

SI 480E

DIGITAL INDICATOR

USER MANUAL

MANUAL Ver 3.03
PROGRAM Ver 4.00



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1. Precautions

1-1. Caution / Warning Marks



Warning Mark means there is possibility to get serious injury or to cause death If the product was not handled in a proper way.

- 1) Do not drop the product and avoid serious external damage on it.
- 2) Do not install the product under direct sunshine or severe vibration.
- 3) Do not install the product under conditions with high voltage or severe electric noise.
- 4) Turn off the power when you use it with external input devices.
- 5) Do not sprinkle water on the product or avoid rainy conditions.



Caution Mark means there is possibility to cause material loss if the product was not handled in a proper way.

- 1) The products can be changed without previous notice as the version is upgraded.
- 2) As version is upgraded the product version increases and all of the function will remain if possible.
- 3) Do not use the product at conditions with fluctuating temperature or severe vibration.

1-2. Copyrights

- 1) All rights are reserved by SEWHACNM Co., LTD.
- 2) Any kind of copy or distribution is prohibited without permission from SEWHACNM Co., LTD.
- 3) This manual can be changed without previous notice as the version is upgraded. If you have any kind of inquiries, please contact your local agent or the Headquarter, SEWHACNM Co., LTD.

1-3. Inquiries

If you have any kinds of inquiries for this model, please contact your local agent or Head Office.

- 1) Head office : SEWHACNM CO., LTD.
- 2) Website : <http://www.sewhacnm.co.kr>
- 3) Email : sales@sewhacnm.co.kr

2. Introduction

2-1. Introduction



Thank you for Purchasing “SI 480E”, the digital weighing indicator. This product is a high-quality indicator connectible to other external devices and has high resolution. Plus, Serial Interface(RS422, RS485) with Modbus Protocol is available for user’s convenience.

Please learn and review this manual before use it and enjoy all of the function of this product.

2-2. Feature

- 1) Since this product is DIN standard size, it is easy to install in a panel.
- 2) Front display is covered with Polycarbonate film, strong against dust and water.
- 3) Serial interface RS422 / RS485 and Analog output 4~20mA (or 0~10V) available. (Modbus Protocol available)

2-3. Components

	
Indicator	Manual

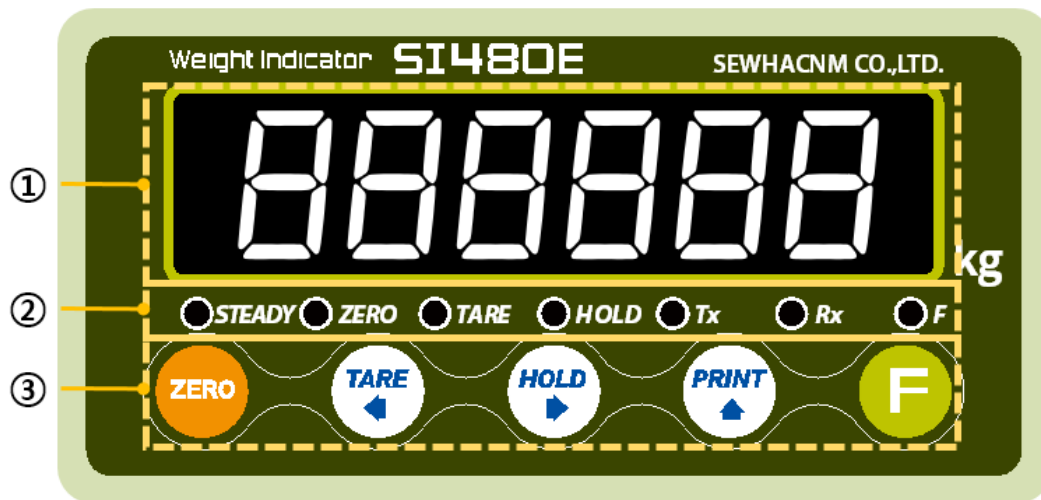
3. Specification

3-1. Specification

Content		Specification	
Load Cell Input Analog Signal	Display Resolution	1/20,000	
	Internal Resolution	1/2,000,000 ($\pm 1,000,000$)	
	Input Sensitivity	Min 0.1 μ V/V	
	Max Signal Input Voltage	Max 3.2mV/V	
	Load Cell Excitation	DC +5V	
	A/D Converting Method	Sigma-Delta	
	Decimal Point	0, 0.0, 0.00, 0.000	
	Drift	Zero	10PPM/ $^{\circ}$ C
		Span	10PPM/ $^{\circ}$ C
Non Linearity		0.001% max	
Operating Environment	Operating Temperature Range	-10 $^{\circ}$ C ~ +40 $^{\circ}$ C [14 $^{\circ}$ F ~ 104 $^{\circ}$ F]	
	Operation Humidity Range	40% ~ 85% RH, No Condensation	
Front Part	Display	15mm(0.56inch), 6 digits red FND(Number/Word) State(Lamp) 7 digits, Red LED	
	Key	5EA	
Interface	Digital input	2EA, Dry Contact(Zero Voltage Contact)	
	Serial interface	RS-422/485 Stream mode, Command mode, Modbus(RTU), Serial interface print	
Power	DC 12~24V (SMPS not included, subject of advice : 24V 1A), Power consumption Max 12W AC (option) : 110~220V, 50~60Hz, 0.5A, Power consumption max 12W		
Size	Size : 97mm(W) x 49mm(H) x 112mm(D), Weight : 350g		

3-2. Front

3-2-1. Display and key pad








① Display : Number/word display 6 digits red FND

② Condition(lamp)



- STEADY : Current weight is steady
- ZERO : Current weight is zero
- TARE : Using Tare function
- HOLD : Using Hold function
- TxD : Transmitting data
- RxD : Receiving data
- F : Function key input

③ Keypad

3-2-2. Key

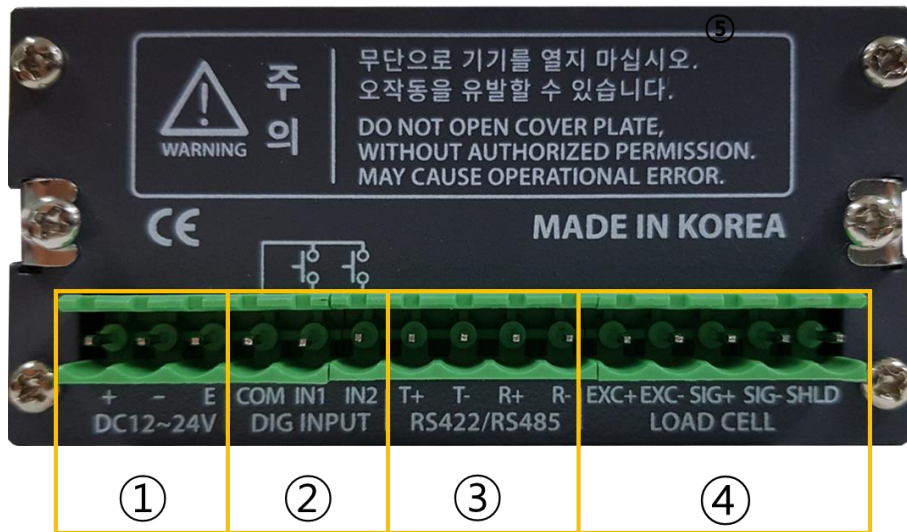
	<ul style="list-style-type: none"> - Set zero point - Clear or Cancel
	<ul style="list-style-type: none"> - Tare set or Tare reset (Does not work under Hold condition or when weight value is ZERO) - Calibration Mode : Move the cursor to the left - Function setting : Move the cursor to the left
	<ul style="list-style-type: none"> - Hold set or Hole reset ※ When HOLD is on, “H” mark will be shown at the display. - Move the cursor to the right.
	<ul style="list-style-type: none"> - Print - Enter the “Test 2” Mode - Increase set value - Saving data under set F103-0/4/5
	<ul style="list-style-type: none"> - Enter “Set-Up” Mode - Enter “Hidden function mode” - Save the value & Move to next step

3-2-3. Key combination

	Double Tare setiing
	If there is a print connected, print Total. (Total cannot be checked on display)

1. Max accumulated weighing count : 999,999times.
Over 999,999times return to “0” time
2. Max accumulated weight display : 999999999 (g, kg, ton)
Over 999,999,999 (g, kg, ton) return to “0” (g, kg, ton)

3-3. Rear panel



- ① DC(basic)/AC(option) Power Input Terminal
- ② External Input Terminal : Dry contact only (zero voltage point)
- ③ Serial Interface RS422,RS485(basic) / RS232C (option)
- ④ Load Cell Input Terminal



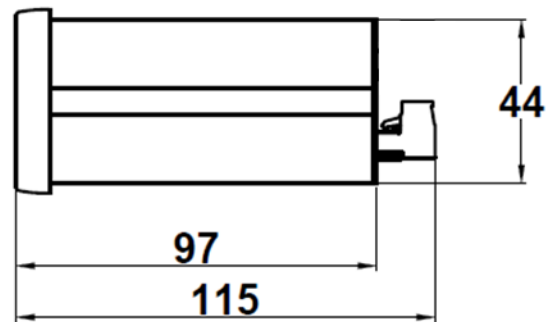
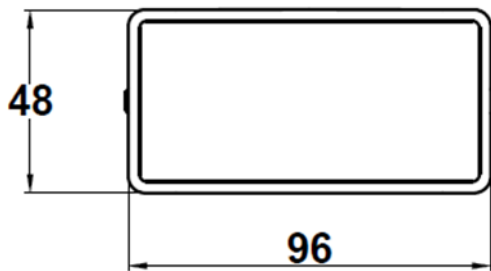
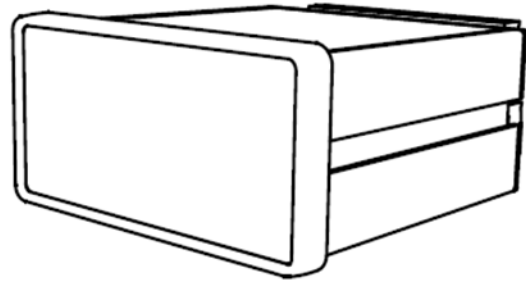
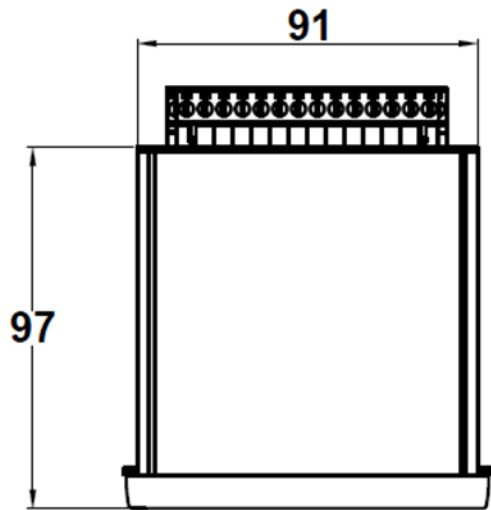
Check the standard Interface and optional specification of the product before installation.

