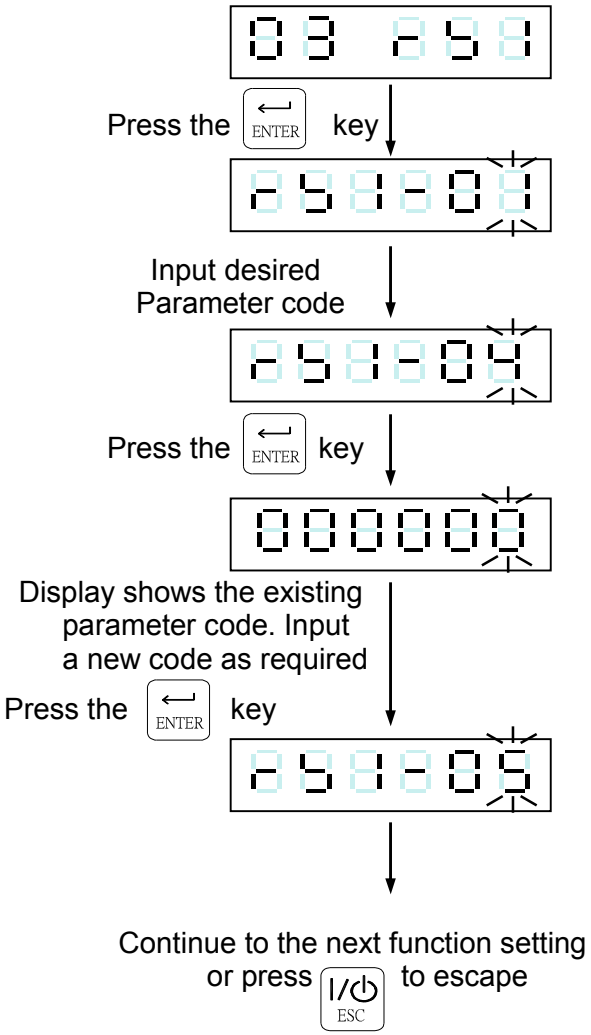
2 Connection type

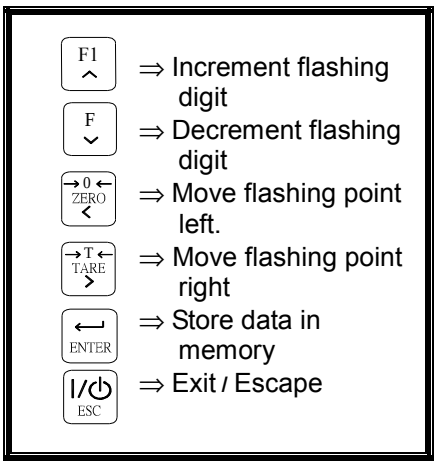


- Notice:
  - The maximum connection is 10 sets of EX-2005
  - When the Host computer has the built-in terminal resist, it is not necessary to have the external one.
  - When the host computer has no single (SG), it is acceptable to disconnect that part.

2 Function setting

First serial port interface 03 rb1
Setting procedure





Item	Function	Setting Value			Default
		Para-meter	Description		
RS1- 01	Transmit format	0	As display		0
		1	Gross only		
		2	Net only		
		3	As display (simple)		
		4	Gross (simple)		
		5	Net (simple)		
		6	Comparison + As display (simple)		
		7	Comparison +Gross (simple)		
		8	Comparison +Net (simple)		
		9	Tare		
		10	Totalised (Accu.) Weight and number of transactions		
RS1- 02	Transmit mode	0	Transmit continuous + command mode		0
		1	Auto transmit + command mode		
		2	Manual transmit + command mode		
		3	Command mode		
		4	MODBUS RTU mode		
RS1- 03	Transmit speed	0	600		2
		1	1200		
		2	2400		
		3	4800		
		4	9600		
		5	19200		
RS1- 04	Parity Bit length Stop Bit	0	N, 8, 1	No parity, 8 data bits, 1 Stop bit	2
		1	O, 7, 1	Odd parity, 7 data bits, 1 Stop bit	
		2	E, 7, 1	Even parity, 7 data bits, 1 Stop bit	
RS1- 04	MODBUS mode: Parity Bit length Stop Bit	0	N, 8, 2	No parity, 8 data bits, 2 Stop bit	2
		1	O, 8, 1	Odd parity, 8 data bits, 1 Stop bit	
		2	E, 8, 1	Even parity, 8 data bits, 1 Stop bit	
RS1- 05	Transmit times	0	Open		0
		1	1 time/sec.		
		2	2 time/sec.		
		3	5 time/sec.		
		4	10 time/sec.		
RS1- 06	Transmission conditions	0 0 0 0 0 0 Negative(Net Wt.) Weight unstable Overload (OL) 0 ⇒ transmit cont. 1 ⇒ Stop transmit			000000
RS1- 07	Indicator poling address	00 ↓ 99	When set to 0, Indicator addressing is not used.		0

2 Data format

1. General Format

NET	S	T	,	G	S	,	+	0	1	2	3	4	5	6	k	g	CR	LF
GROSS	S	T	,	N	T	,	+	1	2	3	4	.	5	6		g		
TARE	S	T	,	T	R	,	+	0	1	2	3	4	5	6		t		
+ OL	O	L	,	G	S	,	+	SP	SP	SP	SP	SP	SP	SP	SP	SP		
- OL	O	L	,	G	S	,	-	SP	SP	SP	SP	SP	SP	SP	SP	SP		
UNSTABLE	U	S	,	G	S	,	+	1	2	3	4	.	5	6	k	g		

2. Totalised (Accu.) Format

Accu. Weight	T	W	,	+	1	2	3	4	5	6	.	7	8	9	k	g	CR	LF
Accu. Wt. Over+	T	W	,	+	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP		
Accu. Wt. Over -	T	W	,	-	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP		
Accu. Count	T	N	,	+	0	1	2	3	4	5	6	7	8	9	SP	SP		
Accu. Count over	T	N	,	+	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP		

3. Simple Format

Gross/Net or same display	+	1	2	3	4	5	6	7	CR	LF
Over load positive	+	SP	SP	SP	SP	SP	SP	SP		
Over load negative	-	SP	SP	SP	SP	SP	SP	SP		

4. Setpoint (1) + Simple Format (Gross/Net or as display)

	+	1	2	3	4	5	6	CR	LF

bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

bit 0 : Zero Band
bit 1 : Over
bit 2 : Under / Hi
bit 3 : SP1 / Go
bit 4 : SP2 / Lo
bit 5 : SP3
bit 6 : Discharge
bit 7 : Batch finished

5. Comparison condition (2)

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7

Byte 0 : Zero Band
Byte 1 : Over
Byte 2 : Under / Hi
Byte 3 : SP1 / Go
Byte 4 : SP2 / Lo
Byte 5 : SP3
Byte 6 : Discharge
Byte 7 : Batch finished

ON : 0 (ASC II Code 30 H)
OFF : 1 (ASC II Code 31 H)

Description

	Output	ASCII	Description
Status 1	OL	4FH, 4CH	Over load
	ST	53H, 54H	Weight stable
	US	55H, 53H	Weight unstable
Status 2	GS	47H, 53H	Gross Weight
	NT	45H, 54H	Net Weight
	TR	54H, 52H	TARE
	TW	54H, 57H	Totalised Weight
	TN	54H, 4EH	Totalised Times
Data of Weight	0 ~ 9	30H ~ 39H	Figure of weight
	+, -	2BH, 2DH	Symbol (+ or -) of weight
	Space	20H	Over load
	.	2EH	Decimal
Units	Space, Space	20H, 20H	None
	kg	6BH, 67H	kg
	Space t	20H, 74H	ton
	lb	6CH, 62H	lb
Ending code	CR, LF	0DH, 0AH	Ending code
Separating code	,	2CH	

2 Command mode

1. Command Format A

Host	Command	<CR>< LF>	
Slave		Command	<CR>< LF>

MZ	Zero	CZ	Zero compensation On/OFF
MT	Tare	CT	Clear TARE value
MG	Gross Weight	MN	Net weight
AT	Accu. Current net weight and times plus 1.		
ST	Deduct times of last accu. Value minus 1		
DT	Clear accu. Value and times		
BB	Start batching (one time)	HB	Load stop
BD	Start unload		
SC	Transmit continuous	SA	Auto transmit
SM	Manual transmit	SO	Command mode
%	Stop continuous transmission and enter the command mode		

2. Command Format B

Host	Command	<CR>< LF>
Slave	Data	<CR>< LF>

RW	Read current weight	RT	Read TARE
RG	Read Gross Weight	RN	Read Net weight
RB	Read current display of wt (simple)	RH	Read Gross (simple)
RI	Read Net (simple)		
RJ	Read comparison situation + current display of weight (simple)		
RK	Read comparison situation + Gross (simple)		
RL	Read comparison situation + Net (simple)		
RO	Read comparison situation (2)		
RF	Read prior completed weight	RA	Read accu. Value (incl. times)

Note : **Prior command plus %**

Read Weight Compared value: RS□□ □□: Setting items

FW	Read target item of unload value	S1	Read SP1
S2	Read SP2	S3	Read SP3
UD	Read Under	LO	Read LO
ZB	Read Zero Band	HI	Read HI
PR	Reading Peak value	OV	Read Over

Ex:

Command : RSFW < CR > < LF > EX2005 reply : RSFW□□□□□□

Finish 6 bytes

3. COMMAND FORMAT C

Host	Command + Data	<CR>< LF>
Slave	Command + Data	<CR>< LF>

Write weight compared value WS□□XXXXXX

XXXXXX : value (6 bytes) □□ : Setting items

FW	Write target item of unload value	S1	Write SP1
S2	Write SP2	S3	Write SP3
UD	Write Under	LO	Write LO
ZB	Write Zero Band	HI	Write HI
PR	Write Peak value	OV	Write Over

2 Error messages

E1: Format command fault

E2: Setting parameters over range

E3: Command not recognised

2 Indicator poling address

If the indicator has an address configured in RS1 – 07 as 0, it will directly respond to the command.

