SI 460A

DIGITAL INDICATOR

USER MANUAL

MANUAL Ver 3.02

PROGRAM Ver 3.01

CONTENTS

1. Before Installation

1-1. Caution / warning marks

⚠️ warning	**This mark warns the possibility to arrive death or serious injury in case of wrongly used.**

1) Don't drop on the ground and avoid serious external damage on item.
2) Don't install under sunshine or heavy vibrated condition.
3) Don't install place where high voltage or heavy electric noise condition.
4) When you connect with other devices, please turn off the power of item.
5) Avoid from water damage.

⚠️ Caution	**This mark cautions the possibility to arrive serious human body injury or product lose in case of wrongly used.**

1) For the improvement of function or performance, we can change item specification without previous notice or permission.
2) Item's performance will be up-dated continuously base on previous version's performance.
3) Do not use this indicator in various temperature environment.

1-2. Copy rights

1) 1) All Right and Authority for this Manual is belonged to SEWHA CNM CO., LTD.
2) Any kinds of copy or distribution without permission of SEWHA CNM CO., LTD. will be prohibited.
3) This manual may be changed as the version is upgraded, without previous notice.

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
4) Tel: +82 32 624 0060

2. Introduction

2-1. Introduction

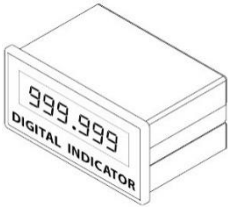Thank you for your choice of SI 460A Industrial indicator.

This "SI 460A" model has serial communication (Modbus available) for user convince and environment.

Please review and learn this instruction manual and enjoy your process efficiency with "SI460A" weighing indicator.

2-2. Feature

1) SI 460A model is the square DIN SIZE and compact enough, so it is easy to install.

2) Front panel is covered with Polycarbonate film, strong against dust and water.

3) RS422, RS485 serial interface and Modbus(RTU) is standard installed.

2-3. Components

Indicator	Manual

3. Specification

3-1. Specification

Content			Specification
Load cell input Analog signal and Digital convert content	Display Resolution		1/20,000
	Internal Resolution		1/2,000,000 (±1,000,000)
	Input Sensitivity		Min 0.1μV/V
	Max Signal Input Voltage		Max 3.2mV/V
	Load cell Excitation		DC +5V
	A/D Conversion Method		Sigma-Delta
	Decimal Point		0, 0.0, 0.00, 0.000
	Drift	Zero	10PPM/℃
		Span	10PPM/℃
	Non Linearity		0.001% max
	Analogue Sampling(second)		60 times/second (max)
Operating environment	Operating Temperature Range		-10℃ ~ +40℃ [14℉ ~ 104℉]
	Operation Humidity Range		40% ~ 85% RH, Non-condensing
Front	Display		1. 15mm(0.56inch), 6 digits red FND(Number/Word) 2. State(Lamp) 7 digits, Red LED
	Key		5EA
Interface	Digital input		2EA, zero voltage point
	Serial interface	RS-422/485	Stream mode, Command mode, Modbus(RTU), Serial print
Power	DC 12~24V (SMPS option is 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 : 96mm(W) x 96mm(H) x 112mm(D), Weight : 500g(DC), 700g(AC)		

3-2. Front

3-2-1. Display and key pad

① ①　**Display 1 : Number/word display 6 digits red FND**

② **Condition(lamp)**

- STEADY : When the weight is stable, ON.
- ZERO : When the current weight is zero, ON.
- TARE : When the "TARE" function is set, ON.
- HOLD : When the "Hold" function is set, ON.
- TxD : When indicator transferring data, ON.
- RxD : When indicator receive data, ON
- F : When input Function key, ON

③ **Key pad**

3-2-2. Key operation

ZERO	- **Make weight value to Zero.** - **Cancel the value or Undo**
TARE	- **Set the TARE Function** **1st input : "TARE", 2nd input : "TARE Reset"** **(When "HOLD" or weight value is ZERO, then this key doesn't work.)** - **Moving the cursor to left.**
HOLD	- **Set the "HOLD" Function** **1st input : "HOLD", 2nd input : "HOLD Reset"** **※ When HOLD is on, "H" mark will be shown at the display.** - **Moving the cursor to right.**
PRINT	- **Print Out** - **Enter the "Test 2" Mode** - **Increase set value** - **Saving data under set 103-0/4/5**
F	- **Enter "Set-Up" Mode** - **Enter "Hidden function mode"** - **Save the value & Move to next step**

3-2-3. Key combination

F ➡ TARE	**Double tare setting** **(Once tare is set, Another tare is overlapped.)**
F ➡ PRINT	**If the Printer is installed,** **You can print out the "Grand-total data".** **(GRAND-total data cannot be displayed.)**

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)
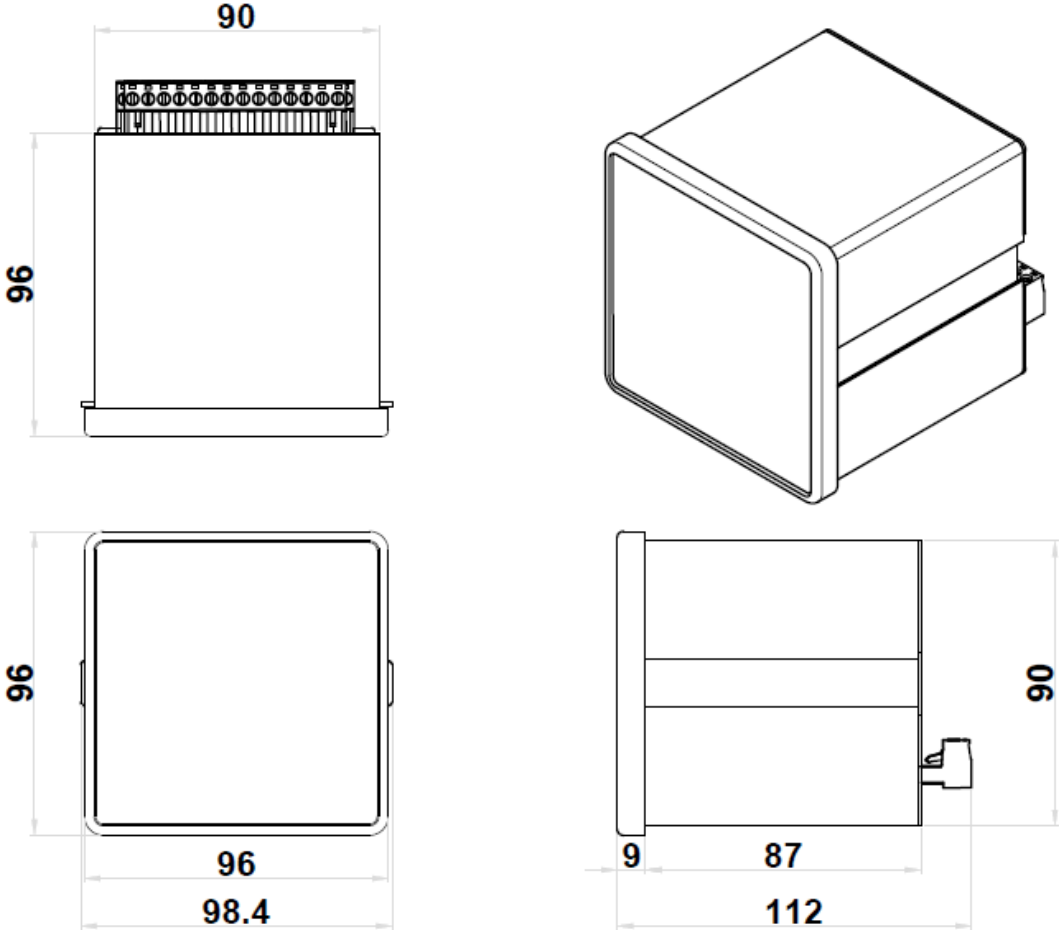
3-3. Rear Panel