Please select options when you purchase this model.

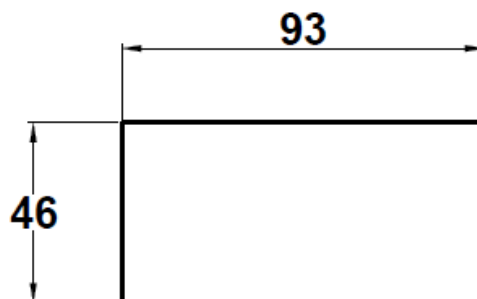
4. Installation

4-1. Size

(Unit : mm)



4-2. Panel Cutting Size (Unit : mm)



4-3. Load cell Installation

How to install load cell input terminal

(The color of the cables can differ from each manufacturer.)



1. If you use tension type of load cell as compression type, connect SIG+ and SIG- crossly.
2. The product can be damaged if you connect other cable to load cell input terminal.
3. Turn off the power of the indicator during connection to load cell.
4. Do not weld around the device.
(Parts of internal circuit of indicator or load cell can be broken during arc welding or electric welding.)

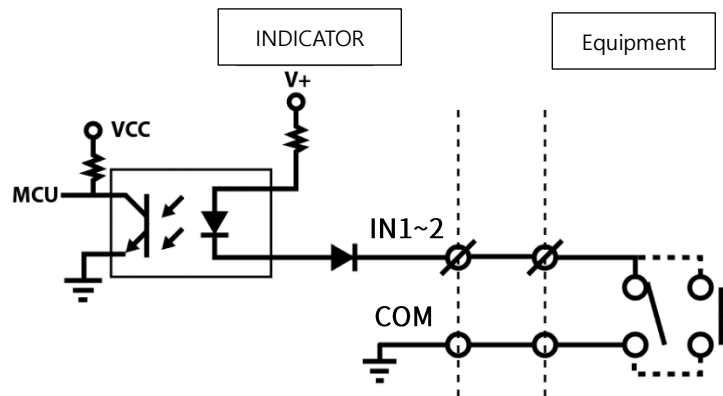


※ Precautions for Indicator-Load Cell Connection

1. You can use a maximum of 8 load cells. (350Ω standard)
2. The product has to be horizontal to the ground for more precise value.
3. Use summing box to adjust output deviation minimally when you install load cell more than two. (Each output gap can cause a margin of error.)
4. Change in temperature can cause a margin of error.
5. Do not weld around the device. If you need, disconnect every cable of indicator.
6. If you weigh static electricity, use earth shield wire or other ways to protect static electricity flowing in Indicator.

4-4. External Input

- 1) Each external Input can be set on F233, F234
- 2) Dry contact for Input Signal

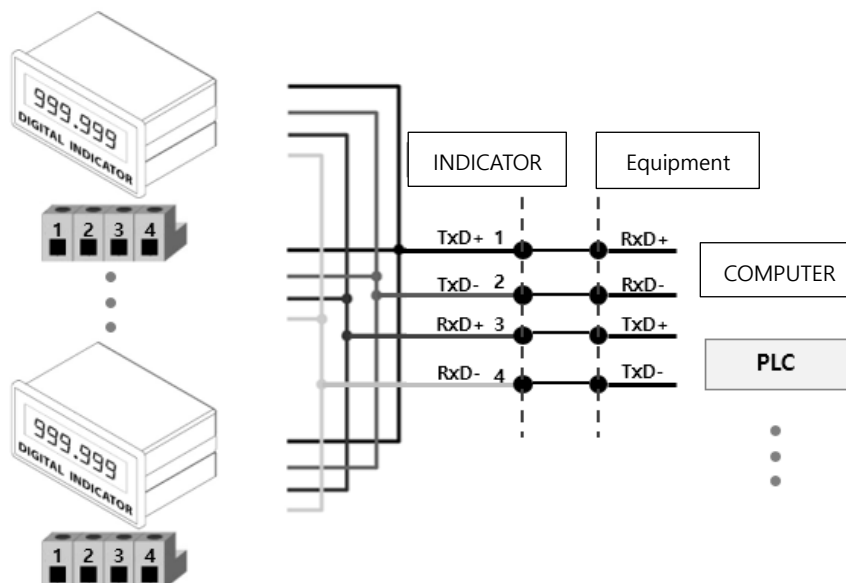


- 3) Terminal component
 - Top, Bottom
 - COM : Input common terminal
 - IN1~IN2: Input Signal Terminal (Dry contact-relay or switch signal)

4-5. Serial interface

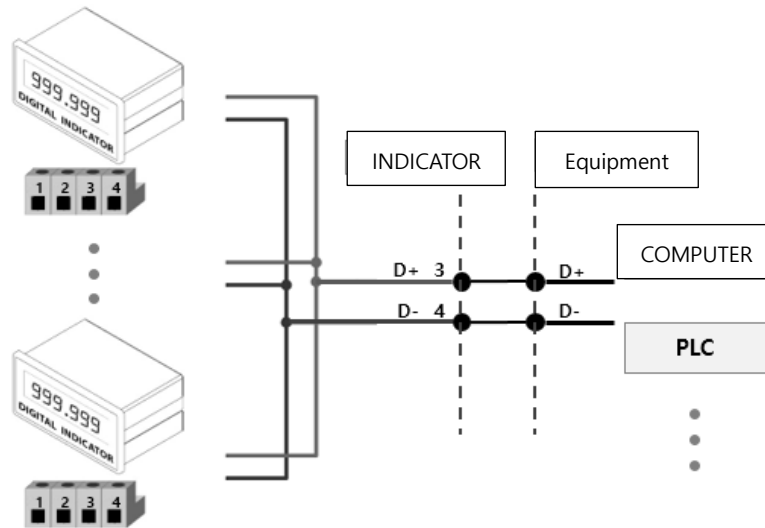
4-5-1. RS422

RS422 Interface is available for long-distance communication (within 1km) since it is strong against electric noise. You can connect up to 32EA of devices like PC, PLC, Printer through Multi-Drop Method.



4-5-2. RS485

RS485 Interface is available for long-distance communication (within 1km) since it is strong against electric noise. Although this Interface is slow compared to RS422, but you can connect up to 32EA of devices like PC, PLC, Printer through Multi-Drop Method.



Since Serial Interface is vulnerable to electric noise, Use twisted shielded cable to minimize communication disruption.