If the indicator has an address configured in RS1-07 as 1~99, it will only respond to the messages prefixed the address.

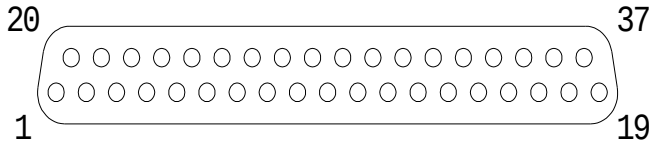
For example: The indicator poling address is set to 02, it would send the weight value only if it received the command:

@02RW < CR > < LF >

5-2 BCD Parallel Output Interface (OP-02)

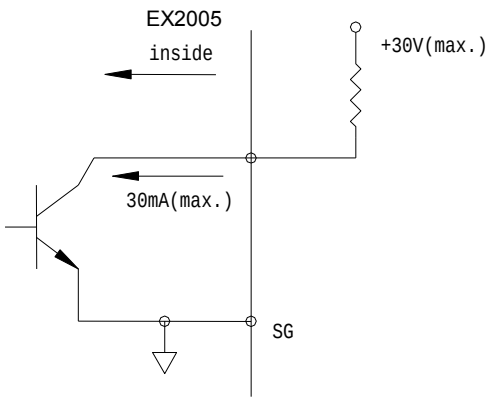
2 PIN Location

D-Sub 37PIN

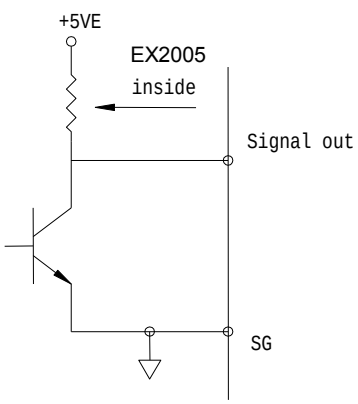


PIN	Function	PIN	Function
1	**SG**	**20**	SG
2	1×10^0	**21**	2×10^0
3	4×10^0	**22**	8×10^0
4	1×10^1	**23**	2×10^1
5	4×10^1	**24**	8×10^1
6	1×10^2	**25**	2×10^2
7	4×10^2	**26**	8×10^2
8	1×10^3	**27**	2×10^3
9	4×10^3	**28**	8×10^3
10	1×10^4	**29**	2×10^4
11	4×10^4	**30**	8×10^4
12	1×10^5	**31**	2×10^5
13	4×10^5	**32**	8×10^5
14	Gross / - Net	**33**	Stable / - MD
15	Plus / - Minus	**34**	DP1
16	DP2	**35**	DP3
17	DP4	**36**	Over / - Normal
18	Data ready	**37**	Hold input
19			

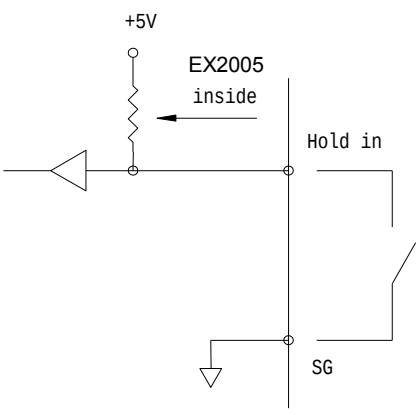
2 Equivalent Circuit



Open Collector Output (OP-02-1)

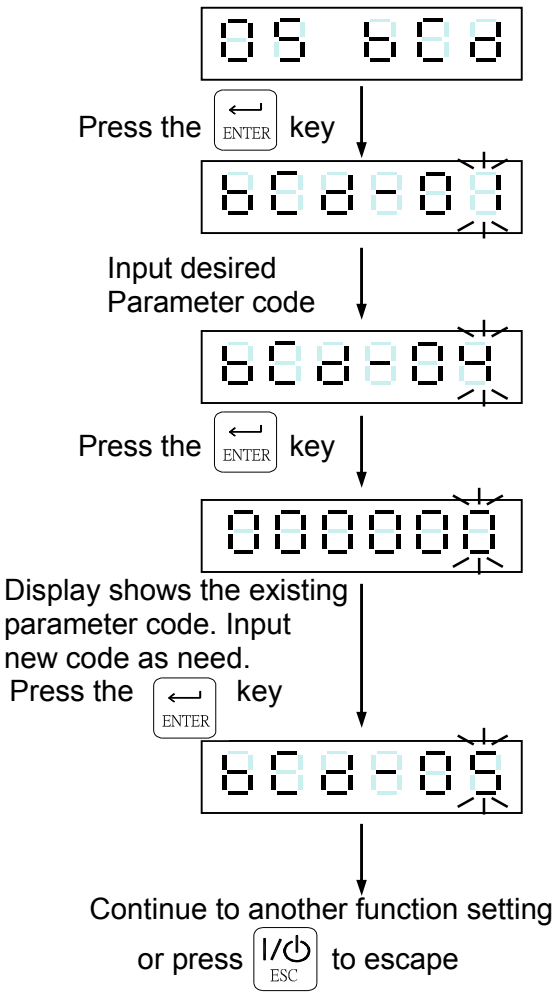


TTL Output (OP-02-2)



Hold Input

2 Function setting

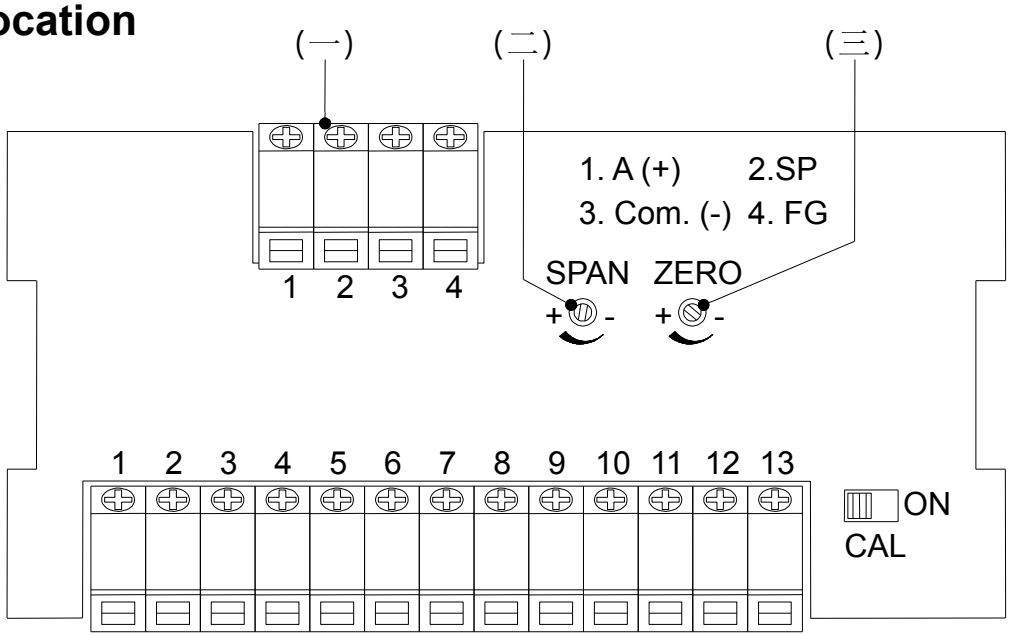


F1 ⇒ Increment flashing digit
F ⇒ Decrement flashing digit
→0← ZERO ⇒ Move flashing point left.
→T← TARE ⇒ Move flashing point right
ENTER ⇒ Store data in memory
I/⏻ ESC ⇒ Exit / Escape

Item	Function	Setting value		Default
		Parameter	Description	
bCd- 01	Data type	0	As display	0
		1	Gross	
		2	Net	
bCd- 02	Transmit mode	0	Transmit continuous	0
		1	Auto transmit	
		2	Manual transmit	
bCd- 03	Output Logic	0	Positive logic action	0
		1	Negative logic action	
bCd- 04	Data ready Signal logic	0	Positive logic action	0
		1	Negative logic action	
bCd- 05	OL output code	0	FFFFFF	0
		1	999999	
bCd- 06	Data code	0	BCD Code	0
		1	Hex. Code	

5-3 Analogue Current Output Interface (OP-03)

2 Location



A. Terminal (4 way)

1st : 0 ~ 20mA current output, positive
2nd 0 ~ 10V voltage output, positive (not support)
3rd : Current signal, negative
4th : Ground

Note: For the voltage output, add a proper resistor value between A(+) and Com(-).

** Formula for the resistor value*

$$\text{Resistor value} = \frac{\text{Voltage output (max. value)}}{\text{Current output (max. value)}}$$

Example: Convert 0~20mA current output into 0~10V voltage

$$\text{Resistor value} = \frac{10\ \text{V}}{0.02\ \text{A}} = 500\ \Omega$$

B. SPAN adjustment

Current / voltage Span adjustment to increase value turn clockwise, decrease value turn anticlockwise.