① **DC / AC(option) Power Input : +(DC12~24V), -(GND), E(EARTH)**

② **External Input : Zero Voltage Point**

③ **Serial Interface Terminal (RS422/485)**
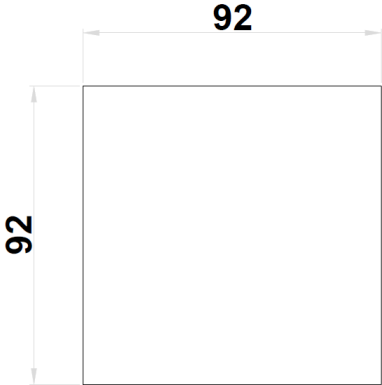
④ **Load Cell Terminal**

⚠ **Caution**　**Please check the Comm. and other specification in the label, attached on the cover plate first, and make connection according to that information.**

4. INSTALLATION

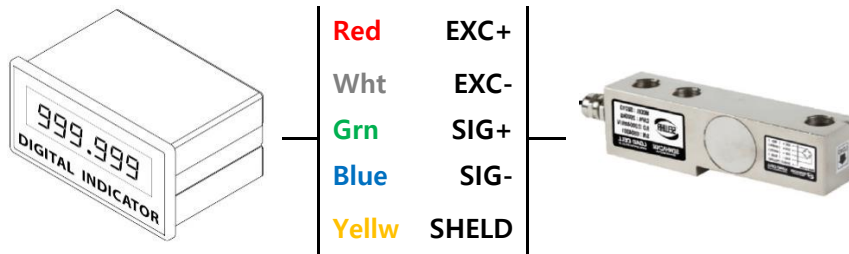## 4-1. External Dimension (Unit: mm)

4-2. Cutting Size (Unit: mm)

4-3. Load Cell Installation

Load Cell Wire Connection (In case of SEWHACNM's Load cell)

It depends on the manufacturer of load cell, please check the specification.)

Red	**EXC+**
Wht	**EXC-**
Grn	**SIG+**
Blue	**SIG-**
Yellw	**SHELD**

⚠ warning

1. Under Set-up the Load cell, if EXC+ and EXC- have a short circuit,

It may cause damage in the indicator. (specially analogue board)

2. If you connect other wires to Load cell terminal wrongly, it may cause damage in the analogue board.

3. Do not weld near the load cells , Indicators or other devices.

4. Before connecting the load cell cable you have to power off and be sure to connect the cable to the terminal correctly.

⚠ warning

※ Load Cell Installation

1. **You can connect Max 8pcs of same capacity Load cells at once. (350 Ω)**
2. **You have to make horizontal balance on the ground.**
3. **If you install more than 2pcs of load cells, use Summing box and adjust output signal difference as minimum. It can make wrong weighing process caused by each load cell's variation.**
4. **If there is some temperature difference around Load cell, it can cause wrong weight measurement.**
5. **Don't do Welding job or Arc discharge around installation place. But, there is no choice, please disconnect power cable and Load cell cable.**

If you measure static electricity material, please make earth between down part and upper part of Load cell.

4-4. External Output

1) Each output relay function can be changed on Function number 233~236.

2) Connected with zero voltage point
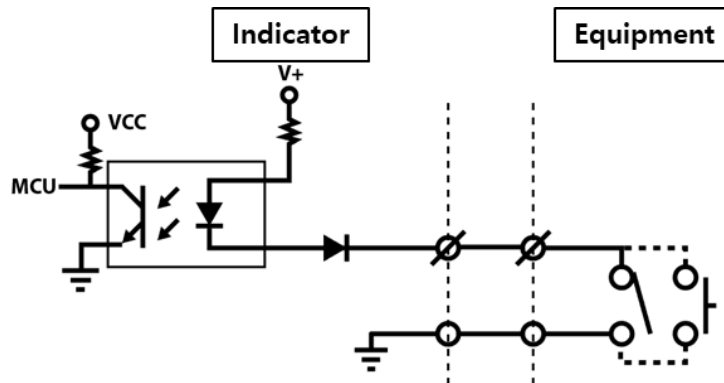

3) Terminal component

- Top, Bottom

- COM : Input common terminal(V+ : 12V DC)

- Ⅰ1~Ⅰ4 : Input signal(Output relay: zero voltage point –relay or switch signal)