5. Set-up

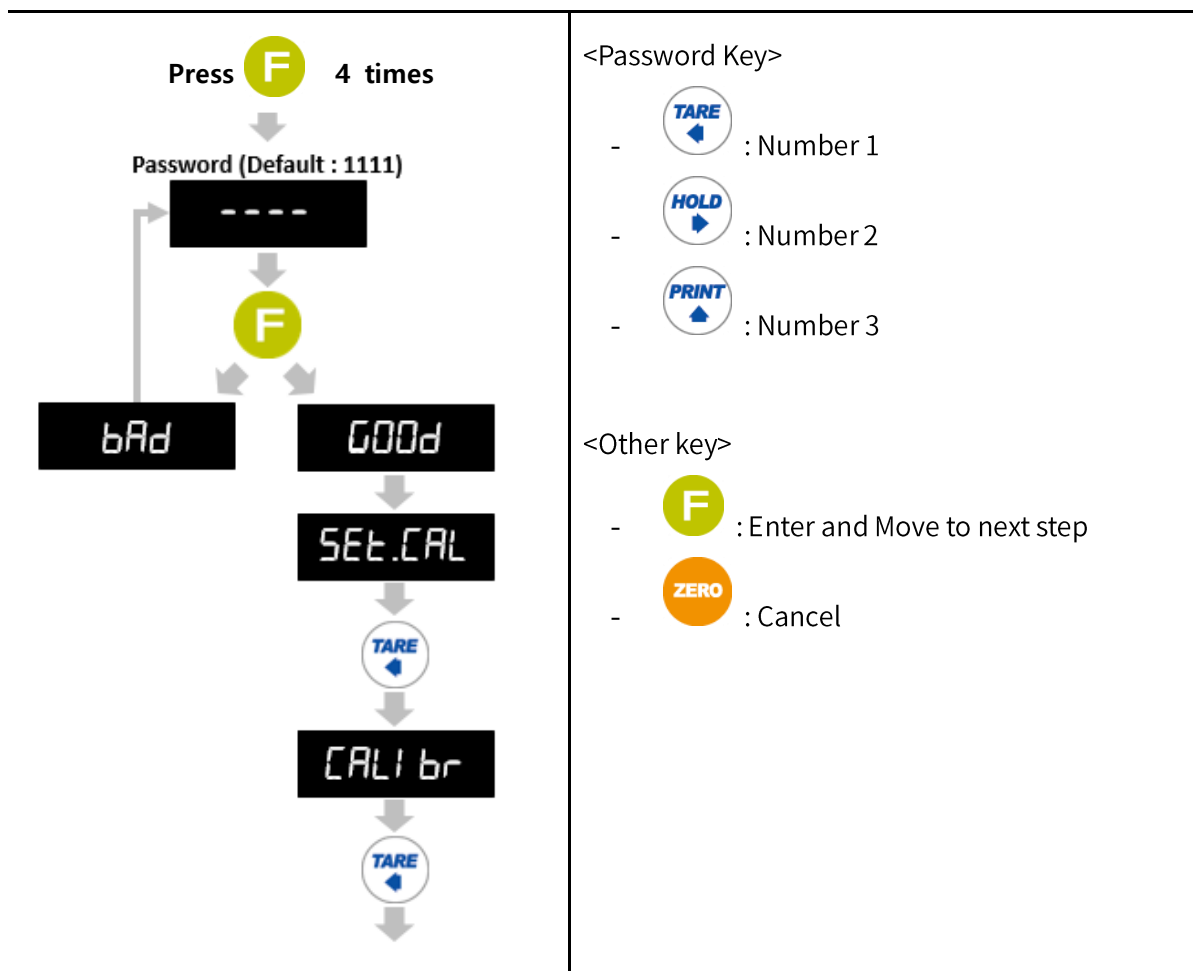
5-1. Calibration

Calibration is a work to correct linearity from zero to Max Capacity, which becomes standard when an indicator displays the current weight.

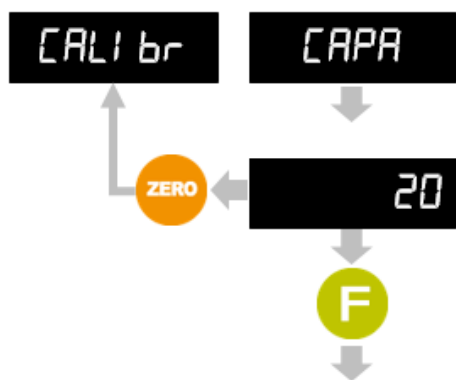


- When enter Calibration mode, Tare/Hold/Print function is initialized.
- Preheat the Indicator for 5 minutes before Calibration to get more exact result.

Step 1. Enter Calibration mode



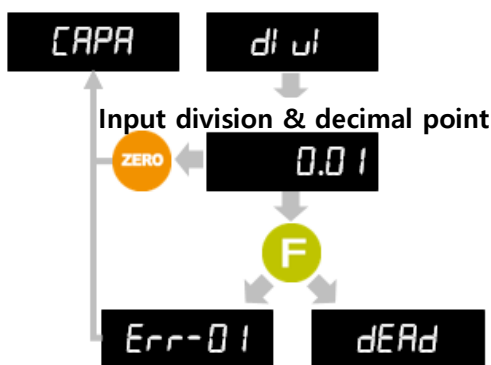
Step 2. Set Maximum Capacity



- , : Move the cursor
- : Increase the number
- : Save and move to next step
- : Cancel and move to previous step

Ex : When you want to set 20.00kg (division 0.01kg) for capacity, input 20.

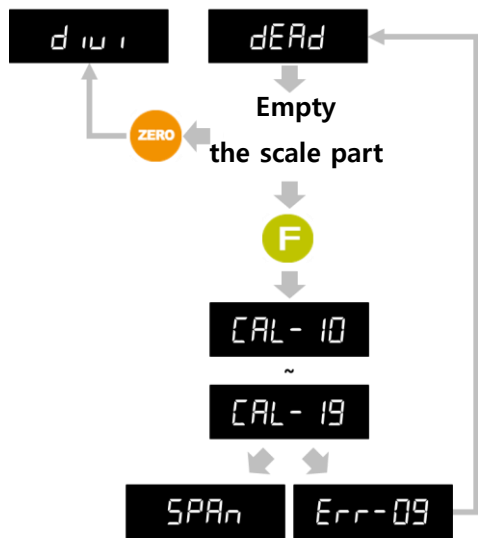
Step 3. Set Decimal Point and Division



- : Move decimal point
- : Increase division
- : Save and move to next step
- : Cancel and move to previous step

- ※ You can set the decimal point to 3 places (0, 0.0, 0.00, 0.000) and division can be set as 1, 2, 5, 10, 20, 50.
- ※ The value of (Max capacity/Division) should not be over 20,000.
- ※ If the value of (Max capacity/Division) is over 20,000, “Er-001” will show up and you have to start from “Step 3. Set Maximum Capacity” again.

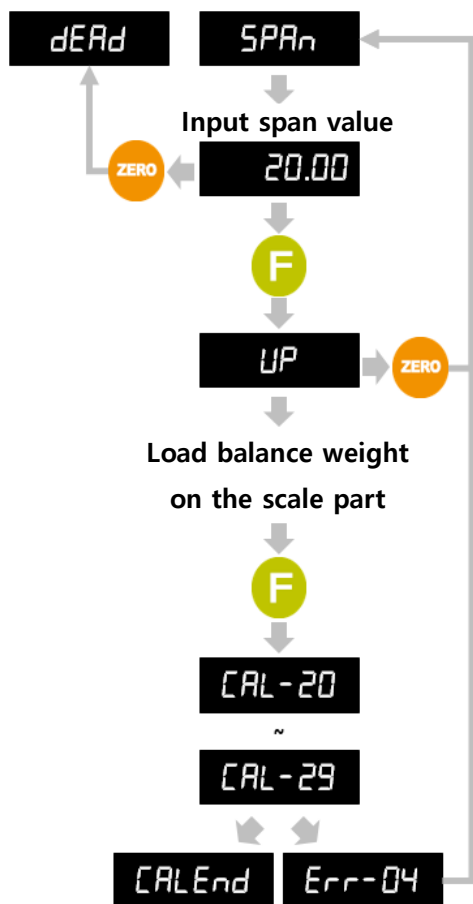
Step 4. Measure Dead Weight



- **F** : Save and move to next step
- **ZERO** : Cancel and move to previous step

※ If “Er-009” shows up, check if there is anything on the scale part or vibration which interrupt calculation of the indicator.

Step 5. Span Calibration



- **TARE** , **HOLD** : Move the cursor
- **PRINT** : Increase Number
- **F** : Save and move to next step
- **ZERO** : Cancel and move to previous step

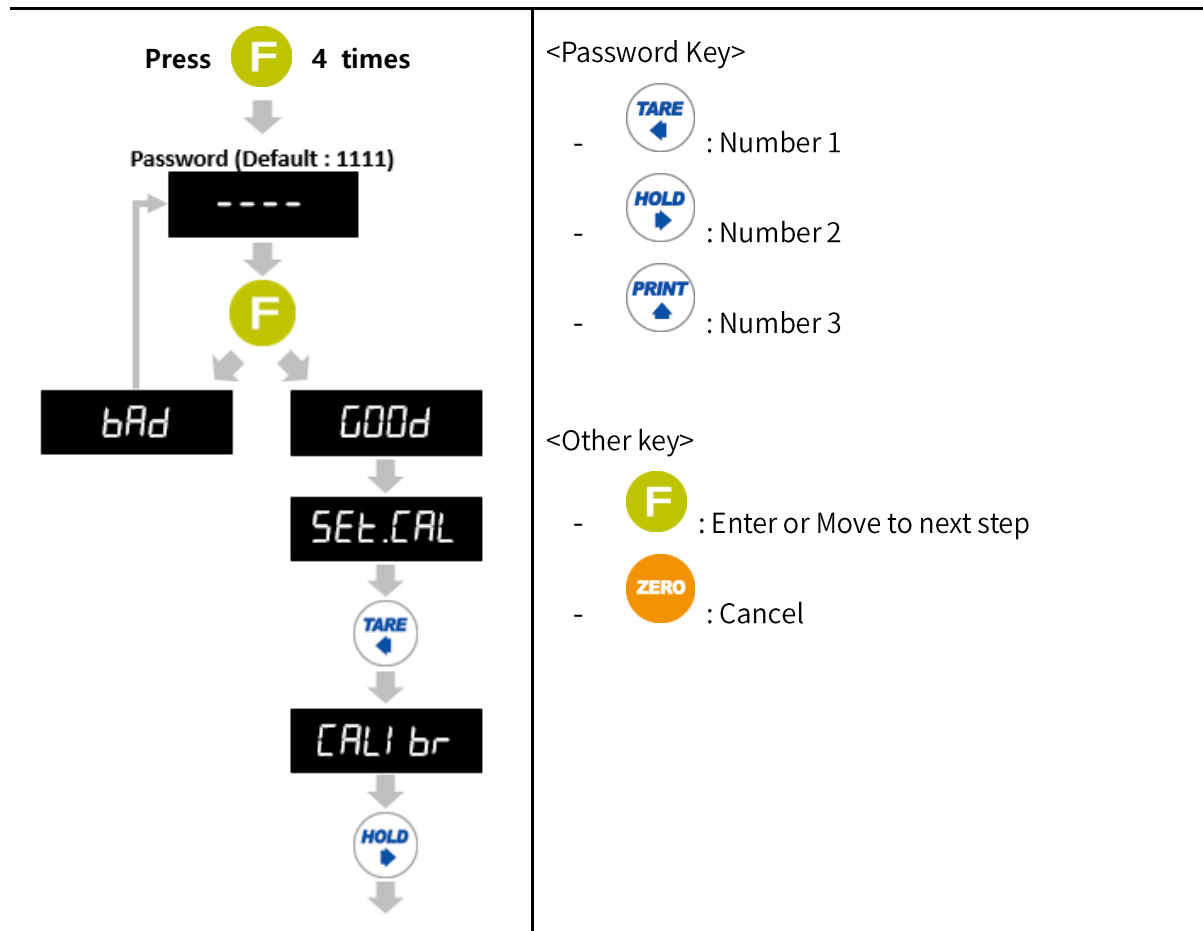
※ Er-004 : The balance weight is over Max capacity

※ Er-005 : The balance weight is under 10% of Max capacity

5-2. Simulation Calibration

You can proceed with Simulation Calibration when you do not have any balance weight. It is the way to calculate and adjust weight via Max capacity of load cell and Rated Output Value. The guaranteed accuracy of simulation calibration is 1/3,000 and it can differ from the accuracy of Rated Output Value of load cell.