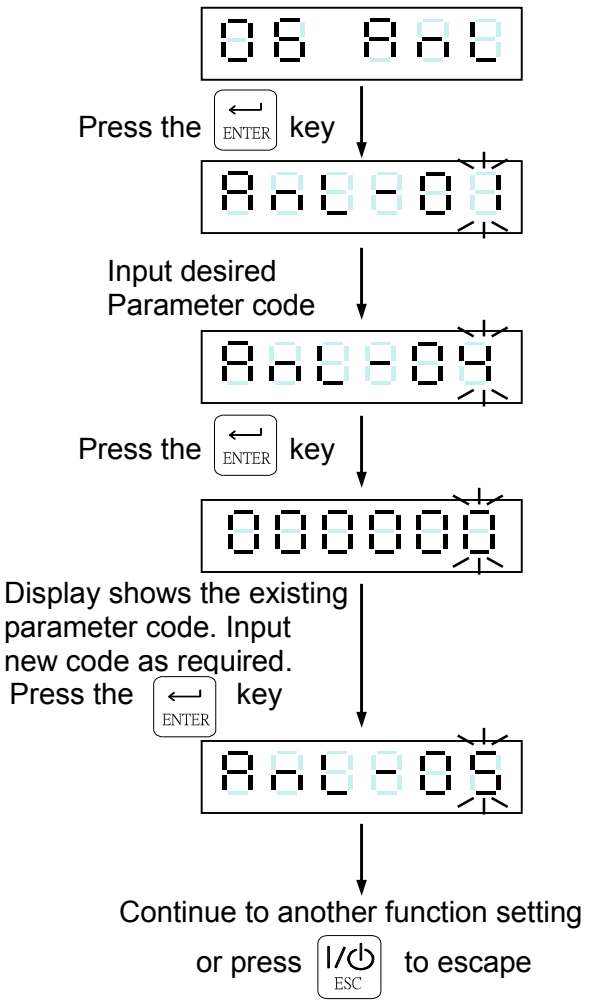
C. ZERO adjustment

Current / voltage Zero adjustment to increase value turn clockwise, decrease value turn anticlockwise.

2 Analogue output interface specification

Resolution	:	16 bits
Current output	:	0 ~ 20mA (0 ~ 550 Ω load)

2 Function setting



F1 ⇒ Increment flashing digit
F ⇒ Decrement flashing digit
→0← ZERO ⇒ Move flashing point left.
→T← TARE ⇒ Move flashing point right
ENTER ⇒ Store data in memory
I/⏻ ESC ⇒ Exit / Escape

Item	Function	Setting value		Default
		Parameter	Description	
AnL- 01	Data type	0	As display	0
		1	Gross	
		2	Net	
AnL- 02	Signal output	0	Current output	0
AnL- 03	Weight in Lo	000000 ~ 999999	When the weight reaches the value of that in AnL-03, the current / voltage output is changed to that configured in AnL-04.	0
AnL- 04	Current in Lo	0.0 mA ~ 20.0 mA		4.0
AnL- 05	Weight in Hi	000000 ~ 999999	When the weight reaches the value of that in AnL-05, the current / voltage output is changed to that configured in AnL-06.	300000
AnL- 06	Current in Hi	0.0 mA ~ 20.0 mA		20.0

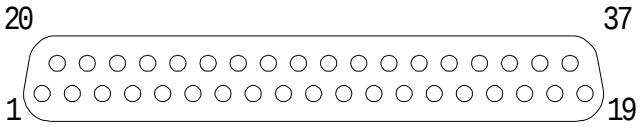
2 Analogue output notes

1. The current output, load resistor should not exceed 550 Ω. It is recommended that a resistor with a low temperature coefficient and a power rating above 0.2 W be used.
2. Avoid short circuits between the positive and negative analogue output terminals as the interface this may cause damage.

5-4 External Parallel Input /Output Interface

2 PIN location

D-Sub 37PIN



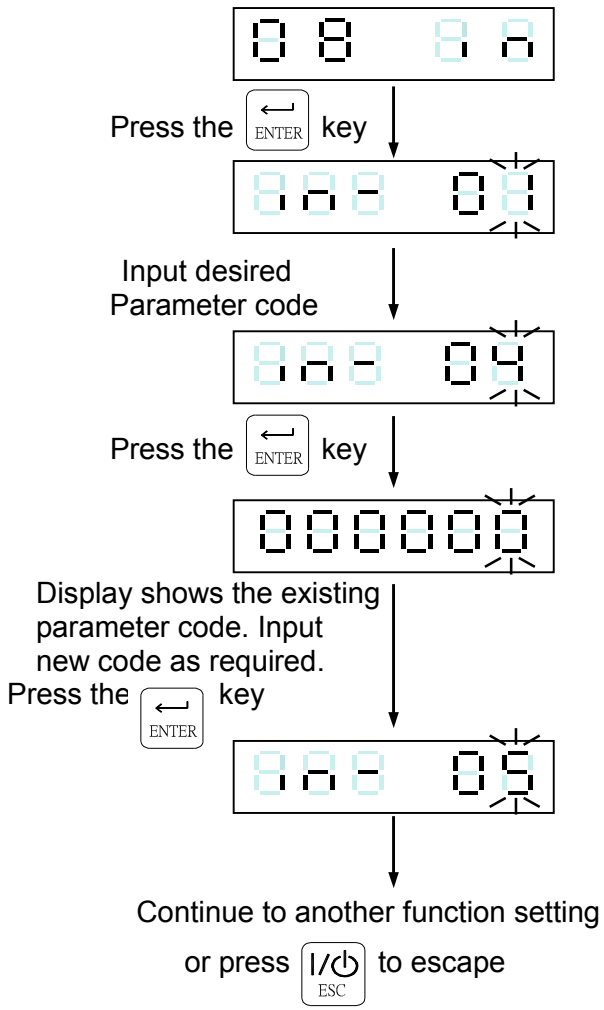
2 OP-04 Control I/O (4 in / 4 out) + Setpoint Input (BCD code)

PIN	I/O	Signal	PIN	I/O	Signal
1	IN	Code 100	20	IN	Code 101
2	IN	Code 102	21	IN	Code 103
3	IN	Code 104	22	IN	Code 105
4	IN	Code 106	23	IN	Code 107
5	IN	Code 108	24	IN	Code 109
6	IN	Code 1010	25	IN	Code 1011
7			26		
8			27	OUT	OUT 1
9	OUT	OUT 2	28	OUT	OUT 3
10	OUT	OUT 4	29	IN	Vex
11		COM 2	30		COM 2
12			31		
13		COM 1	32		COM1
14	IN	IN 1	33	IN	IN 2
15	IN	IN 3	34	IN	IN 4
16			35		
17			36	IN	Code 1
18	IN	Code 2	37	IN	Code 4
19	IN	Code 8			

2 OP-05 Control I/O (8 in / 8 out)

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

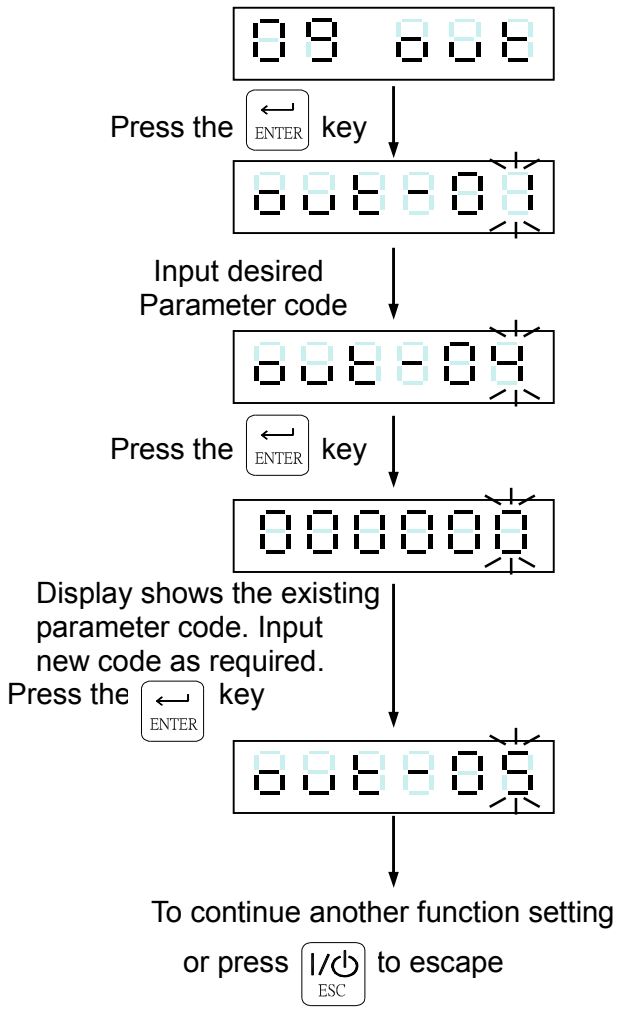
2 Input signal configuration

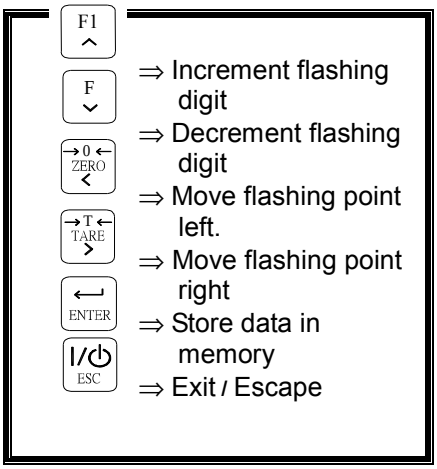


F1	⇒ Increment flashing digit
F	⇒ Decrement flashing digit
→0← ZERO	⇒ Move flashing point left.
→T← TARE	⇒ Move flashing point right
ENTER	⇒ Store data in memory
I/⏻ ESC	⇒ Exit / Escape

