BONGSHIN®

OPERATIONAL MANUAL

BS-270

LOAD LIMITER

CONTENTS

2

INTRODUCTIONS

1. INTRODUCTION

Thank you very much for your purchasing BONGSHIN Digital Weighing LOAD LIMITER of BS-270.

This Instruction Manual will lead you to use BS-270 with top reliability, High speed, high accuracy.

BS-270 series are over load limiters for cranes, lifts and elevators and so reliable because of using strain gage type-load cell.

They are easy to install because of their small size and built-in digital monitor. Digital Weighing Indicator amplifying the analog output from a load Cell, converting the analog signal to digital data and then displaying this data

As a weight reading and is designed for flawless performance in your demanding

Before using, It is recommended that you read this manual carefully so you may use this device to its full potential.

2. PRECAUTIONS

- Place the indicator on a flat and stable surface.
- Do not severely press because the light pressing of keys can incite the operation.
- Do not subject the scale to sudden temperature changes.
  Operating temperature : -10℃~+40℃
- Keep the scale away from strong EMI noises may cause incorrect weight readings.
- Keep the main body from rain and keep in dry area.
- Do not use inflammable materials in cleaning.

FEATURES

1. Features

- Dual set points relay output.
- 5 digit high brightness LED display.
- Wall mount type enclosure (splash proof)
- Appropriate for weight and measurement system.
- Easy operation and various options.
- Simple full digital calibration.
- Watchdog circuitry (system restoration)
- Weight Back-up (power on actual weight)

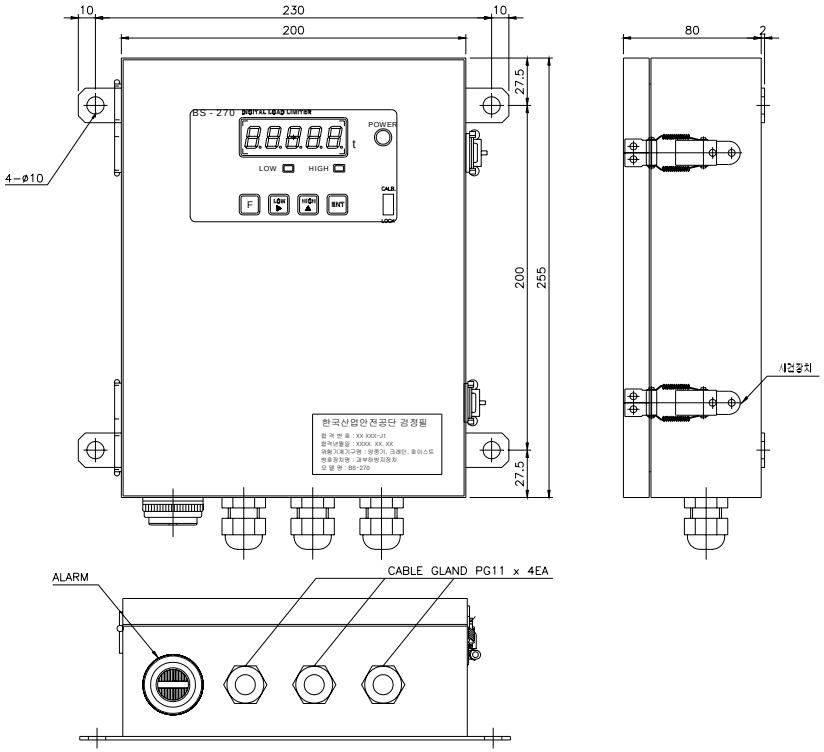
2. Main Function

- RS-232C standard
- User can set the max. weight which users want to and division at one's disposal.