Step 1. Enter Simulation Calibration mode



Step 2. Set Maximum Capacity

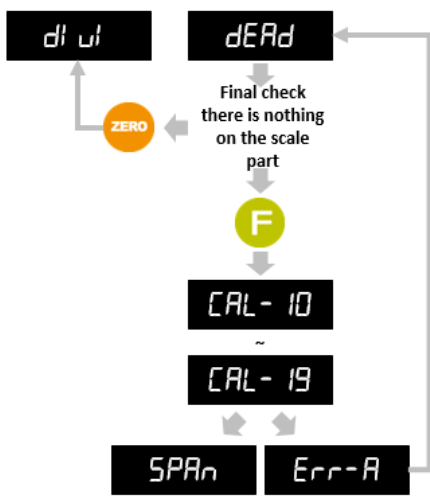
	<ul style="list-style-type: none"> - : Move the cursor - : Increase number - : Save and move to next step - : Cancel and move to previous step
<p>MODEL: xxxxx CAPA: 20kg R.O: 1.429mV/V S/N : xxxxxxxx</p>	<ul style="list-style-type: none"> ※ Capacity in Simulation Calibration means the capacity written on load cell label. ※ Input the capacity of load cell multiplied by the number of load cell. (number of load cell * capacity of load cell)

<Load Cell Label Explanation >

Step 3. Set Decimal Point and Division

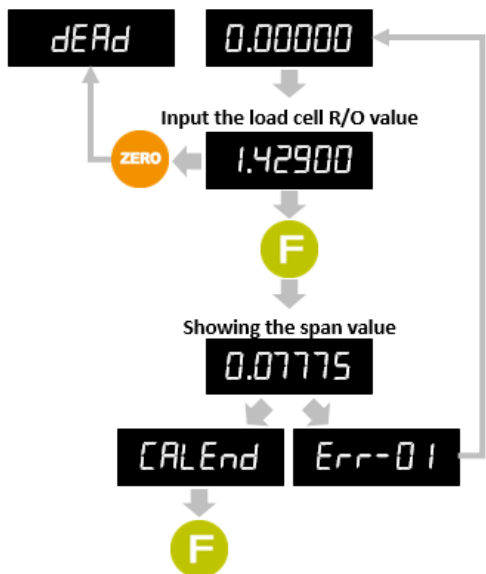
	<ul style="list-style-type: none"> - : Move the decimal point - : Increase division value - : Save and move to next step - : Cancel and move to previous step
<ul style="list-style-type: none"> ※ You can set the decimal point to 3 places (0, 0.0, 0.00, 0.000) and division can be set as 1, 2, 5, 10, 20, 50. ※ The value of (Max capacity/Division) should not be over 20,000. ※ If the value of (Max capacity/Division) is over 20,000, “Er-001” will show up and you have to start from “Step 2. Set Maximum Capacity” again. 	

Step 4. Measure Dead Weight



- ※ **F** : Save and move to next step
- ※ **ZERO** : Cancel and move to previous step
- ※ If “Er-009” shows up, check if there is anything on the scale part or vibration which interrupt calculation of the indicator.

Step 5. Set R.O.V (Rated Output Voltage/mV)



- **TARE** , **HOLD** : Move the cursor
- **PRINT** : Increase number
- **F** : Save and move to next step
- **ZERO** : Cancel and move to previous step

MODEL: xxxxx
 CAPA: 20kg
R.O: 1.429mV/V
 S/N : xxxxxxxx

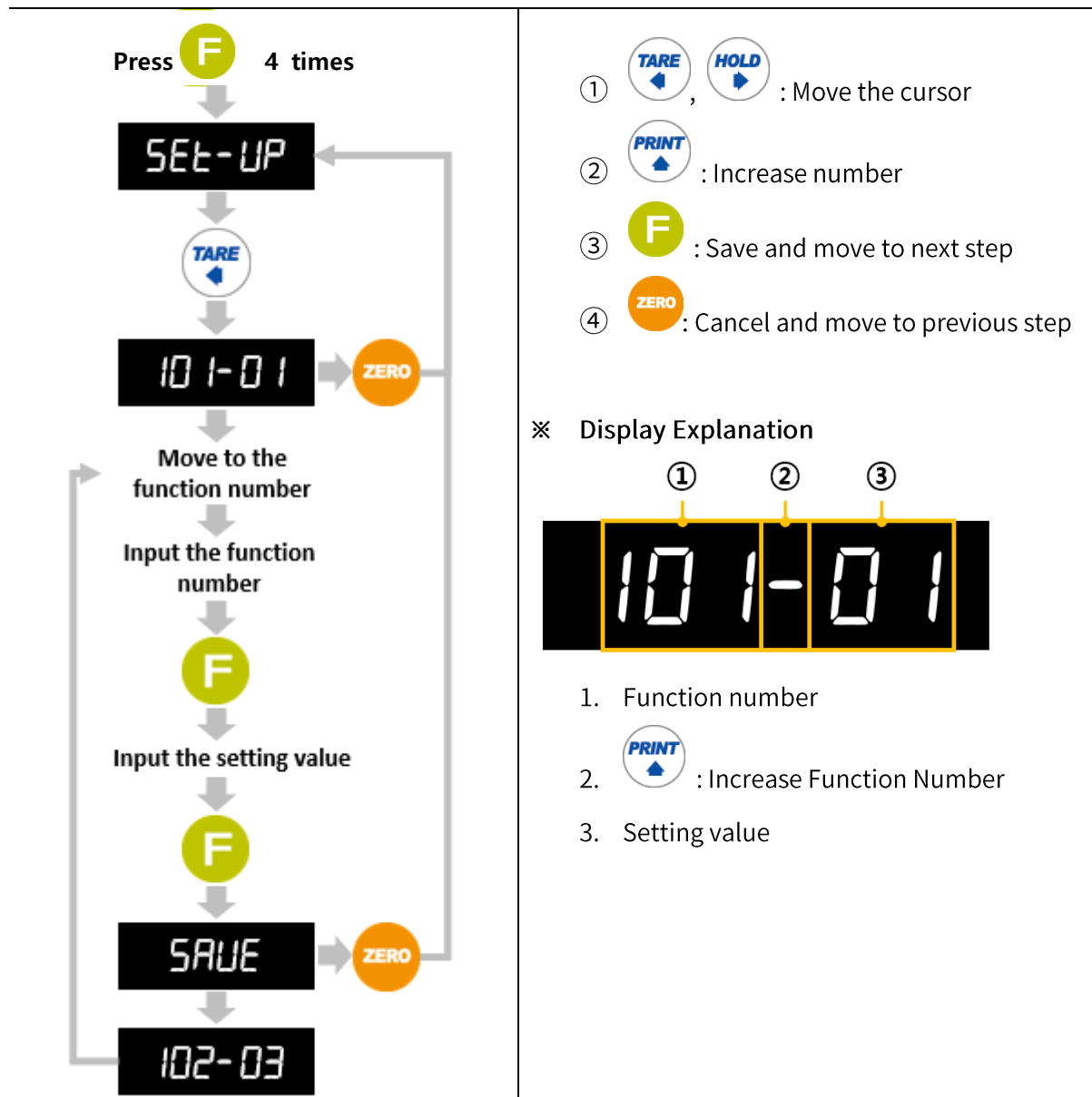
<Load Cell Label Explanation >

※ “Er-001” means you input wrong value. In this case, you need to check load cell label again.

5-3. Function Mode

Function Setting makes indicator operate perfectly with surrounding condition.