4-5. Serial Interface

4-5-1. RS422

RS422 interface is strong for electrical noise, and it is available for below 1km distance. The RS422 is full-duplex communication, it can connect to external equipment such as PC, PLC, printer or etc with fast speed and multiple use. (Max 32ea indicator)
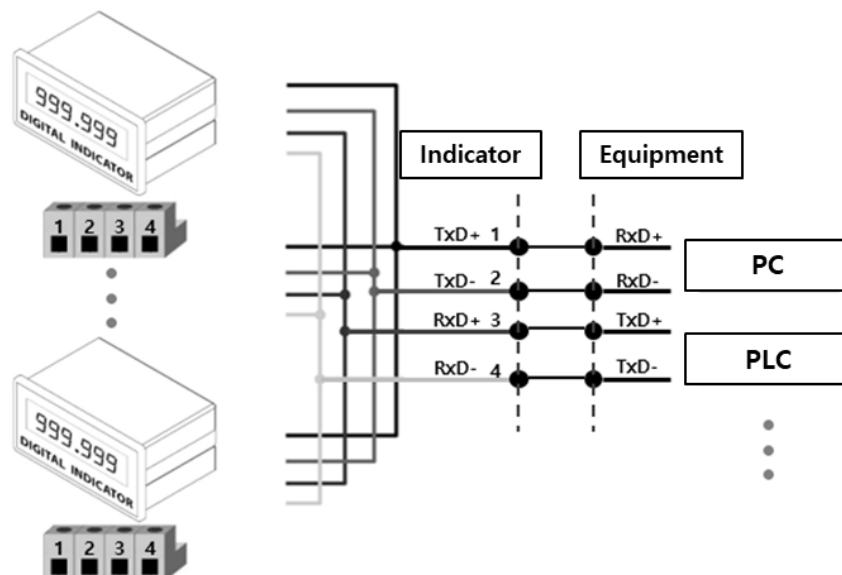
4-5-2. RS485

RS485 interface is strong for electrical noise, and it is available for below 1km distance. The RS485 is half-duplex communication, it has slower speed than RS422.

But, RS485 can connect to external equipment such as PC, PLC, printer or etc with multiple use. (Max 32ea indicator)
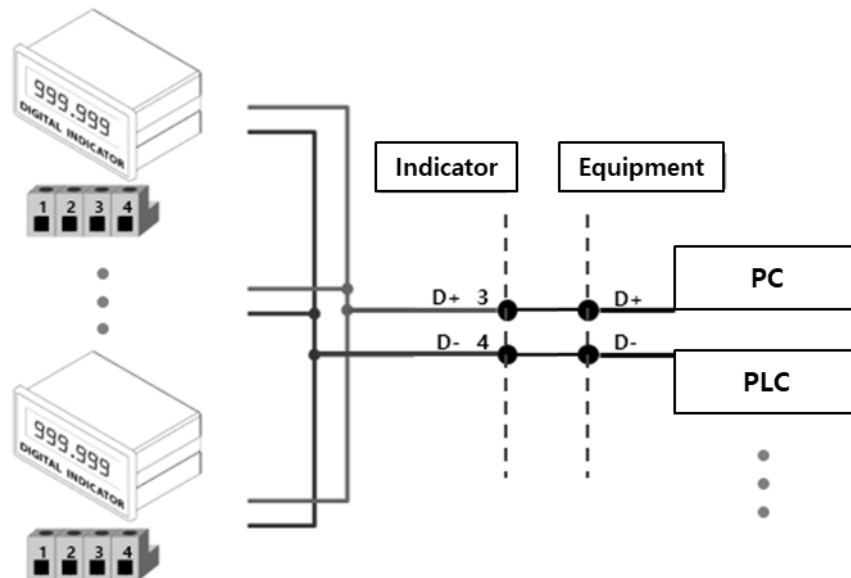
5. SET UP

5-1. Calibration

Calibration is the process of adjusting weight balance between "Real Weight" on the Load Cell and "Displayed weight of Indicator". When you replace Load Cell or Indicator, you have to do Calibration process once again.

> - **When entering calibration mode, Tare, Hold or Printer are reset.**
> - **Please turn on the indicator and preheat longer than 5 mins, before starting to the calibration mode.**

Calibration Key Function			
Key	**Function**	**Key**	**Function**
ZERO	Cancel / Undo	TARE	No. 1 / Move to left
HOLD	No. 2 / Move to right	PRINT	No. 3 / Setting value increase
F	Enter / Save		

STEP 1. Enter the calibration

1) Press **F** key for 4 secs.
2) Press "1111" (TARE TARE TARE TARE), when display shows `----`.
3) Press TARE , when display shows `SEt.CAL`.
4) Press TARE to enter calibration mode, when display shows `CAL lbr`.
5) ZERO key is for cancel or undo.

STEP 2. Setting "Capacity of weighing Scale"

1) After displaying `CAPA`, it flickers.

2) **TARE** , **HOLD** keys are to move.

3) Press **PRINT** to set the capacity of weight.

4) Press **ENTER** to move to the next.

5) **ZERO** is for cancel or undo.

---

c.f. : If user makes 50.00kg capacity (division 0.01kg), enter "50".

STEP 3. Decimal point and division setting

1) When display shows `di UI` and changes to Numbers,

2) Make the decimal point with **HOLD** key.

3) Press **PRINT** to set.

4) Press **ENTER** to move to the next.

5) **ZERO** is for cancel or undo.

- **Enable to set up decimal point up to 3, and set up division value out of (1, 2, 5, 10, 20, 50).**

Digit and decimal point must be fulfilled under the below condition. (division value / Max. capacity value) shall not over 1/20,000.

- **If this condition is not fulfilled, "Err-1" will be displayed and move back to capacity setting mode.**

STEP 4. Measuring the "DEAD" weight of weighing scale

1) When displayed `dEAd`, take away all stuff on the scale.

2) Press `ENTER` key and start calibration

3) After displayed `CAL- 10`, the indicator will calculate dead weight of scale for 10 seconds on itself.

If "Er-009" occurred, keep away all stuff on the scale, external noise or vibration, and try again.

STEP 5. Span Calibration

1) When calibration is successfully done, it shows `SPAn`.

2) The maximum weight flickers.

3) Use the number (0~9) key, enter the balance weight that already prepared.

   (※ Balance weight value shall be higher than 10%, or 'Er-005' occurred.)

4) Press `ENTER` to move to the next.

5) When displayed `UP`, load up the balance weight.

   (※ Balance weight value shall be higher than 10%, or 'Er-005' occurred.)

6) Press `ENTER`, and it shows `CAL- 20`.

7) After calculating for about 10 secs, span value will be displayed.

8) After that, `CALEnd` and the span value are displayed.

9) Press `ENTER` for completion.