Item	Function	Setting value Parameter Þ Description	Default
IN - 01	Input 1	0 ⇒ None 1 ⇒ Zero 2 ⇒ Tare 3 ⇒ Tare reset 4 ⇒ Start batching 5 ⇒ Stop batching 6 ⇒ Discharge Command 7 ⇒ Hold 8 ⇒ Hold display & I/O reset 9 ⇒ Totalise (Accu) Command 10 ⇒ Clear totaliser (Accu) 11 ⇒ Clear previous total (Accu) Value. 12 ⇒ Start to compare 13 ⇒ Serial and parallel printer manual output 14 ⇒ Net / Gross	1
IN - 02	Input 2		2
IN - 03	Input 3		3
IN - 04	Input 4		4
IN - 05	Input 5		5
IN - 06	Input 6		6
IN - 07	Input 7		7
IN - 08	Input 8		8

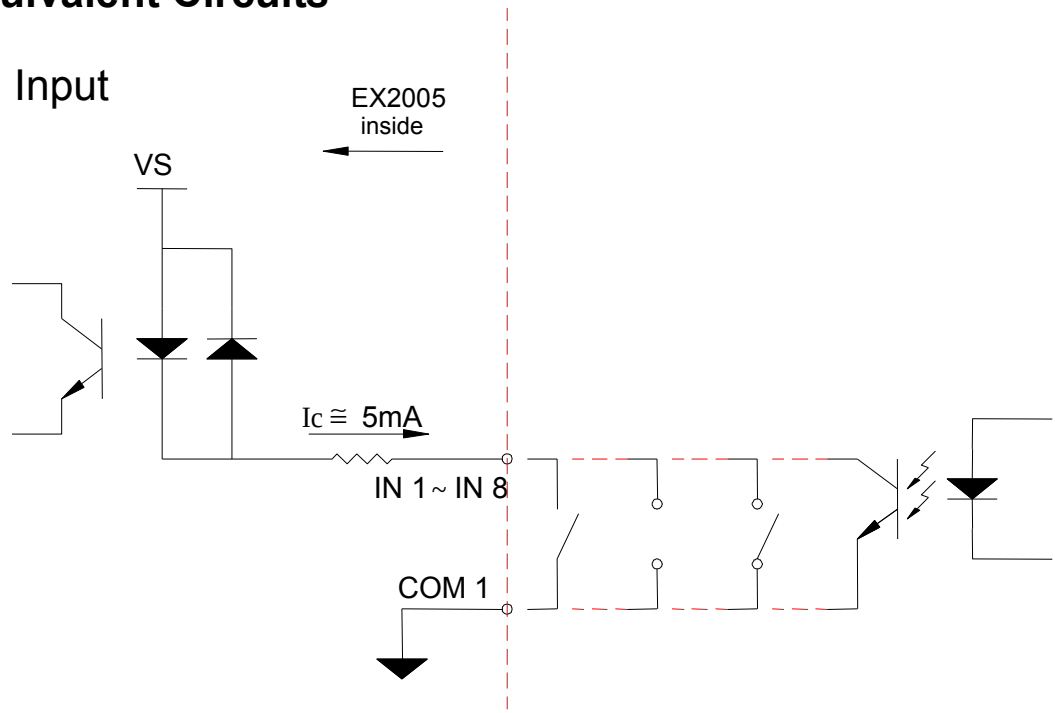
2 Output signal setting





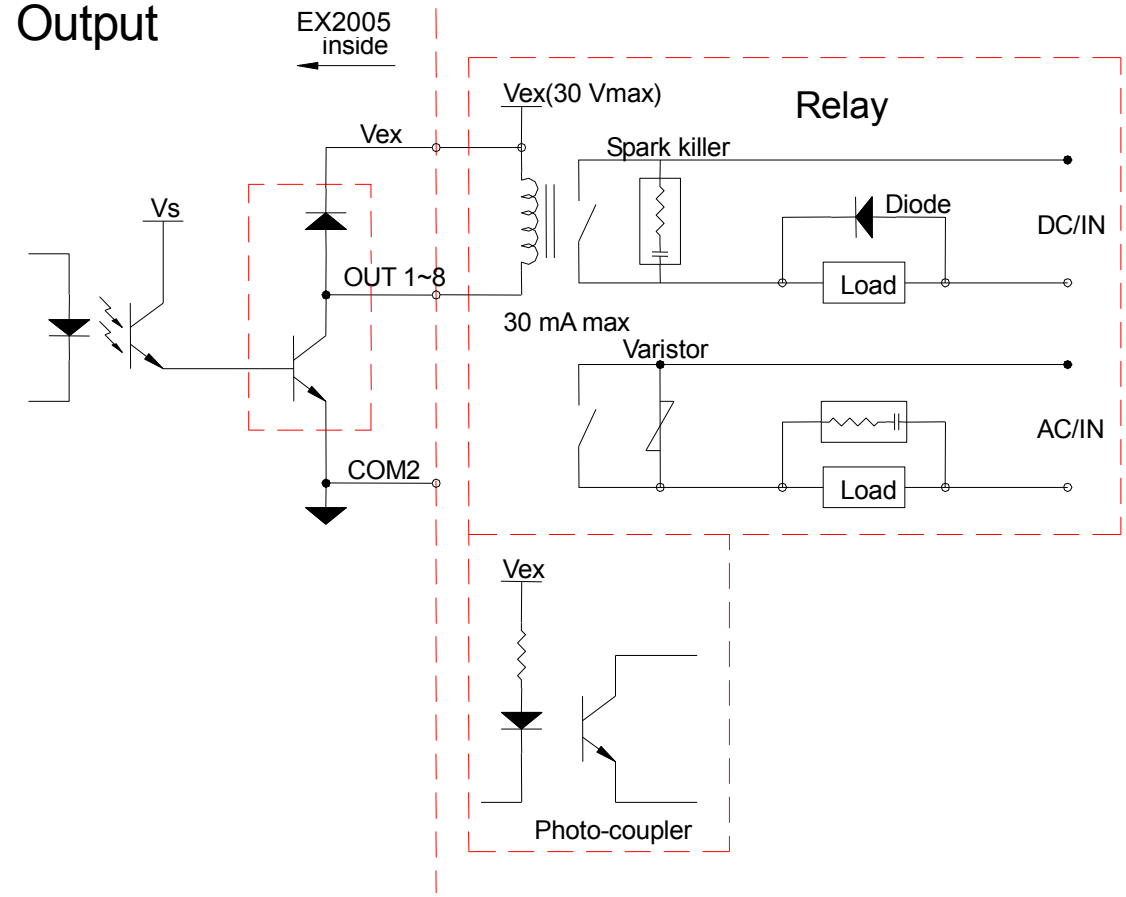
Item	Function	Setting value		Default
		Parameter	Description	
OUT- 01	Output 1	0	⇒ None	1
OUT- 02	Output 2	1	⇒ Zero band	2
OUT- 03	Output 3	2	⇒ SP1	3
OUT- 04	Output 4	3	⇒ SP2	4
OUT- 05	Output 5	4	⇒ SP3	5
OUT- 06	Output 6	5	⇒ Batching completed	6
OUT- 07	Output 7	6	⇒ Discharge	7
OUT- 08	Output 8	7	⇒ Peak ready	8
		8	⇒ Stable	
		9	⇒ Internal batching process running	
		10	⇒ Under	
		11	⇒ Over	
		12	⇒ Hi	
		13	⇒ OK	
		14	⇒ Lo	
OUT-09	The output logic of OUT-04~OUT-01	0000 **à** positive logic 1111 **à** negative logic		0000
OUT-10	The output logic of OUT-08~OUT-05	0000 **à** positive logic 1111 **à** negative logic		0000

2 Equivalent Circuits



4 IN 1 ~ IN 8 and COM 1. Input signal - Open ↔ OFF, Short ↔ ON.

4 Warning: Don't use external power (AC or DC) to connect to the input terminals.



2 **Thumbwheel Switches** (for OP-04)

The interface can connect to external thumbwheel switches or a PLC to input various parameters depending on the configuration of SQ-01. The input variables are:-

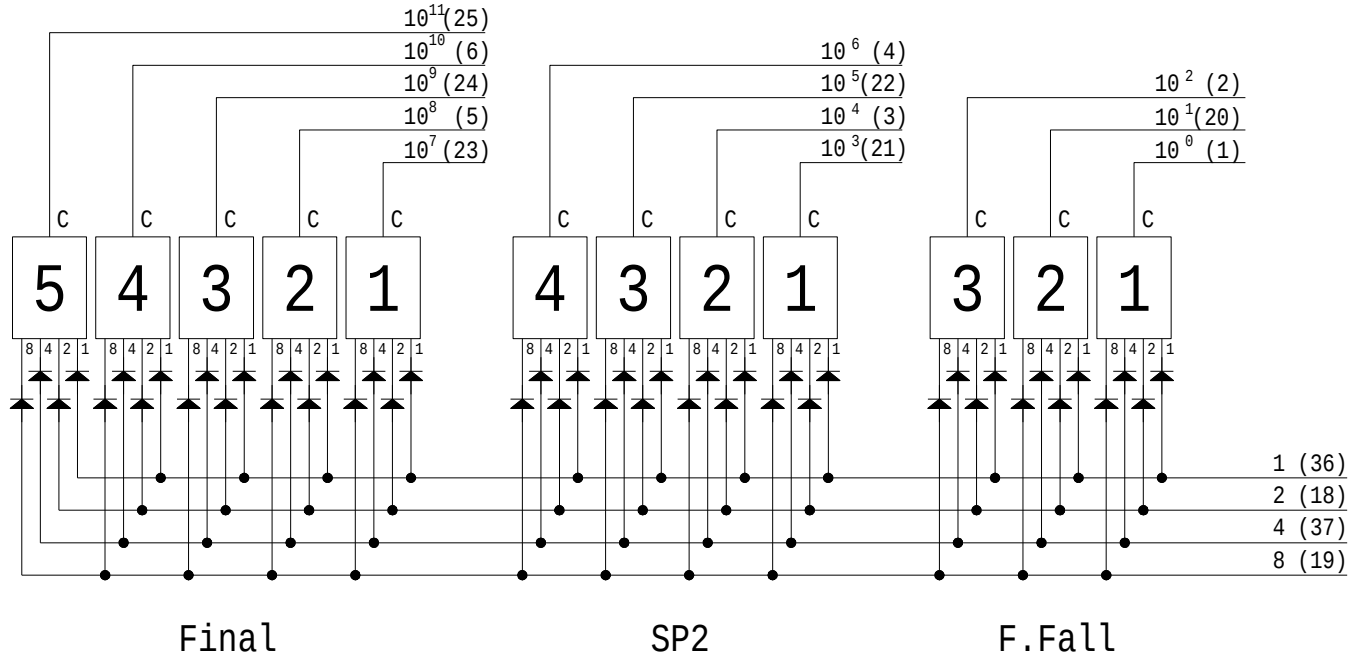
- Final (5 digits), SP2 (4 digits) & Free Fall (3 digits)

or , Hi (6 digits), Lo (6 digits)