5-3-1. How to Enter Function Mode



5-3-2. F-Function List

No.	Subject	Default	Content	
101	ID Number	01	01~99 ID number	
102	Weight Back-up Mode	02	00 : Normal Mode 01 : Zero/Tare Back-Up Mode 02 : Zero Back-Up Mode	
103	Weighing Data Saving Method	03	00 : Manual (When Print key is input) 01 : Auto (At every steady state) 02 : Auto (At the first steady state) 03 : Auto (After weighing is finished) 04 : Manual or Auto (at every steady state) 05 : Manual or Auto (At the first steady state) 06 : Manual or Auto (After weighing is finished)	
◆ Weighing data saving method				
Weighing data saving method (F03)		Print Input	Print Output Data	Saved Data
00	Manual	○	Current Weight	Current Weight
		X	X	X
01	Auto (At every steady state)	○	Recent Steady Weight	X
		X	Steady Weight	Steady Weight
02	Auto (At the first steady state)	○	Recent Steady Weight	X
		X	Steady Weight	Steady Weight
03	Auto (After weighing is finished)	○	Recent Steady Weight	X
		X	Steady Weight	Steady Weight
04	Manual or Auto (at every steady state)	○	Current Weight	Current Weight
		X	Steady Weight	Steady Weight
05	Manual or Auto (At the first steady state)	○	Current Weight	Current Weight
		X	Steady Weight	Steady Weight
06	Manual or Auto (After weighing finished)	○	Current Weight	Current Weight
		X	Steady Weight	Steady Weight

No.	Subject	Default	Content
104	Display Up-Date Speed	09	01 : 1time/sec 04 : 6time/sec 07 :20time/sec 02 : 2time/sec 05 :10time/sec 08 :30time/sec 03 : 3time/sec 06 :15time/sec 09 :60time/sec
105	Display lightness	02	00 : Low ~ 07 : High
108	Buzzer Alarm for External Input Detection	00	00 : enable 01 : disable
110	Weight Unit	00	00 : kg 01 : g 02 : ton
111	Print Language	00	00 : Korean 01 : English
201	Near Zero Range	00	00 ~ 999999
202	Auto Zero Range	00	00 ~ 99 (Unit 1 = 0.25 division)
203	Steady Range	08	01~99 (Unit 1 = 0.25 division)
204	Steady Condition Check Time	10	01~99 (Unit : 0.1 sec.)
205	Digital Filter	10	01:Weak vibration ~ 99:Strong vibration
206	Zero Key Operation	00	00:Always active 01:Active under steady condition only
207	Tare Key Operation	00	00:Always active 01:Active under steady condition only
209	Zero Key Range	02	00: Active within 2% of Max Capacity 01: Active within 5% of Max Capacity 02: Active within 10% of Max Capacity 03: Active within 20% of Max Capacity 04: Active within 50% of Max Capacity 05: Active within 100% of Max Capacity 06:No limit

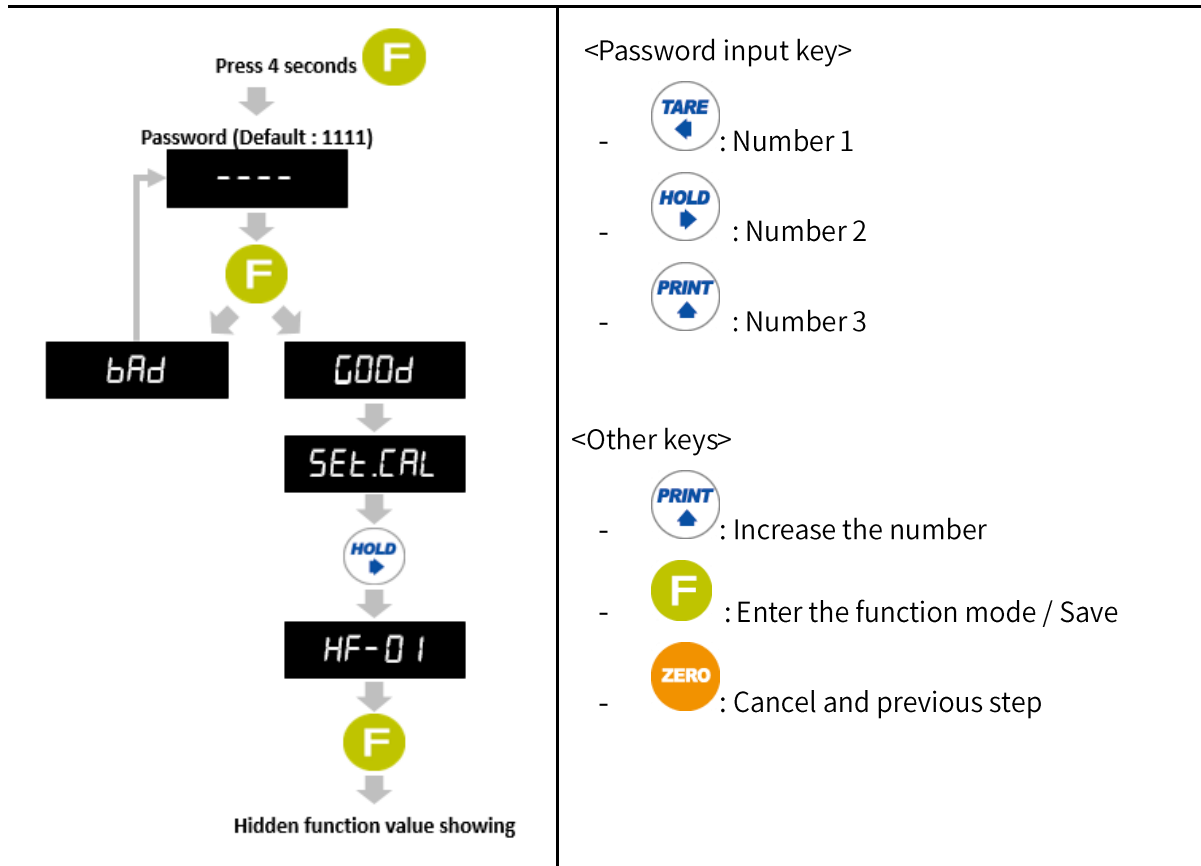
No.	Subject	Default	Content
210	Tare key Range	02	00: Active within 10% of Max Capacity 01: Active within 20% of Max Capacity 02: Active within 50% of Max Capacity 03: Active within 100% of Max Capacity
211	Auto Zero After Tare Key Input	00	00 : disable 01 : enable
212	Tare Delay Time	0	00 : Disuse 01 ~ 10:Use (Unit : 1second)
214	Auto Tare Reset	00	00 : disable (Manual reset) 01 : Auto Reset under Near Zero range 02 : Auto Reset under Steady state
215	Auto Tare Reset Delay Time	00	00 : disable (right after Key or External input) 00 ~ 09 : enable (Unit : 1 second)
216	Hold Mode	00	00:Sample Hold 01:Peak Hold 02:Average Hold
217	Hold Delay Time	00	00 : disable (right after Key or External input) 01 ~ 10 : enable (Unit : 1 second)
218	Hold Reset within Near Zero Range	00	00: disable 01: enable
219	Auto Hold Reset Delay Time	00	00 : disable (right after Key or External input) 01 ~ 10 : enable (Unit : 1 second)
220	Average Hold Time	10	01 ~ 09 (Unit : 0.1 second)
221	Minus Mark (-) Display	00	00 : enable 01 : disable
222	Current Weight Display During UnPass/OverLoad	00	00 : Enable 01 : Disable

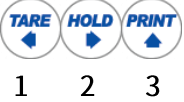
No.	Subject	Default	Content
233	External Input 1	01	00 : disuse 05 : Hold
234	External Input 2	04	01 : Zero 06 : Hold reset 02 : Tare 07 : Hold/Hold reset 03 : Tare reset 08 : Run 04 : Tare/Tare reset 09 : Stop
251	Zero State Lamp	00	00 : Near Zero (Absolute value) 01 : Zero 02 : Near Zero (Positive value)
301	Data bit/Stop bit/ Parity	00	00: Databit 8, Stopbit 1, Paritybit Non 01: Databit 8, Stopbit 1, Paritybit Odd 02: Databit 8, Stopbit 1, Paritybit Even 03: Databit 7, Stopbit 1, Paritybit Odd 04: Databit 7, Stopbit 1, Paritybit Even
302	Baud Rate	02	00 : 2,400bps 05 : 28,800bps 01 : 4,800bps 06 : 38,400bps 02 : 9,600bps 07 : 57,600bps 03 : 14,400bps 08 : 76,800bps 04 : 19,200bps 09 : 115,200bps
303	Communication Mode	00	00: Stream mode 01: Command mode 02: Print mode 03: Modbus (RTU)
304	Command Checksum (F303-01)	00	00 : Disuse 01 : Use
305	Serial Interface Stream Mode Protocol	00	00 : format1 (18byte) 04 : format5 (10byte) 01 : format2 (21byte) 05 : format6 (10byte) 02 : format3 (17byte) 06 : format7 (8byte) 03 : format4 (22byte)









No.	Subject	Default	Content
306	Stream Mode Data Output (F202-00)	00	00 : continuous 01 : 1 time at every steady state 02 : 1 time at the first steady state (over Near Zero) 03 : 1 time after weighing is finished 04 : Input F Key
352	Print Format Setting	00	00: Continuous Print 01: Single Print
354	Print Output Delay Time Setting	00	00~09 (Unit: 1 second)
355	Paper withdraw rate (continuous / single)	00	00 ~ 09 (unit : 1line)
356	Paper withdraw rate (total/ sub-total)	00	00 ~ 09 (unit : 1line)
358	Delete contents after printing total	00	00 : delete 01 : disable

◆ 5-3-3. Hidden function

※ How to enter hidden function mode



No.	Subject	Default	Content
HF01	Serial Number	xxxxx	Factory release number
HF03	Software Version	Ver 4.00	
HF04	Hardware Version	Ver 3.00	
HF05	Date	YY.MM.DD	Able to set using keys
HF06	Time	HH.MM.SS	Able to set using keys
HF07	Password Setting - Password setting for Hidden Function Mode (4 digits) - Input password 2 times to check	----	 1 2 3 Password can be combined with number 1~3.
HF08	Max Capacity	15.000	Change after calibration


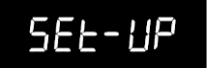



No.	Subject	Default	Content
HF12	Span Constant	x.xxxxx	Use the  to back
HF16	Function Reset	FUNSET	Select between  for "NO" or  for "Yes", then press 
HF17	Span Value Input	OrnU	Input Span Value with calibrator
HF18	Simulation Calibration Constant Value		 to back to previous step
HF19	Factory Reset	ALLSET	Select between  for "NO" or  for "Yes", then press 
HF20	Program Download Mode		
HF39	Use Simulation Calibration	00	00 : disuse 01 : use




5-4. Test mode



Disconnect all of the devices from the indicator before you proceed with test.