4 TECHNICAL SPECIFICATION

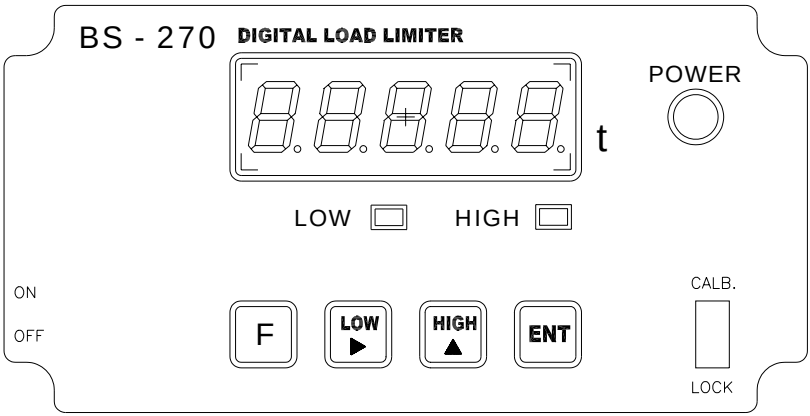
Analog signal input range		+1mV ~ +34mV
Non-linearity		0.01% F.S. max.
Max. Display resolution		1/10,000
Min. Input sensitivity		0.3 μV/Digit
Temperature Drift		Zero drift : ±0.2 μV/℃ RTI max. Span drift : 20ppm/℃ max.
Load cell Excitation		DC 10V, 300mA 350ohm x 4 load cell
Input Noise		±0.3 μV p.p or less
Input Impedance		10 MΩ (Min.)
A/D converter		24bit Sigma-Delta system
A/D internal resolution		Approximately 200,000 counts
A/D conversion speed		10 times/sec
Display		7 Segment LED, 5 Digits, 13mm(Height)
Polarity indication(-)		"-"minus sign
Annunciators		Low(Alarm), High(Overload)
Display increments		1, 2, 5, 10, 20, 50 selectable
Decimal Points		Selectable to any points
Operating Voltage		AC 110/220V, 50/60Hz
Power consumption		Approx. 10 VA
Operating temperature		-10℃ ~ +40℃
Output	**Standard**	RS-232C serial output
	Options	1) DC 0~10V (Voltage output) 2) DC 4~20mA (Current output)
Weight		Approx. 3.0kg

DIMENSIONS


10
230
10
200
80
2
27.5
200
255
27.5
4-ø10
BS-270 DIGITAL LOAD LIMITER
POWER
t
LOW
HIGH
F
LOW
HIGH
ENT
CALB.
LOCK
한국산업안전공단 검정필
AI검출치
ALARM
CABLE GLAND PG11 x 4EA

6

Front Panel



1. Display Lamp (▭)

▭ **LOW lamp** : It will lamp when 1st set point(LOW) control works.

▭ **HIGH lamp** : It will lamp when 2 nd set point(HIGH) control works.

2. Keyboard

▶ Change the digit of the set value.
Move to the right by 1 place.
Usage-input the numeric value in CAL mode.

▲ Available keys instead of numeric keys.
Change the set value
Increases the first place value to 1.

■ **CAL mode :** Switch to select one of the modes cycles.

■ **CAL mode :**

Change the digit of the set value.

Move to the right by 1 place.

■ **LOCK mode :** LOW Relay Range identify.

■ **CAL mode :**

Available keys instead of numeric keys.

Change the set value

Increases the first place value to 1.

■ **LOCK mode :** HIGH Relay Range identify.

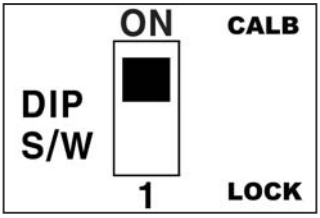
■ **CAL mode :** Store current condition and exit.

■ **ON, OFF** : POWER ON, OFF

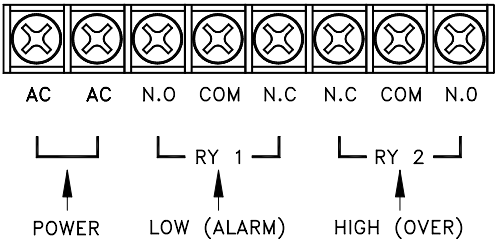
■ **Dip slide switch** : CALIBRATION mode

SW ON : Shift to calibration mode.

Turn sw off after calibration, It returns to weighing mode.