5-2 Simulation Calibration Mode(Calibrating without Test weight)

With this "Simulation Calibration Mode", you can make simple calibration without any "TEST weight" This calibration mode uses "Load cells' max. capacity" and "Max. Output Rate(mV)", so the weight may adjust less than "Test weight Calibration". 1/30,000 of "Simulation Calibration" is guaranteed.

STEP 1. Enter the calibration

1) Press **F** key for 4 secs.

2) Press "1111" (TARE TARE TARE TARE), when display shows `----`.

3) Press TARE , when display shows `SEt.CAL`.

4) Press TARE to enter calibration mode, when display shows `CAL Ibr`.

5) ZERO key is for cancel or undo.

STEP 2. Setting "Capacity of weighing Scale"

1) When displayed `CAPA`, numbers flicker.

2) Move to steps with TARE , HOLD keys.

3) Set the max. capacity weighing value with PRINT .

4) Press **ENTER** key to save it.

5) ZERO is for cancel or undo.

> MODEL: xxxxx
> **CAPA: 15kg**
> R.O: 1.429mV/V
> S/N : xxxxxxx

<Load Cell Example>

Be aware of that the capacity presents max. capacity value stated on the label of Load Cell, unlike the balance weight. Sum up all the values as following manner.
['max. capacity value of 1pc' X 'the number of Load Cells']

STEP 3. Decimal point and division setting

1) When display shows $di\ Ui$ and changes to Numbers,

2) Make the decimal point with HOLD key.

3) Press PRINT to set.

4) Press ENTER to move to the next.

5) ZERO is for cancel or undo.

- **Enable to set up decimal point up to 3, and set up division value out of (1, 2, 5, 10, 20, 50).**

  Digit and decimal point must be fulfilled under the below condition. (division value / Max. capacity value) shall not over 1/20,000.

- **If this condition is not fulfilled, "Err-1" will be displayed and move back to capacity setting mode.**

STEP 4. Measuring the "DEAD" weight of weighing scale

1) When displayed $dEAd$, take away all stuff on the scale.

2) Press ENTER key and start calibration

3) After displayed $CAL - 10$, the indicator will calculate dead weight of scale for 10 seconds on itself.

If "Er-009" occurred, keep away all stuff on the scale, external noise or vibration, and try again.

STEP 6. Max. Capacity of Load Cells (Rated Output Voltage/mV)

1) When displayed **0.00000** ,

2) Enter the max. capacity output of Load Cell (mV/V) or the value stated on report with arrow-buttons.

3) After saved with **ENTER** , formatted-value is shown.

4) And then, **CALEnd** is displayed.

※ **If wrong values are coded in, "Er-009" is shown. You may refer to the value of Load Cell and try again.**

5) Press **ENTER** key for completion.

MODEL: xxxxx

CAPA: 15kg

R.O: 1.429mV/V
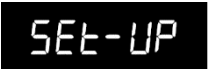
S/N : xxxxxxx

<Sample>

5-3. F-FUNCTION Setting

This function helps conditions to work in appropriate methods for any situation.

5-3-1. Starting F-FUNCTION Mode

1) Press **F** 4 times within 3secs.

2) When displayed **5Et-UP** , press **TARE** .

① ② ③

101-01
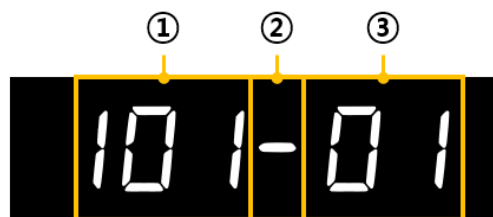
① Enter 'Function Code' with arrow buttons, and press **ENTER** to move.

② Press **PRINT** , to increase 1 for 'Function Number'.

③ With arrow buttons, enter the setting-value, and press **ENTER** to save.

3) Choose 'Function Code' with numbering key, and press **ENTER** .

4) Choose the 'setting-value', and press **ENTER** to save.

5) Once completed and **5AUE** is displayed, go to the next 'Function Code',

if needed.

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5-3-2. F-Function List

Num Ber	Subject	Default	Content
101	Equipment No. setting (ID No.)	01	01~99
102	Weight–back up mode	01	00 : Normal mode 01 : Weight back up mode(Zero) 02 : Weight back up mode(Zero & Tare)
103	Weighing data save method	00	00 : Manual: Whenever "Print" key input 01 : Auto: At every steady states 02 : Auto: At the first steady states (Under empty range) 04 : Manual&Auto: At every steady states 05 : Manual&Auto: At the first steady states (Under empty range)

◆ **Weighing data save method table**

	Weighing data save method (F-103)	Input print(Key, communication, external)	Print data	Save data
00	Manual: Whenever "Print" key input	○	Current weight	Current weight
		X	X	X
01	Auto: At every steady states	○	Current steady weight	X
		X	Steady weight	Steady weight
02	Auto: At the first steady states	○	Current steady weight	X
		X	Steady weight	Steady weight
04	Manual&Auto: At every steady states	○	Current weight	Current weight
		X	Steady weight	Steady weight
05	Manual&Auto: At the first steady states	○	Current weight	Current weight
		X	Steady weight	Steady weight

Num Ber	Subject	Default	Content
104	Display Up-Date Speed	09	01: 1 time/seconds 02: 2 time/seconds 03: 3 time/seconds 04:6 time/seconds 05:10 time/seconds 06: 15 time/seconds 07: 20 time/seconds 08: 30 time/seconds 09: 60 time/seconds
108	Buzzer sound (External input detection)	00	00:Buzzer sound 01:No Buzzer sound
110	Weight unit	00	00: kg 01: g 02: ton
111	Language	00	00: Korean 01: English
201	Empty range	00	00~999999
202	Auto Zero Range	00	00~99 (Unit : 1 = 0.25 gradation)
203	Steady Range	08	01~99 (Unit:0.25 gradation)
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 mode	00	00: Always active 01: Active under steady condition only
207	Tare Key operation mode	00	00: Always active 01: Active under steady condition only
209	Zero key Operation 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
210	Tare key Operation 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 function under Tare state	00	00: Disuse 01: Use