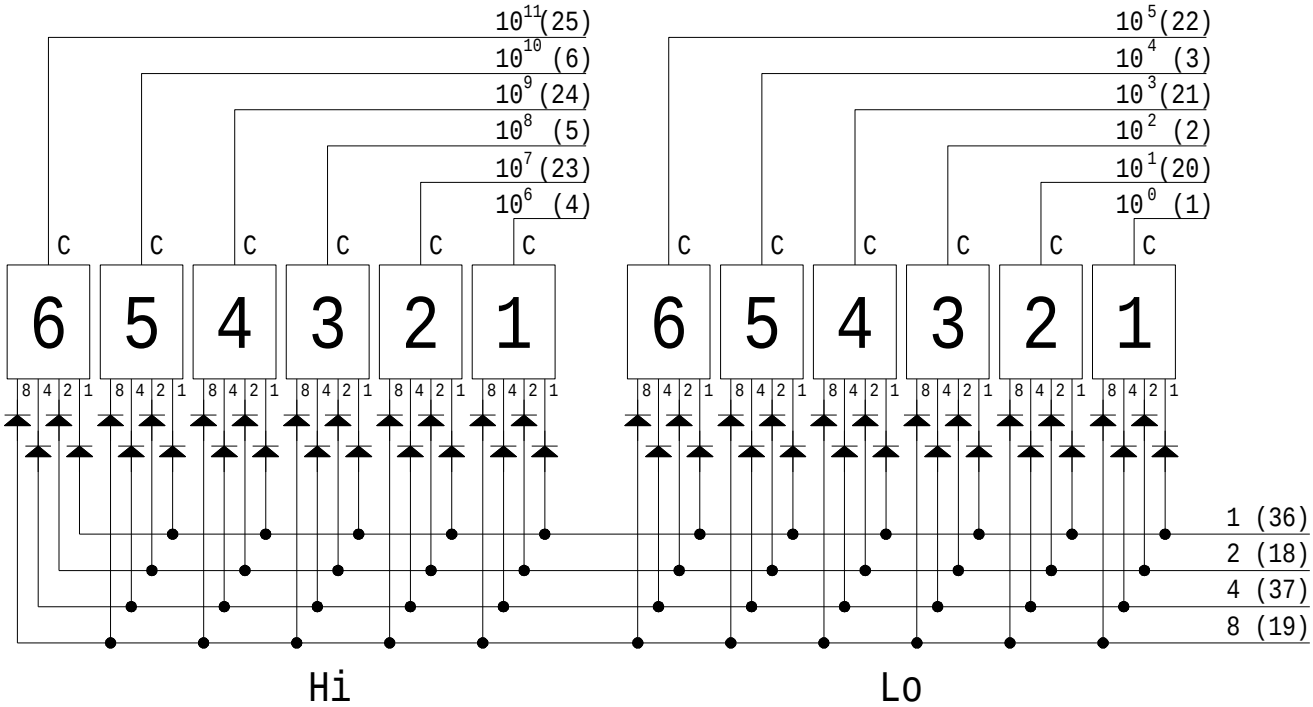
When using external thumbwheel Switches, SQ-18 should be set to 1.

Connection data

SQ-01 = 1, 2, 4 or 5



SQ-01 = 3 or 6



CHAPTER 6 MAINTENANCE

6-1 Restore all Parameters to The Default Factory Values.

(1) While the indicator is counting back to zero, adjust SW to ON and press [F] [ENTER]

(2) Display shows the flashing digits 0.AbE

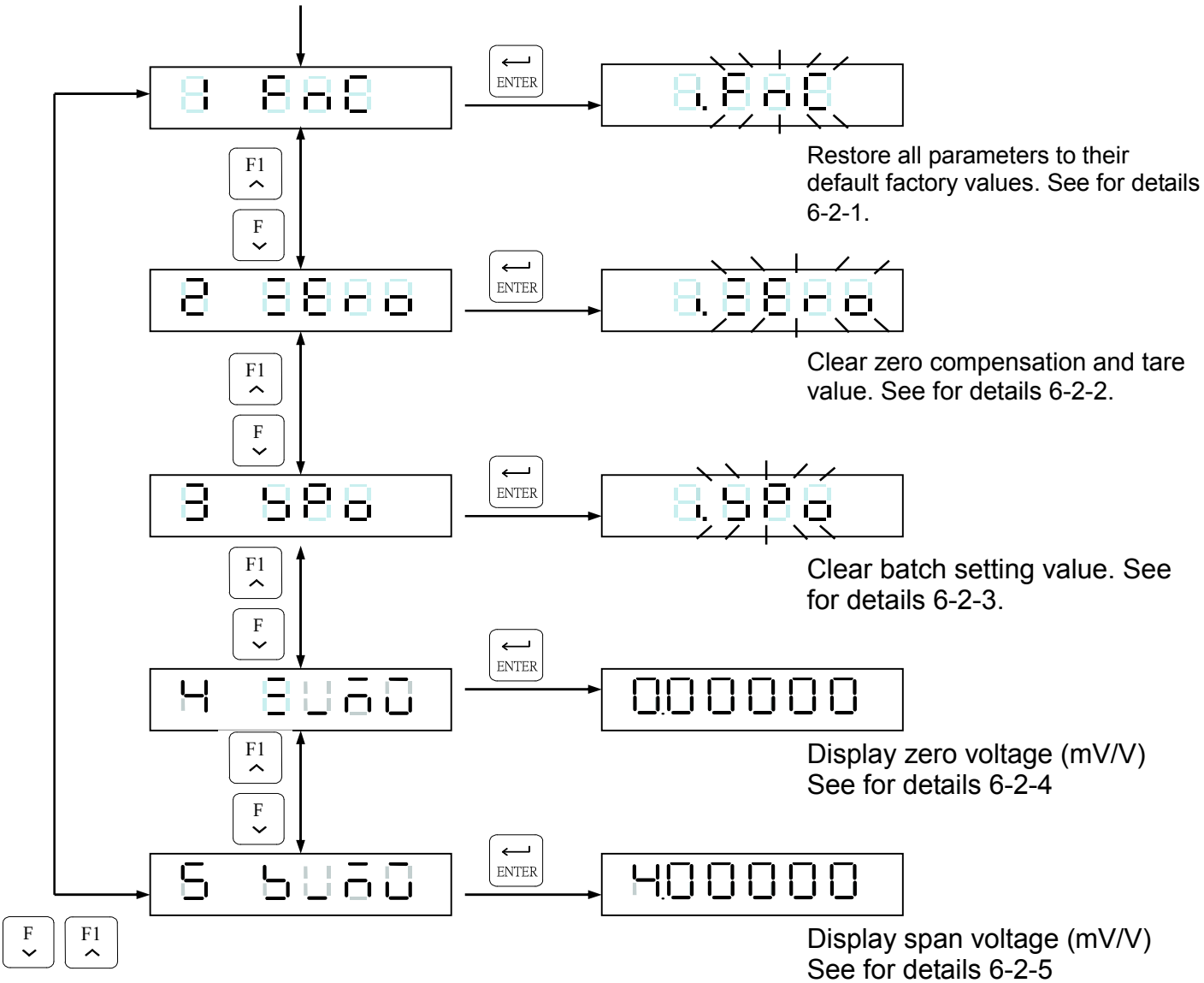
(3) Confirm / abort

(3-1) To confirm press [ENTER] key & don't release it until the display shows End, then release the key and return the calibration SW to OFF.

(3-2) To abort, set the calibration SW to OFF directly.

6-2 Maintenance Function Parameters

Power on the machine. Press [F] [ENTER] keys while the display counts back to zero.



6-2-1 Restore the Function Parameter Back to Its Default Value

(1) During the indicator count back to zero, press F ENTER

(2) The display shows 1 FAC

(3) Press ENTER key and the display shows 1.FAC flashing.

(4) Confirm / abort

(4-1) To confirm, press the ENTER key & don't release it. The display will then show 1 FAC.

(4-2) To abort press the I/⏻ ESC key or switch the power off.

6-2-2 Clear Zero Compensation and Tare Values

(1) During the indicator count back to zero, press F ENTER

(2) The display shows 1 FAC press the F1 key to display 2 CLrA

(3) Press ENTER key, the display shows 2.CLrA flashing.