8 CONNECTION



■ **AC IN** : Available to change AC110/220V with multiple.

Before setting up, please confirm the power voltage.

Please change the connect terminal of 110V/220V after opening the cover

If you need to change. (It was settled with AC220V at the first)

Use a stable power supply AC110/220V ±10%, 50/60Hz

FUSE : Please use the standard approved .

FUSE AC250V, 0.5A (a glass tube with small type)

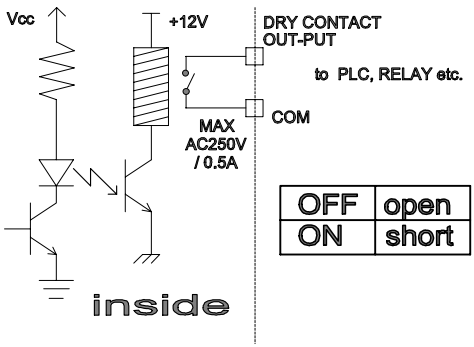
■ **OUT-PUT** : N.O, COM, N.C(LOW) / N.C, COM, N.O(HIGH)

Connect between COM terminal and N.O/N.C terminal

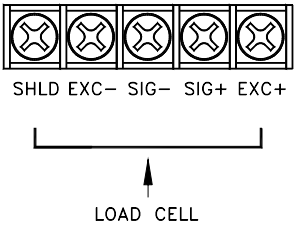
With the earth of no electric power.

Please use the output data For a signal only, don't use it for working.

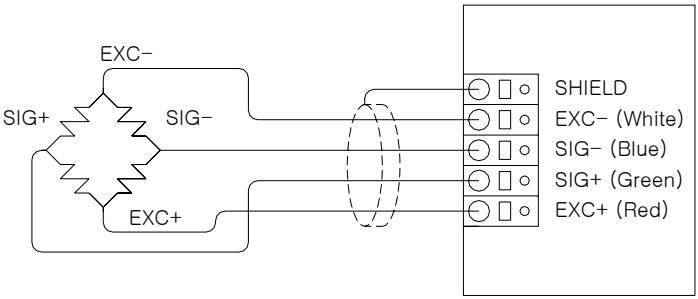
Max earth capacity : AC250V / 0.5A



■ **LOAD CELL** : Please connect the indicator connector with the wire of load cell according to the color.



Pin no.	SIGNAL	
1	SHLD	SHIELD
2	EXC-	Load cell Input Voltage (-) : EXC- (white)
3	SIG-	Load cell output (-) : SIG- (blue)
4	SIG+	Load cell output (+) : SIG+ (green)
5	EXC+	Load cell Input Voltage (+) : EXC+ (red)



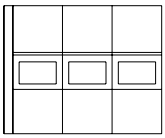
※ Because wire color may be different according to a manufacture and load cell models. Please refer for the data sheet of load cell.

The wire color of load cell according to a manufactures.

	1 SHIELD	2 EXC-	3 SIG-	4 SIG+	5 EXC+
BONGSHIN	**SHIELD**	**WHITE**	**BLUE**	**GREEN**	**RED**
CAS, TMI, AND	SHIELD	WHITE	BLUE	GREEN	RED
BLH	YELLOW	BLACK	RED	WHITE	GREEN
INTERFACE	SHIELD	BLACK	WHITE	GREEN	RED
KYOWA	SHIELD	BLACK	WHITE	GREEN	RED
P.T.	SHIELD	BLACK	WHITE	GREEN	RED
SHOWA	SHIELD	BLUE	BLACK	WHITE	RED
SHINKOH	SHIELD	BLACK	WHITE	GREEN	RED
TML	SHIELD	BLACK	GREEN	WHITE	RED
TFAC	YELLOW	BLUE	BLACK	WHITE	RED
HUNTLEIGH	SHIELD	BLACK	WHITE	RED	GREEN

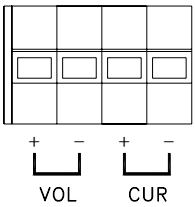
■ **RS-232C Port (Standard)** : Serial interface port.