Num Ber	Subject	Default	Content	
212	Tare Delay Time	00	00: Disuse 01~10:Use (Unit:1sec.)	
214	Tare Removal Timing	00	00: Manual 01: Auto at empty range 02: Auto at steady condition	
215	Auto Tare Removal Time	00	00 : Disuse 01~09 : Use (Unit : 1 sec)	
216	Hold Mode	00	00: Sample Hold 01: Peak Hold, 02: Average Hold	
217	Hold Delay Time	00	00: Disuse 01~10: Use (Unit:1sec.)	
218	Hold Removal at the near zero	00	00: Disuse, 01: Use	
219	Auto Hold Removal Time	00	00: Disuse 01~10: Use (Unit:1second)	
220	Average Hold Time	10	01~99 (Unit:0.1second)	
221	Minus (-) Mark Display	00	00: Use 01: Disuse	
222	Under UNPASS/OVERLOAD state, Weight display	00	00: Display 01: No display	
233	External Input 1 Setting	01	00: Disuse 01: Zero 02: Tare 03: Tare reset 04: Tare/Tare reset	05: Hold 06: Hold reset 07: Hold/Hold reset 08: Print 09: Grand-total print
234	External Input 2 Setting	04		
251	Zero state lamp output standard	00	00: Near Zero 01: Zero	
301	Parity / Stop bit	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	

Num Ber	Subject	Default	Content	
302	Serial communication speed	02	00: 2,400bps 01: 4,800bps 02: 9,600bps 03: 14,400bps 04: 19,200bps	05: 28,800bps 06: 38,400bps 07: 57,600bps 08: 76,800bps 09: 115,200bps
303	Communication mode	00	00: Simplex / Stream Mode 01: Duplex / Command Mode 02:Print Mode 03:Modbus(RTU)	
304	Port 1 "Check-Sum" under command mode (Function 303-01)	00	00: Disuse 01: Use(Include Error Code ; refer 6-1-10)	
305	Data Format under Stream Mode	00	00: Format 1 (18byte) 01: Format 2 (21byte) 02: Format 3 (17byte) 03: Format 4 (22byte)	
306	Date transference under stream mode	00	00: Countinuously 01: Single time on every steady state 02: Single time at the first steady point 03: When input F key	
307	Modbus Transmit Data MSB/LSB location	00	00: MSB -> LSB 01: LSB -> MSB	
352	Print Format Setting	00	00: Continuous Print 01: Single Print	
354	Print Output Delay Time Setting	00	00~09 Print out after set time (Unit : 1second)	
355	Paper Withdraw Rate setting (After Continuous/Single Print)	00	00~09 (Unit: 1line add)	
356	Paper Withdraw Rate setting (After SUB/GRAND Total Print)	00	00~09 (Unit: 1line add)	

ED. 3.00DT180115

5-3-3. Hidden function

※ **How to enter hidden function mode**

① Press **F** Key during 4sec and input.

② When ▬▬▬▬ is displayed, input password.

(Default password : 1111(TARE TARE TARE TARE))

③ When display shows, press HOLD key.

④ Cancel or move to previous step by ZERO key.

Number	Subject	Default	Content
HF01	Serial number check	xxxxx	Factory number
HF03	S/W version check	Ver 3.00	
HF04	H/W version check	Ver 3.00	
HF05	DATE(Y,M,D) check / modification	YY.MM.DD	
HF06	TIME(H,M,S) check / modification	HH.MM.SS	
HF07	Password setting - Password is required when you enter to hidden function. - Enter the password twice.	----	TARE HOLD PRINT **1 2 3** Password combination 1~3
HF08	Maximum capacity weight check	15.000	When calibration, the value is changed
HF12	Span value check	x.xxxxx	Use the **F** to back
HF16	Function list factory reset	FUNSET	Select the TARE or HOLD key, "NO(Cancel the reset)", "YES(Do the reset)" and press ENTER
HF19	Factory reset	ALLSET	
HF20	Program serial download		

5-4. Test mode

Disconnected all indicator and equipment when do the test mode.

How to enter the test mode	1) Press the **F** key 4 times sequentially. 2) Display shows **5Et-UP**. 3) Enter the test mode 1, press **HOLD** key. Enter the test mode 2, press **PRINT** key. 4) Display shows **tESt** it entered test mode.. 5) User can check indicators conditions use the below keys.

Key	Test mode 1	Test mode 2
TARE	Analog Deviation Check	External Input
HOLD	Display Check	
PRINT	Key Input Check	Serial I/F

6) Press **ZERO** key to go back or cancel.

5-4-1. Deviation of Load cell input value check mode

1) Press the [TARE] key in the test mode 1, then displayed actual converted digital value.

2) In this condition, press [TARE] key then adjusted the digital value as `0` If put some load on the loadcell, loaded value is displayed.
This test mode is that check deviation of actual converted digital value.

3) [HOLD] Display from 100 thounsand unit, [PRINT] Display from one million unit, [F] Display from ten million unit .

4) Press [ZERO] key, back to `tESt_1`

5-4-2. Display check mode

1) When test mode, press the [HOLD] key all display switches on and off.

2) User can check by eyes.

3) Press [ZERO] key, back to `tESt_1` step.
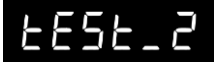
5-4-3. Key pad check mode

You can check the key condition when enter the key.

1) In test mode 1 press the [PRINT] key, display shows `HEY__0`.

2) Except [ZERO] key, showing every numbers with same keys.

3) Press [ZERO] key, back to `tESt_1` display.

KEY	DISPLAY	KEY	DISPLAY
TARE	1	HOLD	2
PRINT	3	F	4

5-4-4. External Input Check Mode

1) In test mode 2, press [TARE], display shows `In    0`.

2) Connected with external input terminal(Ⅰ1 or Ⅰ2) and common terminal(ⅠC), the correct external input value shows.

3) Press [ZERO], back to `tESt_2`.

5-4-5. Interface check mode

1) In test mode 2, press [PRINT] key, display `Conn_1` shows.

2) Connect with PC or other devices through serial interface and check the transference and receipt.(Except [ZERO])

3) At the normal operation, LED will blink one time.

4) Press [ZERO] key, back to `tESt_2` display.