(4) Confirm / abort

(4-1) To confirm press the ENTER key & don't release it. The display will then show 2 CLrA.

(4-2) To abort press the I/⏻ ESC key or switch the power off.

6-2-3 Clear Batch Setting

(1) During the indicator count back to zero, press F ENTER

(2) The display shows 1 FAC press the F1 key to display 3 bAtA

(3) Press ENTER key, the display shows 3.bAtA flashing.

(4) Confirm / abort

(4-1) To confirm press the ENTER key & don't release it. The display will then show 3 bAtA

(4-2) To abort press the I/⏻ ESC key or switch the power off.

6-2-4 Display Zero Voltage (mV/V)

(1) During the indicator count back to zero, press F ENTER

(2) The display shows 1 FAC press the F1 key to display 4 ZuAL

(3) Press ENTER key the display shows the zero voltage (mV/V). e.g. 000000

(4) Press I/⏻ ESC key or switch the power off.

6-2-5 Clear Batch Setting

(1) During the indicator count back to zero, press F ENTER

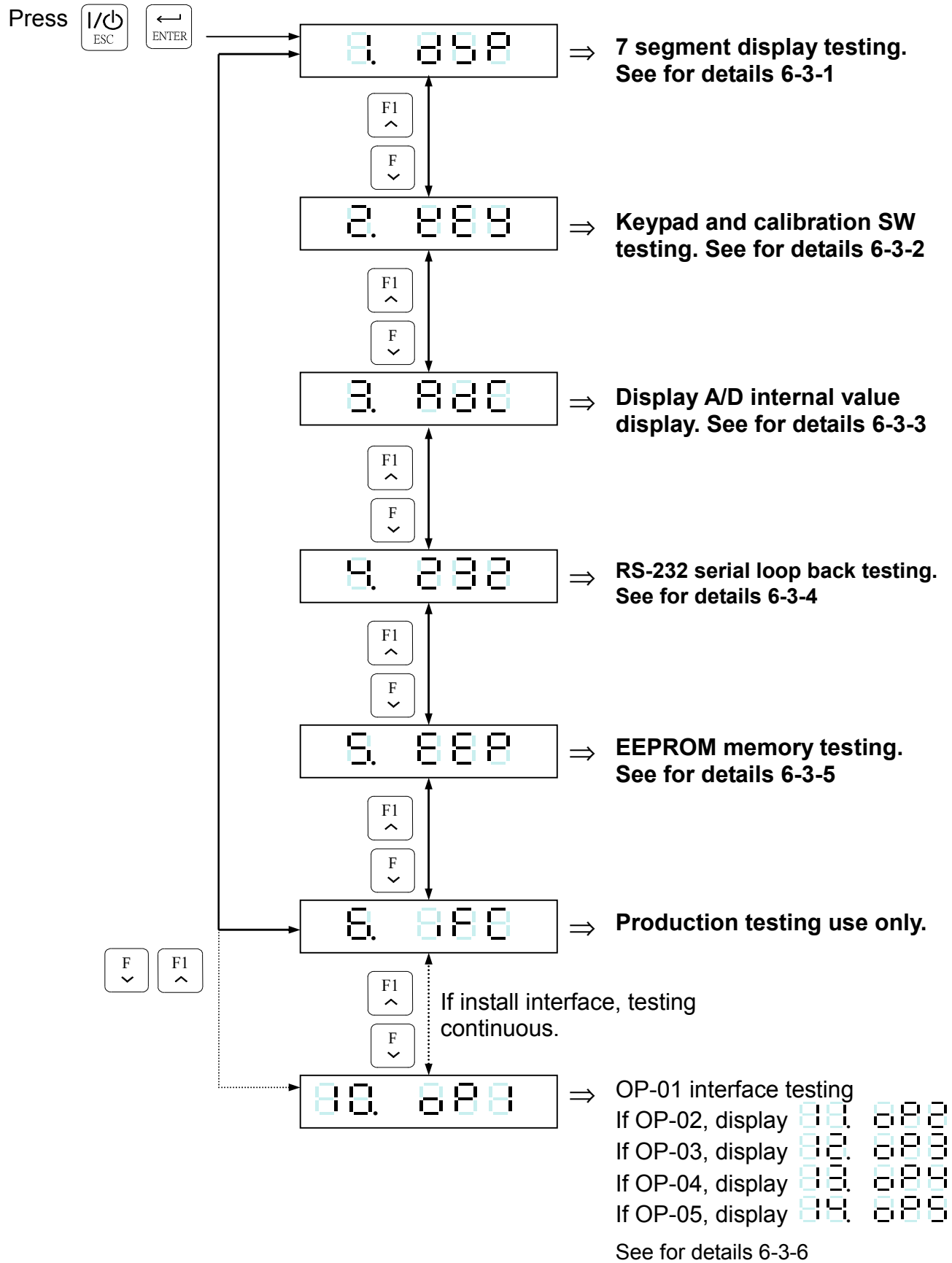
(2) The display shows 8 888 press the F1 key to display 5 batch

(3) Press the ENTER key, the display shows the span voltage (mV/V).
e.g. 4.000000

(4) Press I/⏻ ESC key or switch the power off.

6-3 Test Mode

During the indicator count back to zero



6-3-1 7 Segment Display Testing

The display will show 0 ~ 9, then display "." and all of the icons. To exit press I/⏻ ESC

6-3-2 Keypad and Calibration SW Testing

Setting the calibration SW to "ON", or pressing any key will cause the related display segment to change from → . To exit press I/⏻ ESC

6-3-3 Display A/D Internal Value Display

Display range is 0 ~ 520,000d (-0.1mV/V ~ 4.0mV/V). To exit press I/⏻ ESC

6-3-4 RS-232 Serial Loop Back Testing

Terminal pin 5 and pin 6 must be connected together at the rear of the indicator.

If display shows PASS, the interface is working normally. If display shows FAIL, the interface is not working correctly.

6-3-5 EEPROM Memory Testing

If the display shows PASS, it means normal. If the display shows FAIL, the memory is not working correctly.

6-3-6 Option Interface Card Testing

2 **OP-02 BCD parallel output interface testing**

1) A flashing decimal point indicates the test procedure is active.

2) Program will transmit OFF → ON → OFF signal for each output bit of the BCD interface in sequence.

2 **OP-03 Analogue current output interface testing**

4 ~ 20mA current output testing

Use an ammeter to measure the output current between pin1 & pin 3 of the interface.

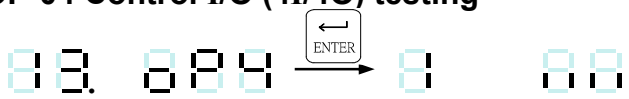
Use the F1 ^ F ⌄ keys to select the output current level desired.

1. 4mA ⇒ 4mA

2. 12mA ⇒ 12mA

3. 20mA ⇒ 20mA

2 OP-04 Control I/O (4I/4O) testing

1) 

F1

2) Press ENTER key to switch to the control input value.

Input 1 ~ 4 signal ON/OFF, related to display ▮ → ▮.

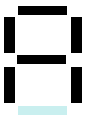
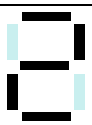
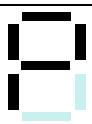
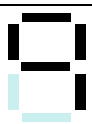
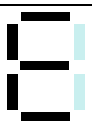
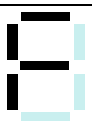
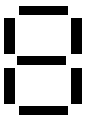
2 OP-05 Control I/O (8I/8O) testing

Press F1 key

▮ ~ ▮ in sequence, represents Output 1 ~ 8

Input 1 ~ 8 signal ON/OFF, related to display ▮ → ▮.

APPENDIX I DESCRIPTION OF 7 SEGMENT CHARACTERS

Digit	7 segments letter	Alphabet	7 segments letter	Alphabet	7 segments letter
0		**A**		N	
1		B		O	
2		C		P	
3		D		Q	
4		E		R	
5		F		S	
6		G		T	
7		H		U	
8		I		V	
9		J		W	
		K		X	
		L		Y	
		M		Z	

APPENDIX II FUNCTION TABLE

Specification Calibration

Item	Function	Setting Value		Default
		Parameter	Description	
CSP-01	Unit	0	None	2
		1	g	
		2	Kg	
		3	t	
		4	lb	
CSP-02	Decimal Point	0	None	0
		1	1 Decimal Point	
		2	2 Decimal Point	
		3	3 Decimal Point	
CSP-03	Division	1	Division	1
		2		
		5		
		10		
		20		
		50		
CSP-04	Max. Capacity	999999 ↓ 000000	Max. capacity	999999
CSP-05	Zero range	0 =full range (±1%~30%)	Zero range = calibration zero point ± (Max. capacity×setting value %)	0
CSP-06	Time of zero tracking	0.0 ~ 5.0 (sec)	Time and range of zero tracking should be use at the same time. If the time is set to 0.0, the zero tracking function is disabled.	1.0
CSP-07	Range of zero tracking	0 ~ 9	Range of zero tracking = (setting value×½)D , D=min. division Range and time of zero tracking should be use at the same time. If the range is set to 0, the zero tracking function is disabled.	2
CSP-08	Investigate time in stable	0.0 ~ 5.0 (sec)	Investigate time and range should be use at the same time. If the time is set to 0.0, the investigate time is disabled.	1.0
CSP-09	Investigate range in stable	0 ~ 9	Investigate time and range should be use at the same time. If the range is set to 0, the investigate range is disabled.	2
CSP-10	Weight unstable, function ZERO and TARE	0	Action	0
		1	None	
CSP-11	Gross Weight is negative, function TARE	0	Action	0
		1	None	