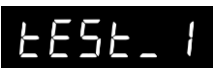
How to enter
the test mode

- 1) Press  4 times and  displays
- 2) Press  for Test mode 1 or  for Test mode 2.
- 3)  means you succeeded to enter the test mode.
- 4) User can check indicators conditions use the below keys.



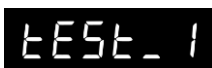
Key	Test mode 1	Test mode 2
	Load Cell Input Value Fluctuation Check Mode	External Input Check Mode
	Display Check Mode	
	Keypad Check Mode	Serial Interface Check Mode

- 5) Press  to go back or cancel.

5-4-1. Load Cell Input Value Fluctuation Check Mode


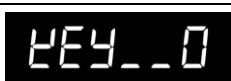



- 1) Press  on the test mode 1, then Digital value which is converted Analog Input value displays.
- 2) In this condition, press  and  will display.
In this condition, the weight loaded on the scale part converted to digital value so you can check the deviation of change of weight.
- 3) Press  (100 thousand unit),  (1 million unit) or  (10 million unit) to check load cell input value fluctuation check mode.
- 4) Press  to go back to 





5-4-2. Display Check Mode

- 1) Press  to make display flicker.
- 2) You can check display condition.
- 3) Press  to go back to 





5-4-3. Keypad Check Mode

You can check key operation on display.





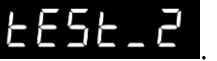
- 1) In test mode 1 press the  key, display shows .
- 2) When you push a key except for , relevant numbers will show up on display.
- 3) Press  to go back to 

KEY	DISPLAY	KEY	DISPLAY
	1		2
	3		4

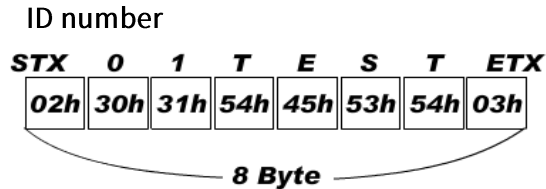
5-4-4. External Input Check Mode

- 1) Press  on Test mode 2.
 - 2) When  displays, wire External Input terminal (I1~I2) and Input Common Terminal(IC) to check External Input number on display.
 - 3) Press  to go back to .
-

5-4-5. Serial Interface Check Mode

- 1) Press  on Test mode 2,  will display.
 - 2) Connect Indicator to equipment which is Serial Interface available like PC.
 - 3) Press any key except for  to send arbitrary protocol to connected device.
 - 4) LED flicker 1 time after reception.
 - 5) Press  to go back to .
-

※ Test protocol

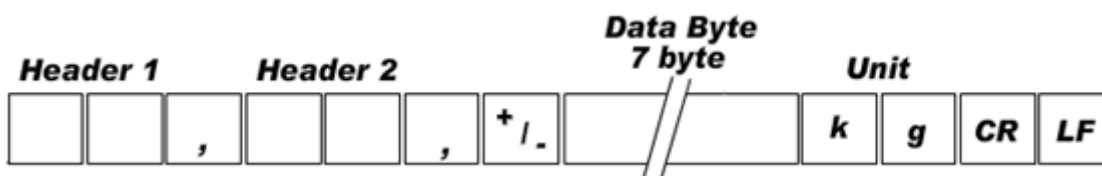


Serial port COM1 and COM2 cannot be tested at the same time.

6. Communication Data Format

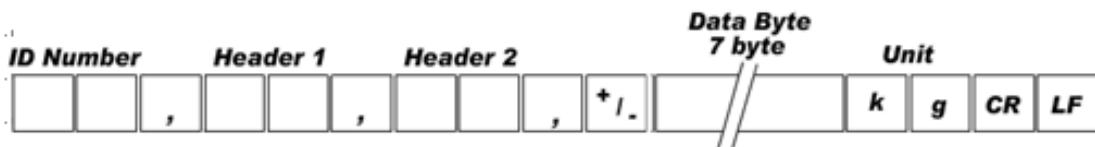
6-1. Stream Mode

6-1-1. Format 1 (excluding ID number) – 18 byte



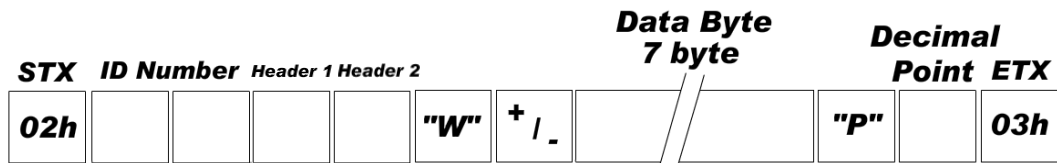
Classification	Contents						
Header1 (2Byte)	OL : Overloaded ST : Stable US : Unstable						
Header2 (2Byte)	NT : NET-WEIGHT GS : GROSS-WEIGHT						
Sign (1Bbyte)	Mark						
Weight Data (7Byte)	Current weight						
UNIT (2Byte)	kg- <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>k</td><td>g</td></tr></table> g- <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td>g</td></tr></table> ton- <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td>t</td></tr></table>	k	g		g		t
k	g						
	g						
	t						
CR (1byte)	Carriage Return						
LF (1byte)	Line Feed						
Example	ASCII : ST,NT,+0000.00kg CR LF HEX : 53h 54h 2Ch 4Eh 54h 2Ch 2Bh 30h 30h 30h 30h 2Eh 30h 30h 6Bh 67h 0Dh 0Ah						

6-1-2. Format 2 (including ID number) – 21 byte



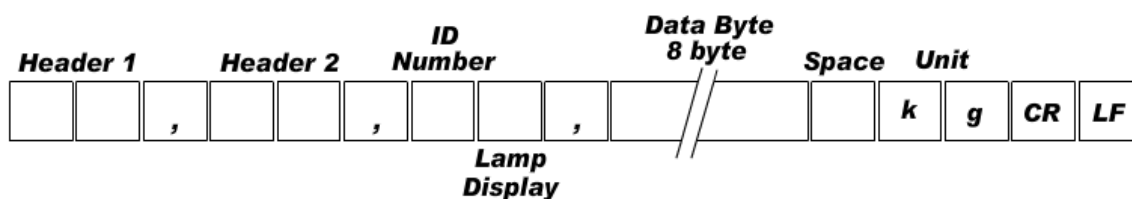
Classification	Contents						
ID Number (2Byte)	ID number						
Header1 (2Byte)	OL : Overloaded ST : Stable US : Unstable						
Header2 (2Byte)	NT : NET-WEIGHT GS : GROSS-WEIGHT						
Sign (1Btye)	Mark						
Weight Data (7Byte)	Sign						
UNIT (2Byte)	kg- <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>k</td><td>g</td></tr></table> g- <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td>g</td></tr></table> ton- <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td>t</td></tr></table>	k	g		g		t
k	g						
	g						
	t						
CR (1byte)	Carriage Return						
LF (1byte)	Line Feed						
Example	ASCII : 01,ST,NT,+0000.00kg CR LF HEX : 30h 31h 2Ch 53h 54h 2Ch 4Eh 54h 2Ch 2Bh 30h 30h 30h 30h 2Eh 30h 30h 6Bh 67h 0Dh 0Ah						

6-1-3. Format 3 (Including ID number) – 17 byte



Classification	Contents
STX (1Byte)	Start of Text
ID Number (2Byte)	
Header1 (1Byte)	O : Overloaded S : Stable U : Unstable
Header2 (1Byte)	N : NET-WEIGHT G : GROSS-WEIGHT
"W" (1Byte)	Current weight separator
Sign (1Byte)	Mark
Weight Data (7Byte)	Current weight
"P" (1Byte)	Decimal point separator
Decimal Point (1Byte)	
ETX (1Byte)	End of Text
Example	ASCII : STX 01SNW+0000000P2 ETX HEX : 02h 30h 31h 53h 4Eh 57h 2Bh 30h 30h 30h 30h 30h 30h 30h 50h 32h 03h

6-1-4. Format 4 (including ID number) – 22 byte



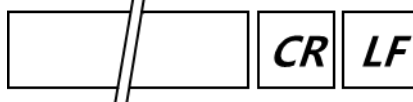
Classification	Contents
Header1 (2Byte)	OL : Overloaded ST : Stable US : Unstable
Header2 (2Byte)	NT : NET-WEIGHT GS : GROSS-WEIGHT
ID Number (1Byte)	ID number
Lamp Display (1Byte)	Lamp status display
Weight Data (8Byte)	Current weight including mark (Mark for minus '-' only)
UNIT (2Byte)	kg : kg g : g t : ton
CR (1byte)	Carriage Return
LF (1byte)	Line Feed
Example	ASCII : ST,NT,.?_0.12 kg CR LF HEX : 53h 54h 2Ch 4Eh 54h 2Ch 01h E1h 2Ch 20h 20h 20h 20h 30h 2Eh 31h 32h 20h 6Bh 67h 0Dh 0Ah

※ Explanation of State Lamp Display

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1	Steady	1	Hold	Print	Gross weight	Tare	Zero

6-1-5. Format 5 – 10 byte

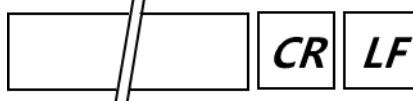
Data Byte
8 byte



Classification	Contents
Weight Data (8Byte)	Current weight including decimal point and mark (Mark for minus '-' only)
CR (1byte)	Carriage Return
LF (1byte)	Line Feed
Example	ASCII : _ _ _ _ 0.12 CR LF HEX : 20h 20h 20h 20h 30h 2Eh 31h 32h 0Dh 0Ah ASCII : - _ _ _ 0.12 CR LF HEX : 2Dh 20h 20h 20h 30h 2Eh 31h 32h 0Dh 0Ah