※ **Test protocol**

ID number

STX	0	1	T	E	S	T	ETX
02h	30h	31h	54h	45h	53h	54h	03h

— 8 Byte —

27
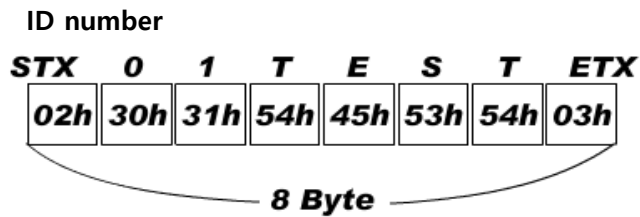
6. Communication Data Format

6-1. Simplex (Stream mode)

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

Classification	Contents
Header1 (2Byte)	OL : Current weight is over than max capacity weight. ST : Stable weight US : Unstable weight
Header2 (2Byte)	NT : NET-WEIGHT(Real weight which is excluded tare weight) GS : GROSS-WEIGHT 　　(Under tare set, it is included real weight and tare weight.)
Sign (1Btye)	Sign
Weight Data (7Byte)	Current weight
UNIT (2Byte)	kg - k g g - 　 g ton- 　 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 : Current weight is over than max capacity weight. ST : Stable weight US : Unstable weight
Header2 (2Byte)	NT : NET-WEIGHT(Real weight which is excluded tare weight) GS : GROSS-WEIGHT (Under tare set, it is included real weight and tare weight.)
Sign (1Btye)	Sign
Weight Data (7Byte)	Current weight
UNIT (2Byte)	kg - k g g - g ton- 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

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6-1-3. Format 3 (Including ID number) – 17 byte
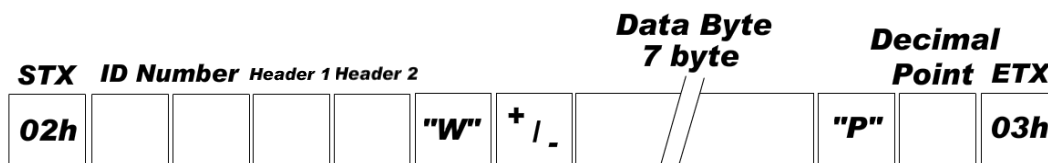
Classification	Contents
STX (1Byte)	Start of Text
ID Number (2Byte)	ID Number
Header1 (1Byte)	OL : Current weight is over than max capacity weight. ST : Stable weight US : Unstable weight
Header2 (1Byte)	NT : NET-WEIGHT(Real weight which is excluded tare weight) GS : GROSS-WEIGHT (Under tare set, it is included real weight and tare weight.)
"W" (1Byte)	Weight display separator
Sign (1Btye)	Sign
Weight Data (7Byte)	Current weight
"P" (1Byte)	Decimal point display seperator
Decimal Point (1Byte)	Decimal point
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 : Current weight is over than max capacity weight. ST : Stable weight US : Unstable weight
Header2 (2Byte)	NT : NET-WEIGHT(Real weight which is excluded tare weight) GS : GROSS-WEIGHT (Under tare set, it is included real weight and tare weight)
ID Number (1Byte)	ID Number
Lamp Display (1Byte)	Lamp status display
Weight Data (8Byte)	Current weight including Sign (When weight is negative number, sign '-' is displayed, otherwise sign '+' is not displayed when weight is positive number))
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

※ 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

6-2. Command Mode

Under "Command Mode", Indicator will recognize the receipt of Order based on 02h(STX) and 03h(ETX) signal, and transfers 06h(ACK), 15h(NAK).

6-2-1. Read command

Subject	Command	Length of transmission data
Current Weight	STX ID RCWT ETX	22 byte
Current data	STX ID RCWD ETX	46 byte
Grand total data	STX ID RGRD ETX	28 byte
Current time data	STX ID RTIM ETX	14 byte
Current date data	STX ID RDAT ETX	14 byte
Tare weight	STX ID RTAR ETX	18 byte

6-2-2. Write command

Subject	Command	Length of transmission data
Zero	STX ID WZER ETX	8 byte
Tare	STX ID WTAR ETX	8 byte
Tare Reset	STX ID WTRS ETX	8 byte
Hold	STX ID WHOL ETX	8 byte
Hold Reset	STX ID WHRS ETX	8 byte
Print	STX ID WPRT ETX	8 byte
Grand total Print	STX ID WGPR ETX	8 byte
Delete Grand total	STX ID WGTC ETX	8 byte
Date setting	STX ID WDAT DATE (YYMMDD) ETX	14 byte
Time setting	STX ID WTIM TIME (HHMMSS) ETX	14 byte

6-2-3. Read Command Detail

Current Weight	
ASCII : STX ID(2byte) RCWT ETX	**HEX :** 02 30 31 52 43 57 54 03

Response	STX ID RCWT **State1(1byte) State2(1byte) P decimal point(1byte) +/- (1byte) Current weight(7byte) Weight unit(2byte)** ETX
	State1 : O(Over Load) , S(Steady), U(Unsteady)
	State2 : N(Net weight), G(Gross weight)

Ex) Steady(S), TARE not used(N), 0.000kg

STX	ID		R	C	W	T	S	N	P	3	+	0	0	0
02h	30h	31h	52h	43h	57h	54h	53h	4Eh	50h	33h	2Bh	30h	30h	30h

0	0	0	0	k	g	ETX
30h	30h	30h	30h	6Bh	67h	03h

Indicator memory data	
ASCII : STX ID(2byte) RCWD ETX	**HEX :** 02 30 31 52 43 57 44 03

Response	STX ID RCWD P **decimal point(1byte) date(6byte) Time(6byte) No. of weighing(6byte) +/-(1byte) Tare(7byte) +/-(1byte) weight(7byte) weight unit(2byte)** ETX

Ex) DATE : Aug 12th,2014, TIME : 12:00:00, the no. of weighing : 10, TARE : 2.000kg, current weight : 3.000kg

STX	ID		R	C	W	D	P	3	1	4	0	1	0	1
02h	30h	31h	52h	43h	57h	44h	50h	33h	31h	34h	30h	31h	30h	31h

1	2	0	0	0	0	0	0	0	0	1	0	+	0	0
31h	32h	30h	30h	30h	30h	30h	30h	30h	30h	31h	30h	2Bh	30h	30h

0	2	0	0	0	+	0	0	0	3	0	0	0	k	g
30h	32h	30h	30h	30h	2Bh	30h	30h	30h	33h	30h	30h	30h	6Bh	67h

ETX
03h

Grand Total data		
ASCII : STX ID(2byte) RGRD ETX		**HEX :** 02 30 31 52 47 52 44 03
Response	STX ID RGRD P decimal point**(1byte) the no. of weighing (6byte)** **Accumulated weight(10byte) unit(2byte)** ETX	

Ex) the no. of weighing : 10   , Accumulated Weight : 10.000kg

STX	ID		R	G	R	D	P	3	0	0	0	0	1	0
02h	30h	31h	52h	47h	52h	44h	50h	33h	30h	30h	30h	30h	31h	30h