2 FNC Group Function Setting

Item	Function	Setting value				Default
		Parameter	Description			
FNC-01	Digital Filter I	0	5 Hz			4
		1	4.17 Hz			
		2	2.5 Hz			
		3	2.08 Hz			
		4	1.25 Hz			
		5	1.04 Hz			
		6	0.63 Hz			
		7	0.52 Hz			
		8	0.31 Hz			
		9	0.26 Hz			
FNC-02	Digital Filter II	0	Disabled			2
		1	Less filter ↕ Greater			
		2				
		3				
		4				
		5				
FNC-03	Key – Locked	000000 ↓ 111111	0	Normal **(lock disable)**	The bits and front panel key positions are related to each other.	000000
			1	Close **(lock enable)**		
FNC-04	“F” function setting	Parameter ⇒ Description 0 ⇒ Display Net / Gross weight 1 ⇒ Setpoint parameter setting 2 ⇒ Tare reset 3 ⇒ Manual serial, parallel print output. 4 ⇒ Start load 5 ⇒ Stop load 6 ⇒ Start comparison 7 ⇒ Unload command 8 ⇒ Totalise weight and counts command 9 ⇒ Clear totalised weight and counts 10 ⇒ Hold mode 11 ⇒ Escape Hold mode (I/O DSP) 12 ⇒ Convert to Gross / Net / totalised weight / totalised Count				1
FNC-05	“F1” function setting					0

Item	Function	Setting value		Default
		Parameter	Description	
FNC-06	Front panel indication "◄" setting (top)	Parameter ⇒ Description 0 ⇒ Zero 1 ⇒ MD 2 ⇒ Gross 3 ⇒ Net 4 ⇒ Totalised weight (Accu. V) 5 ⇒ Totalised transactions (Accu. C) 6 ⇒ SP1 7 ⇒ SP2 8 ⇒ SP3 9 ⇒ Hi 10 ⇒ OK 11 ⇒ Lo 12 ⇒ Under 13 ⇒ Over 14 ⇒ Discharge 15 ⇒ Running 16 ⇒ Hold		0
FNC-07	Front panel indication "◄" setting (next to top)			1
FNC-08	Front panel indication "◄" setting (next to bottom)			2
FNC-09	Front panel indication "◄" setting (bottom)			3
FNC-10	Return to zero band	0	5 d	0
		1	10 d	
		2	20 d	
		3	40 d	
		4	60 d	
		5	80 d	
		6	100 d	
		7	150 d	
		8	200 d	
		9	250 d	
FNC-11	Hold	0	Hold	0
		1	Peak hold (positive 1)	
		2	Peak hold (negative)	
		3	Peak hold (absolute value)	
		4	Peak hold (positive 2)	
FNC-12	Rate for display rewrite	0	No limitation	0
		1	20 times/sec	
		2	10 times/sec	
		3	5 times/sec	
		4	1 time/sec	

Serial Input/Output Interface (Build in)

Item	Function	Setting Value			Default
		Para-meter	Description		
RS1- 01	Transmit format	0	As display		0
		1	Gross only		
		2	Net only		
		3	As display (simple)		
		4	Gross (simple)		
		5	Net (simple)		
		6	Comparison + As display (simple)		
		7	Comparison +Gross (simple)		
		8	Comparison +Net (simple)		
		9	Tare		
		10	Totalised (Accu.) Weight and number of transactions		
RS1- 02	Transmit mode	0	Transmit continuous + command mode		0
		1	Auto transmit + command mode		
		2	Manual transmit + command mode		
		3	Command mode		
		4	MODBUS RTU mode		
RS1- 03	Transmit speed	0	600		2
		1	1200		
		2	2400		
		3	4800		
		4	9600		
		5	19200		
RS1- 04	Parity Bit length Stop Bit	0	N, 8, 1	No parity, 8 data bits, 1 Stop bit	2
		1	O, 7, 1	Odd parity, 7 data bits, 1 Stop bit	
		2	E, 7, 1	Even parity, 7 data bits, 1 Stop bit	
RS1- 04	MODBUS mode: Parity Bit length Stop Bit	0	N, 8, 2	No parity, 8 data bits, 2 Stop bit	2
		1	O, 8, 1	Odd parity, 8 data bits, 1 Stop bit	
		2	E, 8, 1	Even parity, 8 data bits, 1 Stop bit	
RS1- 05	Transmit times	0	Open		0
		1	1 time/sec.		
		2	2 time/sec.		
		3	5 time/sec.		
		4	10 time/sec.		
RS1- 06	Transmission conditions	0 0 0 0 0 0 Negative(Net Wt.) Weight unstable Overload (OL) 0 ⇒ transmit cont. 1 ⇒ Stop transmit			000000
RS1- 07	Indicator poling address	00 ↓ 99	When set to 0, Indicator addressing is not used.		0

BCD Parallel Output Interface (OP – 02)

Item	Function	Setting value		Default
		Parameter	Description	
bCd- 01	Data type	0	As display	0
		1	Gross	
		2	Net	
bCd- 02	Transmit mode	0	Transmit continuous	0
		1	Auto transmit	
		2	Manual transmit	
bCd- 03	Output Logic	0	Positive logic action	0
		1	Negative logic action	
bCd- 04	Data ready Signal logic	0	Positive logic action	0
		1	Negative logic action	
bCd- 05	OL output code	0	FFFFFF	0
		1	999999	
bCd- 06	Data code	0	BCD Code	0
		1	Hex. Code	

Analogue Current/Voltage Output Interface (Op - 03)

Item	Function	Setting value		Default
		Parameter	Description	
AnL- 01	Data type	0	As display	0
		1	Gross	
		2	Net	
AnL- 02	Signal output	0	Current output	0
AnL- 03	Weight in Lo	000000 ~ 999999	When the weight reaches the value of that in AnL-03, the current / voltage output is changed to that configured in AnL-04.	0
AnL- 04	Current / Voltage in Lo	0.0 mA ~ 20.0 mA		4.0
AnL- 05	Weight in Hi	000000 ~ 999999	When the weight reaches the value of that in AnL-05, the current / voltage output is changed to that configured in AnL-06.	300000
AnL- 06	Current / Voltage in Hi	0.0 mA ~ 20.0 mA		20.0

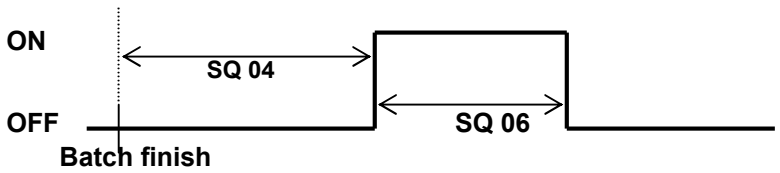
External Parallel Input/Output Interface (Op-04 & Op-05)

Item	Function	Setting value Parameter ⇒ Description	Default
IN - 01	Input 1	0 ⇒ None 1 ⇒ Zero 2 ⇒ Tare 3 ⇒ Tare reset 4 ⇒ Start batching 5 ⇒ Stop batching 6 ⇒ Discharge Command 7 ⇒ Hold 8 ⇒ Hold display & I/O reset 9 ⇒ Totalise (Accu) Command 10 ⇒ Clear totaliser (Accu) 11 ⇒ Clear previous total (Accu) Value. 12 ⇒ Start to compare 13 ⇒ Serial and parallel printer manual output 14 ⇒ Net / Gross	1
IN - 02	Input 2		2
IN - 03	Input 3		3
IN - 04	Input 4		4
IN - 05	Input 5		5
IN - 06	Input 6		6
IN - 07	Input 7		7
IN - 08	Input 8		8

Item	Function	Setting value Parameter	Description	Default
OUT- 01	Output 1	0 ⇒ None 1 ⇒ Zero band 2 ⇒ SP1 3 ⇒ SP2 4 ⇒ SP3 5 ⇒ Batching completed 6 ⇒ Discharge 7 ⇒ Peak ready 8 ⇒ Stable 9 ⇒ Internal batching process running 10 ⇒ Under 11 ⇒ Over 12 ⇒ Hi 13 ⇒ OK 14 ⇒ Lo		1
OUT- 02	Output 2			2
OUT- 03	Output 3			3
OUT- 04	Output 4			4
OUT- 05	Output 5			5
OUT- 06	Output 6			6
OUT- 07	Output 7			7
OUT- 08	Output 8			8
OUT- 09	The output logics of OUT-04~OUT-01	0000 **à** positive logic 1111 **à** negative logic		0000
OUT- 10	The output logics of OUT-08~OUT-05	0000 **à** positive logic 1111 **à** negative logic		0000

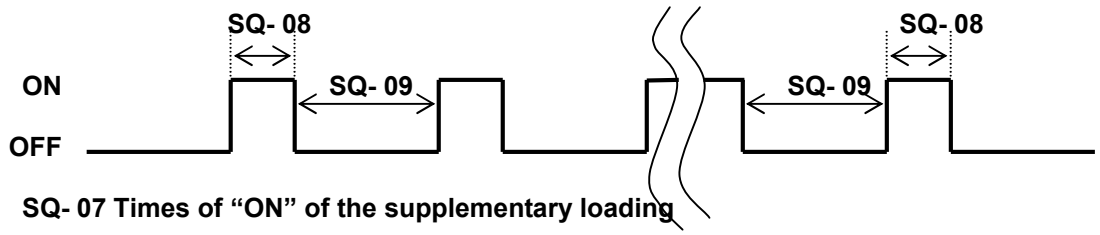
Item	Function	Setting value		Default
		Parameter	Description	
SQ- 01	Batching mode	1	Normal batch	1
		2	Loss-in weight	
		3	Comparison mode	
		4	Normal batch (Built-in program)	
		5	Loss-in weight (Built-in program)	
		6	Hold mode (Built-in program)	
SQ- 02	Batching start delay time	0.0 ~ 25.5 (sec)	The built-in auto-program starts the batch comparison procedure after the input of the batch start signal.	0.0
SQ- 03	SP1,SP2 Waiting time comparison	0.0 ~ 25.5 (sec)	No full flow comparison during this function's set time period. If the set value is 0, indicates this function is not in use.	0.0
SQ- 04	Batch finish output signal delay time	0.0 ~ 25.5 (sec)	Output the batch finished signal after this delay time.	0.5
SQ- 05	Batch finish Condition	0	Wait until the weight is stabilized	0
		1	No need to wait until the weight has stabilized	
SQ- 06	Batch finish Output signal time	0.0 ~ 25.5 (sec)	Batch finished output signal time. If set to 0, the output signal will be off until the next batch start.	1.0