6-1-6. Format 6 – 10 byte

Data Byte
8 byte



Classification	Contents
Weight Data (8Byte)	Current weight including decimal point and mark
CR (1byte)	Carriage Return
LF (1byte)	Line Feed
Example	ASCII : +0123.45 CR LF HEX : 2Bh 30h 31h 32h 33h 2Eh 34h 35h 0Dh 0Ah ASCII : -0123.45 CR LF HEX : 2Dh 30h 31h 32h 33h 2Eh 34h 35h 0Dh 0Ah

6-1-7. Format 7 (excluding decimal point) – 8 byte

Data Byte
5 byte



Classification	Contents
Sign (1Byte)	Mark for minus '-' only
Weight Data (5Byte)	Current weight
CR (1byte)	Carriage Return
LF (1byte)	Line Feed
Example	ASCII : _01234 CR LF HEX : 20h 30h 31h 32h 33h 34h 0Dh 0Ah ASCII : -01234 CR LF HEX : 2Dh 30h 31h 32h 33h 34h 0Dh 0Ah

6-2. Command Mode

Command judgement judge data 06h (ACK), 15h (NAK) and Error Code which starts with 02h(STX) and ends with 03h(ETX).

6-2-1. Read command

Current Weight (Displayed Weight)		
Transmit	Format : STX(1) ID(2) RCWT(4) ETX(1) ASCII : STX 01RCWT ETX HEX : 02h 30h 31h 52h 43h 57h 54h 03h	8 Byte
Respond	Format : STX(1) ID(2) RCWT(4) State1(1) State 2(1) P(1) Decimal point(1) Sign(1) Current weight(7) Unit(2) ETX(1) ASCII : STX 01RCWTSNP2+0012345kg ETX HEX : 02h 30h 31h 52h 43h 57h 54h 53h 4Eh 50h 32h 2Bh 30h 30h 31h 32h 33h 34h 35h 6Bh 67h 03h	22 Byte
	State 1: O(Overloaded), S(Steady), U(Unsteady) State 2: N(Net weight), G(Gross weight)	
Current Weight (Memory)		
Transmit	Format : STX(1) ID(2) RCWD(4) ETX(1) ASCII : STX 01RCWD ETX HEX : 02h 30h 31h 52h 43h 57h 44h 03h	8 Byte
Respond	Format : STX(1) ID(2) RCWD(4) P(1) Decimal point(1) Date(6) Time(6) Part no.(2) Weighing Count(6) Sign(1) Tare weight(7) Sign(1) Current weight(7) Unit(2) ETX(1) ASCII : STX 01RCWDP217110112303501012345+0123456+0123456kg ETX HEX : 02h 30h 31h 52h 43h 57h 44h 50h 32h 31h 37h 31h 31h 30h 31h 31h 32h 33h 30h 33h 35h 30h 31h 30h 31h 32h 33h 34h 35h 2Bh 30h 31h 32h 33h 34h 35h 36h 2Bh 30h 31h 32h 33h 34h 35h 36h 6Bh 67h 03h	48 Byte

Sub-total		
Transmit	Format : STX(1) ID(2) RSUB(4) ETX(1) ASCII : STX 01RSUB ETX HEX : 02h 30h 31h 52h 53h 55h 42h 03h	8 Byte
Respond	Format : STX(1) ID(2) RSUB(4) P(1) Decimal point(1) Part no.(2) Sub-total count(6) Sub-total weight(10) Unit(2) ETX(1) ASCII : STX 01RSUBP2010123450123456789kg ETX HEX : 02h 30h 31h 52h 53h 55h 42h 50h 32h 30h 31h 30h 31h 32h 33h 34h 35h 30h 31h 32h 33h 34h 35h 36h 37h 38h 39h 6Bh 67h 03h	30 Byte
Total		
Transmit	Format : STX(1) ID(2) RGRD(4) ETX(1) ASCII : STX 01RGRD ETX HEX : 02h 30h 31h 52h 47h 52h 44h 03h	8 byte
Respond	Format : STX(1) ID(2) RGRD(4) P(1) Decimal point(1) Total횟수(6) Total weight(10) Unit(2) ETX(1) ASCII : STX 01RGRDP20123450123456789kg ETX HEX : 02h 30h 31h 52h 47h 52h 44h 50h 32h 30h 31h 32h 33h 34h 35h 30h 31h 32h 33h 34h 35h 36h 37h 38h 39h 6Bh 67h 03h	28 byte
Time		
Transmit	Format : STX(1) ID(2) RTIM(4) ETX(1) ASCII : STX 01RTIM ETX HEX : 02h 30h 31h 52h 54h 49h 4Dh 03h	8 Byte
Respond	Format : STX(1) ID(2) RTIM(4) Time(6) ETX(1) ASCII : STX 01RTIM123035 ETX HEX : 02h 30h 31h 52h 54h 49h 4Dh 31h 32h 33h 30h 33h 35h 03h	14 Byte
Date		
Transmit	Format : STX(1) ID(2) RDAT(4) ETX(1) ASCII : STX 01RDAT ETX HEX : 02h 30h 31h 52h 44h 41h 54h 03h	8 Byte
Respond	Format : STX(1) ID(2) RDAT(4) Date(6) ETX(1) ASCII : STX 01RDAT171101 ETX HEX : 02h 30h 31h 52h 44h 41h 54h 31h 37h 31h 31h 30h 31h 03h	14 Byte

Tare Weight		
Transmit	Format : STX(1) ID(2) RTAR(4) ETX(1) ASCII : STX 01RTAR ETX HEX : 02h 30h 31h 52h 54h 41h 52h 03h	8 Byte
Respond	Format : STX(1) ID(2) RTAR(4) P(1) Decimal point(1) Sign(1) Tare weight(7) ETX(1) ASCII : STX 01RTARP2+0123456 ETX HEX : 02h 30h 31h 52h 54h 41h 52h 50h 32h 2Bh 30h 31h 32h 33h 34h 35h 36h 03h	18 Byte

6-2-2. Write Command

-Transmit (Normal): STX + ID(2Byte) + ACK + ETX

-Transmit (Error): STX + ID(2Byte) + NAK + ETX

Zero Setting					
Transmit	Format : STX(1) ID(2) WZER(4) ETX(1) ASCII : STX 01WZER ETX HEX : 02h 30h 31h 57h 5Ah 45h 52h 03h				8 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte
Tare Setting					
Transmit	Format : STX(1) ID(2) WTAR(4) ETX(1) ASCII : STX 01WTAR ETX HEX : 02h 30h 31h 57h 54h 41h 52h 03h				8 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte
Tare Reset					
Transmit	Format : STX(1) ID(2) WTRS(4) ETX(1) ASCII : STX 01WTRS ETX HEX : 02h 30h 31h 57h 54h 52h 53h 03h				8 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte
Hold Setting					
Transmit	Format : STX(1) ID(2) WHOL(4) ETX(1) ASCII : STX 01WHOL ETX HEX : 02h 30h 31h 57h 48h 4Fh 4Ch 03h				8 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX	5 Byte

		HEX : 02h 30h 31h 06h 03h		HEX : 02h 30h 31h 15h 03h	
Hold Reset					
Transmit	Format : STX(1) ID(2) WHRS(4) Part no.(2) ETX(1) ASCII : STX 01WHRS ETX HEX : 02h 30h 31h 57h 48h 52h 53h 03h				8 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte
Print					
Transmit	Format : STX(1) ID(2) WPRT(4) ETX(1) ASCII : STX 01WPRT ETX HEX : 02h 30h 31h 57h 50h 52h 54h 03h				8 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte
Print Sub-total					
Transmit	Format : STX(1) ID(2) WSPR(4) ETX(1) ASCII : STX 01WSPR ETX HEX : 02h 30h 31h 57h 53h 50h 52h 03h				8 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte
Print Total					
Transmit	Format : STX(1) ID(2) WGPR(4) ETX(1) ASCII : STX 01WGPR ETX HEX : 02h 30h 31h 57h 47h 50h 52h 03h				8 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte

Delete Sub-total					
Transmit	Format : STX(1) ID(2) WSTC(4) ETX(1) ASCII : STX 01WSTC ETX HEX : 02h 30h 31h 57h 53h 54h 43h 03h				8 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte
Delete Total					
Transmit	Format : STX(1) ID(2) WGTC(4) ETX(1) ASCII : STX 01WGTC ETX HEX : 02h 30h 31h 57h 47h 54h 43h 03h				8 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte
Run					
Transmit	Format : STX(1) ID(2) WSTR(4) ETX(1) ASCII : STX 01WSTR ETX HEX : 02h 30h 31h 57h 53h 54h 52h 03h				8 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte
Stop					
Transmit	Format : STX(1) ID(2) WSTP(4) ETX(1) ASCII : STX 01WSTP ETX HEX : 02h 30h 31h 57h 53h 54h 50h 03h				8 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte

Time Setting					
Transmit	Format : STX(1) ID(2) WTIM(4) TIME(6) ETX(1) ASCII : STX 01WTIM123035 ETX HEX : 02h 30h 31h 57h 54h 49h 4Dh 31h 32h 33h 30h 33h 35h 03h				14 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	Format : STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte
Date Setting					
Transmit	Format : STX(1) ID(2) WDAT(4) DATE(6) ETX(1) ASCII : STX 01WDAT171101 ETX HEX : 02h 30h 31h 57h 44h 41h 54h 31h 37h 31h 31h 30h 31h 03h				14 Byte
Respond	Normal	Format : STX(1) ID(2) ACK(1) ETX(1) ASCII : STX 01 ACK ETX HEX : 02h 30h 31h 06h 03h	Error	STX(1) ID(2) NAK(1) ETX(1) ASCII : STX 01 NAK ETX HEX : 02h 30h 31h 15h 03h	5 Byte

※ **How to calculate CHECK SUM**

Check sum is a remainder when Sum of HEX value of the data from STX to ETX and the value is into 100.

ex) The sum HEX value from STX to ETX(02,30,31,52,43,57,54,03) is 1A6h.