0	0	0	0	0	1	0	0	0	0	k	g	ETX
30h	30h	30h	30h	30h	31h	30h	30h	30h	30h	6Bh	67h	03h

Current Time data		
ASCII : STX ID(2byte) RTIM ETX		**HEX :** 02 30 31 52 54 49 4D 03
Response	STX ID RTIM **Current Time(6byte)** ETX	

EX) Time : 12:00:00

STX	ID		R	T	I	M	1	2	0	0	0	0	ETX
02h	30h	31h	52h	54h	49h	4Dh	31h	32h	30h	30h	30h	30h	03h

Current date data		
ASCII : STX ID(2byte) RDAT ETX		**HEX :** 02 30 31 52 44 41 54 03
Response	STX ID RDAT **Current Date(6byte)** ETX	

EX) Date : Aug 12th ,2014

STX	ID		R	D	A	T	1	4	0	1	0	1	ETX
02h	30h	31h	52h	44h	41h	54h	31h	34h	30h	31h	30h	31h	03h

Tare data		
ASCII : STX ID(2byte) RTAR ETX		**HEX :** 02 30 31 52 54 41 52 03
Response	STX ID RTAR P **decimal point(1byte) +/-(1byte) TARE value(7byte)** ETX	

EX) TARE : 2.000kg

STX	ID		R	T	A	R	P	3	+	0	0	0	2	0
02h	30h	31h	52h	54h	41h	52h	50h	33h	2Bh	30h	30h	30h	32h	30h

0	0	ETX
30h	30h	03h

6-2-4. Write Command Detail

Zero (same as "ZERO" key)	
ASCII : STX ID(2Byte) WZER ETX	**HEX :** 02 30 31 57 5A 45 52 03
Response Normal : STX ID ACK ETX Error : STX ID NAK ETX	

Tare	
ASCII : STX ID(2Byte) WTAR ETX	**HEX :** 02 30 31 57 54 41 52 03
Response Normal : STX ID ACK ETX Error : STX ID NAK ETX	

Tare reset	
ASCII : STX ID(2Byte) WTRS ETX	**HEX :** 02 30 31 57 54 52 53 03
Response Normal : STX ID ACK ETX Error : STX ID NAK ETX	

Hold	
ASCII : STX ID(2Byte) WHOL ETX	**HEX :** 02 30 31 57 48 4F 4C 03
Response Normal : STX ID ACK ETX Error : STX ID NAK ETX	

Hold reset	
ASCII : STX ID(2Byte) WHRS ETX	**HEX :** 02 30 31 57 48 52 53 03
Response Normal : STX ID ACK ETX Error : STX ID NAK ETX	

PRINT (Data will be transferred to the port which is set as print mode -Function 303- 02)	
ASCII : STX ID(2Byte) WPRT ETX	**HEX :** 02 30 31 57 50 52 54 03
Response Normal : STX ID ACK ETX Error : STX ID NAK ETX	

Grand Total Print (Data will be transferred to the port which is set as print mode -Function 303- 02)	
ASCII : STX ID(2Byte) WGPR ETX	**HEX :** 02 30 31 57 47 50 52 03
Response Normal : STX ID ACK ETX Error : STX ID NAK ETX	

Grand Total Delete	
ASCII : STX ID(2Byte) WGTC ETX	**HEX :** 02 30 31 57 47 54 43 03
Response Normal : STX ID ACK ETX Error : STX ID NAK ETX	

Date setting
ASCII : STX ID(2byte) WDAT data(6byte) ETX

Ex) Date: Jan. 2nd, 2014

STX	ID		W	D	A	T	1	4	0	1	0	2	ETX
02h	30h	31h	57h	44h	41h	54h	31h	34h	30h	31h	30h	32h	03h

Response Normal : STX ID ACK ETX   Error : STX ID NAK ETX

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Time setting													

ASCII : STX ID(2byte) WTIM time(6byte) ETX

Ex) Time: 12:00:00

STX	ID	W	T	I	M	1	2	0	0	0	0	ETX
02h	30h	31h	57h	54h	49h	4Dh	31h	32h	30h	30h	30h	30h	03h

Response	Normal : STX ID ACK ETX Error : STX ID NAK ETX

How to Calculate Check sum

Sum the value from "STX" to "ETX" and converts to ASCII(2byte) and transfer.

Convert the Sum value(HEX) to ASCII and transmit(28byte) .

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). the rest of result is A6h.

Calculated remainder value is A6h, then convert A6h to ASCII, 41(A), 36(6), and transfer

6-3. Modbus memory map

- RO : Read Only
- RW : Read Write
- Each P/N's set point can't over max capacity of Indicator.
    ex)35.00kg = 3,500 (0xDAC)
- When you input date and time, it should be 6digit.
    ex) 1st January 2014 = 140101 (0x22345)
        15(H) : 50(M) : 17(S) = 155017 (0x25D89)
- Refer the memory register for regarding 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

6-3-1. Data map

Address	Length	Feature	Description
0	2	RO	Capacity
2	2	RO	None(0x00)
4	2	RO	Analog Value
6	2	RO	Span Value
8	1	RO	Division
9	1	RO	Decimal point
10	2	RO	Current Weight
12	2	RO	Tare Weight
14	2	RO	Measured Weight
16	2	RO	Digital input
18	2	RO	Lamp
20	2	RO	Error
32	2	RO	Grand total Count
34	2	RO	Grand total Weight
436	2	RW	Date
438	2	RW	Time
440	1	RW	Key value

6-3-2. Digital input register

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

6-3-3. Lamp register

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

6-3-4. Error register

1bit	2bit	3bit	4bit	5bit	6bit	7bit	8bit
Loadcell Error	Over Load						

6-3-5. Key register

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

6-4. Print format

It can be connected with all kinds of Serial interface printer, but the print format is already programed and fixed with SE7200/7300 model (30column). So, you can get the right print form by connecting and using that printer.