Batch finish signal



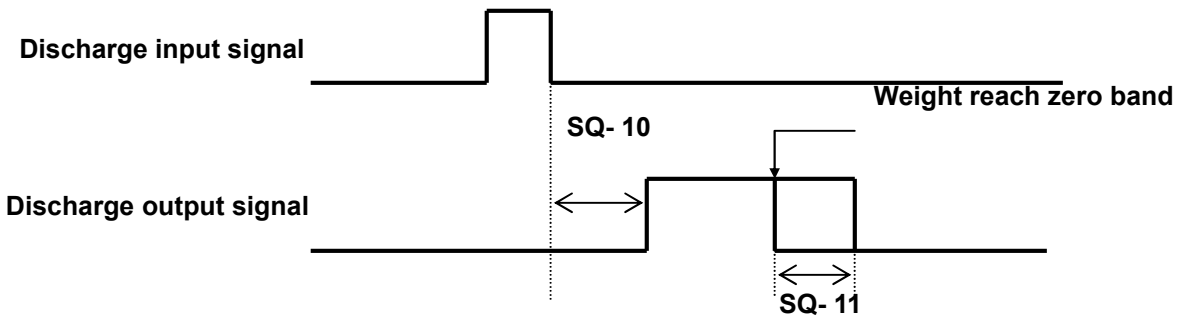
SQ- 07	Number of Times the supplementary loading function operates	0 ~ 255	If the set value is 0, this function is not in use.	0
SQ- 08	Supplementary loading gate open time	0.0 ~ 25.5 (sec)	Must be coordinate with times of supplementary loading, (SQ- 07)	0.1
SQ- 09	Supplementary loading gate close time	0.0 ~ 25.5 (sec)	Must be coordinate with times of supplementary loading, (SQ- 07)	1.0

Supplementary loading signal



SQ- 07 Times of "ON" of the supplementary loading

Function Configuration Menu

Item	Function	Setting value		Default
		Parameter	Description	
SQ- 10	Discharge start delay time	0.0 ~ 25.5 (sec)	Delay time before Discharge signal is ON.	0.0
SQ- 11	Discharge stop delay time	0.0 ~ 25.5 (sec)	Delay time before Discharge signal is OFF.	0.0
SQ- 12	Discharge time	0.0 ~ 25.5 (sec)	Won't activate internal discharge control function, if set to 0.	0
				
SQ- 13	Restart delay time	0.0 ~ 25.5 (sec)	Delay time before Restart signal is ON.	1.0
SQ- 14	Batching counts	0 ~ 255 (times)	Number of batch runs 0 ⇒ one batch only	0
SQ- 15	Set the zero band in to final weighing value	0	No setting	0
		1	Setting	
SQ- 16	Hi, OK, Lo	0	Comparison anytime	0
		1	To compare at batch finish	
		2	To compare at external input signal	
		3	To compare at batching finish and external input signal.	
		4	Comparison auto	
SQ- 17	Auto accu. weight / counts	0	Disabled	0
		1	Enabled	
SQ- 18	The parameter source in weight comparison	0	Key in directly from front keypad	0
		1	Input directly from rear interface	
SQ- 19	Weight comparison delay time	0.0 ~ 25.5 (sec)	Comparison delay time for Hi, OK, Lo	0.5
SQ- 20	TARE auto.	0	Press keypad TARE to TARE	0
		1	TARE auto	
SQ- 21	Discharge auto	0	Input from external input or keypad	0
		1	Discharge auto + manual	

APPENDIX III MODBUS DATA ADDRESS TABLE

Data Register		Bit I/O		Bit I/O	
Modbus	**SCALE**	**Modbus**	**SCALE Output**	**Modbus**	**SCALE Input**
40000 ~ 40001	As display value	00000	Stable status	01000	Zero
40002 ~ 40003	Gross weight	00001	Zero status	01001	Clear zero compensation
40004 ~ 40005	Net weight	00002	Gross	01002	Tare
40006 ~ 40007	Tare value	00003	Net	01003	Clear tare
40008 ~ 40009	Gross weight hold value			01004	Clear pre-tare
40010 ~ 40011	Net weight hold value	00050	Zero Band	01005	Display the gross weight on main display
40012 ~ 40013	Weight final value	00051	Sp1	01006	Display the net weight on main display
40014 ~ 40015	Unit weight	00052	Sp2	01007	Enter/Exit the function mode
40016 ~ 40017	Percentage value	00053	Sp3	01008 ~ 01027	Switch from the 1st to 20th unit
40018 ~ 40019	Totalised value	00054	Batch Finish		
40020 ~ 40021	Totalised times	00055	Under	01049	Switch the operation modes
40022 ~ 40023	Totalised times of HI value	00056	Over	01050	Totalised the current net weight and add 1 to the totalised times
40024 ~ 40025	Totalised times of LO value	00057	Discharging	01051	Deduct the last totalised value and deduct 1 to the totalised times
40026 ~ 40027	Totalised times of OK value	00058	Hi-Hi	01052	Clear the totalised value and times
		00059	Hi	01053	Running
		00060	Go	01054	Stop
		00061	Lo	01055	Discharge starts
41000 ~ 41001	Pre-tare value	00062	Lo-Lo	01056	Hold mode ON/OFF
41002 ~ 41003	Zero band value	00063	Peak ready	01057	Release "Hold value"
41004 ~ 41005	Target value	00064	Running	01058	Output judgement
41006 ~ 41007	SP1value	00065	ZERO calibration	01059	ZERO calibration
41008 ~ 41009	SP2 value	00066	SPAN calibration	01060	SPAN calibration
41010 ~ 41011	SP3 value	00067	Calibrate ERR0		
41012 ~ 41013	LO_LO value	00068	Calibrate ERR2		
41014 ~ 41015	LO value	00069	Calibrate ERR6		
41016 ~ 41017	HI_HI value				
41018 ~ 41019	HI value				
41020 ~ 41021	Under value				
41022 ~ 41023	Over value				
41024 ~ 41025	Peak value setting				
41100 ~ 41101	SPAN calibration value				

4 The settings marked in grey are not available.

APPENDIX VI MODBUS DATA ADDRESS TABLE

(For Hitech and Pro-face Human Machine Interface)

Data Register		Bit I/O		Bit I/O	
Modbus	**SCALE**	**Modbus**	**SCALE Output**	**Modbus**	**SCALE Input**
40001 ~ 40002	As display value	00001	Stable status	01001	Zero
40003 ~ 40004	Gross weight	00002	Zero status	01002	Clear zero compensation
40005 ~ 40006	Net weight	00003	Gross	01003	Tare
40007 ~ 40008	Tare value	00004	Net	01004	Clear tare
40009 ~ 40010	Gross weight hold value			01005	Clear pre-tare
40011 ~ 40012	Net weight hold value	00051	Zero Band	01006	Display the gross weight on main display
40013 ~ 40014	Weight final value	00052	Sp1	01007	Display the net weight on main display
40015 ~ 40016	Unit weight	00053	Sp2	01008	Enter/Exit the function mode
40017 ~ 40018	Percentage value	00054	Sp3	01009 ~ 01028	Switch from the 1st to 20th unit
40019 ~ 40020	Totalised value	00055	Batch Finish		
40021 ~ 40022	Totalised times	00056	Under	01050	Switch the operation modes
40023 ~ 40024	Totalised times of HI value	00057	Over	01051	Totalised the current net weight and add 1 to the totalised times
40025 ~ 40026	Totalised times of LO value	00058	Discharging	01052	Deduct the last totalised value and deduct 1 to the totalised times
40027 ~ 40028	Totalised times of OK value	00059	Hi-Hi	01053	Clear the totalised value and times
		00060	Hi	01054	Running
		00061	Go	01055	Stop
		00062	Lo	01056	Discharge starts
41001 ~ 41002	Pre-tare value	00063	Lo-Lo	01057	Hold mode ON/OFF
41003 ~ 41004	Zero band value	00064	Peak ready	01058	Release "Hold value"
41005 ~ 41006	Target value	00065	Running	01059	Output judgement
41007 ~ 41008	SP1value	00066	ZERO calibration	01060	ZERO calibration
41009 ~ 41010	SP2 value	00067	SPAN calibration	01061	SPAN calibration
41011 ~ 41012	SP3 value	00068	Calibrate ERR0		
41013 ~ 41014	LO_LO value	00069	Calibrate ERR2		
41015 ~ 41016	LO value	00070	Calibrate ERR6		
41017 ~ 41018	HI_HI value				
41019 ~ 41020	HI value				
41021 ~ 41022	Under value				
41023 ~ 41024	Over value				
41025 ~ 41026	Peak value setting				
41101 ~ 41102	SPAN calibration value				

4 The settings marked in grey are not available.