Then, divide 1A6h by 100h(1A6h/100h) and the remainder is A6h.

This value is converted to ASCII and transferred to 41(A) 36(6).

Command Judgement of Command mode judges and outputs 06h(ACK) and 15h(NAK), Error code between the data which starts with 02h(STX) and ends with 03h(ETX)

6-3. Modbus

- RO : Read Only
- RW : Read Write
- Setting value for Each Part Number cannot be over Max Capacity
ex) If you want to set 35.00kg, input 3500 (0xDAC)
- Input 6 digits to set Date and Time
ex) Input 140101 (0x22345) for 2014 January 1st
Input 155017 (0x25D89) for 3:50:17 pm
- Refer to Memory Register Table below for lamp, error, digital input, standard key, special key.
- Modbus Function Codes
 - '03' (0x03) : Read Holding Registers
 - '04' (0x04) : Read Input Registers
 - '06' (0x06) : Write Single Registers
 - '16' (0x10) : Write Multiple Registers

6-3-1. Data Address Map

Contents	Address		Length	Feature
Max Capacity	0	0x00	2	R
ADC Value	4	0x04	2	R
Span Constant	6	0x06	2	R
Division	8	0x08	1	R
Decimal Point	9	0x09	1	R
Current Weight	10	0x0A	2	R
Tare Weight	12	0x0C	2	R
Measured Weight	14	0x0E	2	R
External Input	16	0x10	1	R
Lamp	18	0x12	2	R
Error	20	0x14	2	R
Total Count	32	0x20	2	R
Total Weight	34	0x22	2	R
Date	436	0x1B4	2	R/W
Time	438	0x1B6	2	R/W
Key	440	0x1B8	1	R/W

6-3-2. External Input Data Map

1bit	2bit	3bit	4bit	5bit	6bit	7bit	8bit
IN 1	IN 2						

6-3-3. Lamp Data Map

1bit	2bit	3bit	4bit	5bit	6bit	7bit	8bit
Steady	Zro	Tare	Hold	TxD	RxD	F	

6-3-4. Key Data Map

1bit	2bit	3bit	4bit	5bit	6bit	7bit	8bit
		Zero	Tare	Tare reset	Hold	Hold reset	Print
9bit	10bit	11bit	12bit	13bit	14bit	15bit	16bit
		Print Total	Delete Total				

6-4. Print format

It can be connect the indicator to all kinds of Serial Interface printers, but recommend you to use SE7200, SE7300 (30 columns) since the print format is programmed and fixed with the models.

	Korean (111-00)	English (111-01)
Continuous F352-01	<pre> ===== 날짜 : 2011-05-10 시간 : 18:00:10 장비번호 : 1 품번 : 10 순번 중량 1 1.330kg 2 5.350kg ===== </pre>	<pre> ===== DATE : 2011-05-10 TIME : 18:00:10 SERIAL No : 1 PART No : 20 COUNT WEIGHT 1 1.330kg 2 5.350kg ===== </pre>
Single F352-00	<pre> ===== 날짜 : 2011-05-10 시간 : 18:00:10 장비번호 : 1 품번 : 20 순번 중량 1 1.330kg ===== 날짜 : 2011-05-10 시간 : 18:00:10 장비번호 : 1 품번 : 20 순번 중량 2 5.350kg ===== </pre>	<pre> ===== DATE : 2011-05-10 TIME : 18:00:10 SERIAL No : 1 PART No : 20 COUNT WEIGHT 1 1.330kg ===== DATE : 2011-05-10 TIME : 18:00:10 SERIAL No : 1 PART No : 20 COUNT WEIGHT 2 5.350kg ===== </pre>
Total	<pre> ===== 총 계 날짜 : 2011-05-10 시간 : 18:00:10 장비번호 : 1 계량횟수 : 20 누적중량 : 258.145kg ===== 총계 삭제 ===== </pre>	<pre> ===== TOTAL DATE : 2011-05-10 TIME : 18:00:10 SERIAL No : 1 TOTAL COUNT : 20 TOTAL WEIGHT : 258.145kg ===== TOTAL DELETE ===== </pre>

Date and Time will be printed when it is number first in spite of Continuous format setting.

7. Error and Treatment

7-1. Error during Load Cell Installation

Error	Causing	Treatment	Remark
Weight is unstable	<ol style="list-style-type: none"> 1. Load cell broken 2. Load cell isolation resistance error 3. There is interruption on the weighing part 4. Summing board broken 	<ol style="list-style-type: none"> 1. Measure input/output resistance of Load cell. 2. Measure Load cell isolation resistance 3. Change Summing Board 4. Make sure that there is nothing on the scale part. 	<ol style="list-style-type: none"> 1. Input Resistance of “EXC+” and “EXC-“ is about $400\Omega \pm 30$ 2. Output Resistance of “SIG+“ and “SIG-“ is about $350\Omega \pm 3.5$ 3. Isolate Resistance is more than $100M\Omega$
Weight increases regularly or does not returns to Zero.	<ol style="list-style-type: none"> 1. Load cell error 2. Load cell connection Error 	<ol style="list-style-type: none"> 1. Check load cell connection 2. Measure resistance value of load cell 	
Weight value is Minus (-)	<ol style="list-style-type: none"> 1. Load cell Output wires (SIG+, SIG-) are switched 	<ol style="list-style-type: none"> 1. Check load cell connection 	
“UnPAss” displays	<ol style="list-style-type: none"> 1. Load cell broken or Indicator connection error 	<ol style="list-style-type: none"> 1. Check load cell 2. Check load cell connection 	
	<ol style="list-style-type: none"> 1. Power has been supplied when the scale part is not empty. 	<ol style="list-style-type: none"> 1. Remove weight on the load cell 	
“OL” displays (OVER LOAD)	<ol style="list-style-type: none"> 1. Load cell broken or Indicator connection Error 2. Weight over Max Capacity 	<ol style="list-style-type: none"> 1. Check load cell 2. Check load cell connection 3. Remove overloaded weight 	

7-2. ERROR

Display	Cause
Err-01	The value of (Max Capacity/Division) is over 20,000.
Err-04	The balance weight is heavier than Max Capacity.
Err-05	The balance weight is lighter than 10% of Max Capacity.
Err-06	Amp and Gain are too big, Load cell cables (SIG+ / SIG-) are connected crossly, Did not load the balance weight
Err-07	Amp and Gain are too big, Load cell cables (SIG+ / SIG-) are connected crossly, Did not load the balance weight
Err-09	Input unavailable setting value
Err-10	The weight is not stable during calibration.

※ Er-06/07 mean it is impossible to calculate precise weight with the calibration information you input.

7-3. Error and treatment

Following Error table shows causing of error and treatment, when weighing process is not working or it cannot measure weighing due to indicator error.

Display	Cause	Treatment
<p>“Ad-Err”</p> <p>or</p> <p>“OL”</p>	<ol style="list-style-type: none"> 1. Load cell broken 2. Load cell cable broken 3. Load cell connection Error 4. A/D Board Error 5. Analogue value over 1,040,000. <p>※ “OL” displays as well if the current value is over the absolute value of Max Capacity.</p> <p>Ex) Max Capacity is “100” and current weight is uner “-100” : “OL” shows up.</p>	<ol style="list-style-type: none"> 1. Check load cell input digital value on Test mode 1. If this value does not change, check load cell and connection condition first. 2. Check weight value error with another indicator. 3. Check A/D converting board error with another indicator. 4. Check Power cable 5. Check load cell terminal
<p>“UnPAss”</p>	<ol style="list-style-type: none"> 1. Power has been supplied when the scale part is not empty. <p>※ F01-00 : “UnPAss” displays when power has been supplied though there is load of 10% of Max Capacity on the scale part.</p> <p>※ F01-01 : Indicator saved previous zero value so it normally works with the load on the scale part not showing “UnPAss”.</p>	<ol style="list-style-type: none"> 1. Make sure that the weighing part is empty before turn on the power. 2. Set F01-01(Back-up) so that the indicator can remember first empty value.
<p>“HALt”</p>	<p>“HALt” on the display or continuous beep – Hard ware error</p>	<p>Please contact the distributor or the Head Office.</p>

Warranty Certification

This product passed strict quality test of SEWHACNM Co., LTD.

If there is a defect of manufacturing or abnormal detection within warranty period, please contact our agent or distributor with this Warranty Certification so that you can get the product repaired or replaced.

Warranty Clause

1. The warranty period is one(1) year from your purchase date.

2. Warranty Exemption Clause

- Warranty period expired
- Mal-function caused by repairmen, modification, etc without any authorization of the Headquarter.
- Mal-function caused by user's carelessness
- Mal-function caused by distribution of non-authorized distributor or agent
- Mal-function caused since user did not follow the precautions.
- Mal-function or defection caused by Fore Majeur
- Without presentation of this Warranty Certification

3. Other

- Warranty Certification without authorized stamp is invalid.

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Made in KOREA

Product

Digital Weighing
Indicator

Model

SI 480E

Serial No.

**AUTHORIZED
STAMP**