	Korean (111-00)	English (111-01)
Continuous Print 352-00	============================ 날짜 :　　　　　2011-05-10 시간 :　　　　　18:00:10 장비번호 :　　　　　　1 　순번　　　　　중량 　　1　　　　1.330kg 　　2　　　　5.350kg 　　3　　　　1.380kg	============================ DATE :　　　　　2011-05-10 TIME :　　　　　18:00:10 SERIAL No :　　　　　　1 COUNT　　　　WEIGHT 　1　　　　1.330kg 　2　　　　5.350kg 　3　　　　1.380kg
Single Print 352-01	============================ 날짜 :　　　　　2011-05-10 시간 :　　　　　18:00:10 장비번호 :　　　　　　1 　순번　　　　　중량 　　1　　　　1.330kg ============================ 날짜 :　　　　　2011-05-10 시간 :　　　　　18:00:10 장비번호 :　　　　　　1 　　2　　　　5.350kg	============================ DATE :　　　　　2011-05-10 TIME :　　　　　18:00:10 SERIAL No :　　　　　　1 COUNT　　　　WEIGHT 　1　　　　1.330kg ============================ DATE :　　　　　2011-05-10 TIME :　　　　　18:00:10 SERIAL No :　　　　　　1 COUNT　　　　WEIGHT 　2　　　　5.350kg
Grand-total Print	============================ 　　　총　　계 날짜 :　　　　　2011-05-10 시간 :　　　　　18:00:10 장비번호 :　　　　　　1 계량횟수 :　　　　　　20 누적중량 :　　258.145kg ============================ 　　총계 삭제 ============================	============================ 　　　TOTAL DATE :　　　　　2011-05-10 TIME :　　　　　18:00:10 SERIAL No :　　　　　　1 TOTAL COUNT :　　　20 TOTAL WEIGHT : 258.145kg ============================ 　　TOTAL DELETE ============================

Date and Time data is printed in Continuous Print mode such as Single Print Mode, if it is first print out

7. Error & treatment

7-1. Error & treatment during Loadcell installation

Error	Causing	Treatment	Remark
Weight Value is unstable	1) Load cell broken 2) Load cell isolation resistance error 3) Weighing part touches other devices or some weight is on the weighing part 4) Summing Board Error	1) Measure input/output resistance of Load cell. 2) Measure Load cell isolation resistance	1) Input Resistance of "EXC+" and "EXC-" is about 400Ω ±30 2) Output Resistance of "SIG+" and "SIG-" is about 350Ω ±3.5 3) Isolate Resistance is more than 100MΩ
Weight Value is increased regular rate, but not return to "Zero	1) Load cell Error 2) Load cell connection Error	1) Check Load cell connection 2) Measure Load cell Resistance	
Weight Value is increased to under Zero	1) Load cell Output wire (SIG+, SIG-) is switched	1) Make wire correction	
"UN PASS" display	1) Load cell broken or Indicator connection Error	1) Load cell Check 2) Load cell connection Check	
	1) Power was "ON" when some weight is on the load cell.	1) Remove weight on the Load cell	
"OL" display (Over Load)	1) Load cell broken or Indicator connection Error 2) Loading over than Max Capacity	1) Load cell Check 2) Load cell connection Check 3) Remove over loaded weight	

7-2. Error code

Display	Cause
Err-01	When Max capacity/digit value is over 20,000
Err-04	Standard weight value is over than Max Capacity
Err-05	Standard weight value is less than 10% of Max Capacity
Err-06	When Calibration, it is excess than maximum A/D converting value
Err-07	When Calibration, it is less than minimum A/D converting value
Err-08	Under the function setting, the number shouldn't be entered.
Err-A	There is continuous vibration on the weighing part during calibration.

※ **In case of Err-06/07, it is difficult to calculate correct weight by current data during calibration process**

7-3. Error and treatment

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

Display	Cause	Treatment

"Ad-Err
 	
or
 	
"0L"**
	1. Load cell Error
	2. Load cell cable Error
	3. Load cell connection Error
	4. A/D Board Error
	5.If Analogue value
	  is over 1,040,000.
	※ When weigh "-" value,
	  If it is over set max capa, "OVER" is displayed.
	  Ex) Even though set max capa is "100" and it is over "-100", "OVER" is displayed.
		1. Under "TEST" mode 1, check analogue value. If you cannot get any analogue value or there is no change although adding load, please check load cell, load cell cable, connection conditions first.
		2. Replace another load cell, and check the indicator condition. If you have same problem, please replace new indicator and check A/D board error.
		3. Try to connect the indicator's A/D with the other indicator.
		4. Check the power and connection of terminal.

"UnPAss"	1. Power is ON, when some materials are on weighing part. ※ Under "Function 101-00", if there are more than 10% loading of Max capacity, "**Un-Pass**" display will be appeared and indicator will stay until removing the load. ※Under "Function 101-01", it can memory empty value, and it becomes set value without displaying" Un-pass")	1. If you set "Normal Mode", please check weighing part empty or not before turn on the power. If there are some materials in/on weighing part, please remove those materials and turn on the power. 2. Please try to set F-function 101-01(Back-up) mode so that the indicator can remember first empty value.
"HAlt"	H/W has some problem.	Please contact the distributor or Head Office.

ED. 3.00DT180115

Warranty certification

This product is passed "SEWHACNM Co., Ltd.'s strict quality test.

If there is defect of manufacturing or abnormal detection within warranty period, please contact our Agent or Distributor with this Warranty certificate.

Then, we will repair or replace free of charge.

Warranty clause

1. The Warranty period, we can guaranty, is one(1) year from your purchasing date

2. Warranty Exception Clause

- Warranty period is expired.

- Any kinds of Mal-function or defection caused by Modification or Repair without Sewhacnm's permission.

- Any kinds of Mal-function, Defection, or External damage, caused by operator

- Any kinds of Mal-function, Defection, caused by using spare part from Non-Authorized Distributor or Agent.

- Any kinds of Mal-function, Defection, caused by not following Warnings or Cautions mentioned on this manual.

- Any kinds of Mal-function, Defection caused by "Force Majeur", like Fire, Flood.

- Without presentation of this **"Warranty Certification".**

3. Other

- Any kinds of "Warranty Certification" without authorized Stamp is out of validity

Main office: **SEWHACNM Co.,Ltd.** #504, 302dong, 397, Seokcheon-ro, Ojeong-gu, Bucheon-si, Gyeonggi-do, Korea Tel : +82 32-624-0060 Fax : +82 32-624-0065 E-mail : sales@sewhacnm.co.kr Homepage : http://www.sewhacnm.co.kr Made in KOREA	**Product**	Digital Weighing Indicator
	Model	SI 460A
	Serial No.	
	AUTHORIZED STAMP	