(computer, printer)



■ **Analog Output (Option)** : Analog Output 0 ~10V, 4~20mA

(PLC Interface)

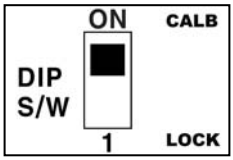


Calibration mode

1. How to enter CAL mode

Slid switch usage

■ **Dip slide SW CALB. – CALIBRATION Mode**



Pressing 

the key and set mode start.

2. Key Usage

■ **CAL mode :** Switch to select one of the modes cycles.

■ **CAL mode :**

Change the digit of the set value.

Move to the right by 1 place.

■ **CAL mode :**

Available keys instead of numeric keys.

Change the set value

Increases the first place value to 1.

■ **CAL mode :** Store current condition and exit.

3. Calibration Menu (Step 1 ~ Step 8)

Step 1 : Minimum Division Set
Step 2 : Zero Calibration
Step 3 : Decimal Point Adjustment
Step 4 : Setting Weight in span calibration
Step 5 : Maximum Capacity Set
Step 6 : LOW(Alarm) Weight Set
Step 7 : HIGH(Overload) Weight Set
Step 8 : END

■ Step 1

- Function : **Minimum Division Set**

Range → 1, 2, 5, 10, 20, 50

A step to set up a division value.

"15" means "Division" and "xx" means a division capable of displaying.

Also this value will be displayed as 1-2-5-10-20-50 by each key.

A step to set up a Decimal point is Function mode.

So, it will be go to the next step recording the position.

Key	Display	Description
F : mode ENT :move into LOW △ : increase ENT : Store and move into next menu	15. 1	0.01 ton (Decimal point :0.00) 1 : 1,2,3,4,5… 2 : 2,4,6,8,10… 5 : 5,10,15,20,25… 10 : 10,20,30,40,50… 20 : 20,40,60,80,100… 50 : 50,100,150,200,250…

☞ REF 1. The minimum division means the value of one division.

☞ REF 2. External resolution is obtained by division the min. division by the maximum capacity. Set the resolution to be within 1/10,000.

■ Step 2

- Function : **Zero Calibration**

Key	Display	Description
 Zero calibration and move into next menu		Unload the tray and press **"ENT" key** Under zero calibration Zero calibration is completed.

☞ REF 1. If zero calibration is done without any error, "18888" message is displayed and program moves into Step 3 automatically.

■ Step 3

- Function : **Decimal Point Adjustment**

Key	Display	Description
 : move into  : Shift of decimal point  : Store and move into next menu		18888 : 0 1888.8 : 0.0 **188.88 : 0.00** 18.888 : 0.000 1.8888 : 0.0000

■ Step 4

- Function : **Setting Weight In Span Calibration**

Range → 1~ 99,999

Key	Display	Description
ENT : move into LOW △ : Increase HIGH ▷ : Shift of digit ENT : Store and move into next menu	LoAd 020.00	Setting Weight 20.00ton Load the weight which was set in and press **"ENT" key.** Under span calibration **Example :** 20.00 ton setting LoAd 020.00 5.00 ton setting LoAd 005.00

☞ REF 1. The weight shall be within the range of 10%~100% of maximum weight.

☞ REF 2. The setting weight must be over the range of 10% of maximum weight.

☞ REF 3. The setting weight over the maximum capacity.

■ Step 5

- Function : **Maximum Capacity Set**

Range → 1 ~ 99,999

Key	Display	Description
ENT : move into LOW △ : Increase HIGH ▷ : Shift of digit ENT : Store and move into next menu	FULL 020.00	Maximum capacity 20.00 ton

☞ REF 1. The maximum capacity means the maximum weight that scale can measure.

■ Step 6

- Function : **LOW (Alarm) weight Set**

Range → 1 ~ 99,999

Key	Display	Description
ENT : move into LOW △ : Increase HIGH ▷ : Shift of digit ENT : Store and move into next menu	LO 020.00	LOW(Alarm) weight set 20.00 ton

■ Step 7

- Function : **HIGH (Overload) weight Set**

  Range → 1 ~ 99,999

Key	Display	Description
ENT : move into LOW △ : Increase HIGH ▷ : Shift of digit ENT : Store and move into next menu	HIGH 022.00	HIGH(Overload) weight set 22.00 ton

■ Step 8

- Function : **END**

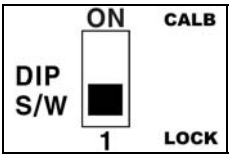
  The "Good" message is displayed in 8 step,
  all span adjustment is end.
  Press **"ENT"** key after put down of span standard weight on the crane.
  The indicator will enter into user's weighing mode.

Key	Display	Description
ENT : Store and move into weighing mode	Good	END

4. How to enter Weighing mode

Slid switch usage

■ **Dip slide SW LOCK – Weighing Mode**



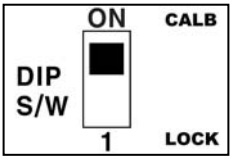
18

ZERO Calibration

1. How to enter CAL mode

Slid switch usage

■ **Dip slide SW CALB. – CALIBRATION Mode**



Pressing [F] the key and set mode start.

2. ZERO Calibration

■ Step 1

Key	Display	Description
[F] : mode [ENT] : Zero calibration and move into next menu	5.d.00	Each times are press the "F" mode key which is changed preset conditions as followed. Unload the tray and press "ENT" key Under zero calibration Zero calibration is completed.

☞ REF 1. If zero calibration is done without any error, "18888" message is displayed and program moves into Step 1 automatically.

■ Step 2

- Function : **END**

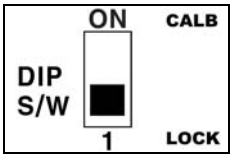
The "Good" message is displayed in 2 step,
all zero adjustment is end.
The indicator will enter into user's weighing mode.

Key	Display	Description
F : mode ENT : Store and move into weighing mode	Good	Each times are press the "F" mode key which is changed preset conditions as followed. END

3. How to enter Weighing mode

Slid switch usage

■ **Dip slide SW LOCK – Weighing Mode**

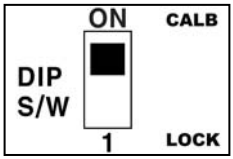


LOW(Alarm), HIGH(Overload) SET

1. How to enter CAL mode

Slid switch usage

■ **Dip slide SW CALB. – CALIBRATION Mode**



Pressing [F] the key and set mode start.

2. LOW (Alarm) weight setting

Range → 1 ~ 99,999

Key	Display	Description
[F] : mode [ENT] : move into [LOW △] : Increase [HIGH ▷] : Shift of digit [ENT] : Store and move into next menu	LO 020.00	Each times are press the "F" mode key which is changed preset conditions as followed. LOW(Alarm) weight set 20.00 ton

☞ REF 1. LOW(Alarm) weight ≦ HIGH(Overload) weight

3. HIGH (Overload) weight setting

Range → 1 ~ 99,999

Key	Display	Description
F : mode ENT : move into LOW △ : Increase HIGH ▷ : Shift of digit ENT : Store and move into next menu	HIGH 022.00	Each times are press the "F" mode key which is changed preset conditions as followed. HIGH(Overload) weight set 22.00 ton

☞ REF 1. LOW(Alarm) weight ≦ HIGH(Overload) weight

4. How to enter Weighing mode

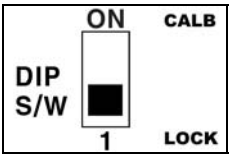
- Function : **END**

The "Good" message is displayed, all relay adjustment is end.
Press "ENT" key after put down of span standard weight on the crane.
The indicator will enter into user's weighing mode.

Key	Display	Description
F : mode ENT : Store and move into weighing mode	Good	Each times are press the "F" mode key which is changed preset conditions as followed. END

Slid switch usage

■ **Dip slide SW LOCK – Weighing Mode**



Serial Interface (RS-232C)

▶ Signal Format

■ Type : EIA-RS-232C

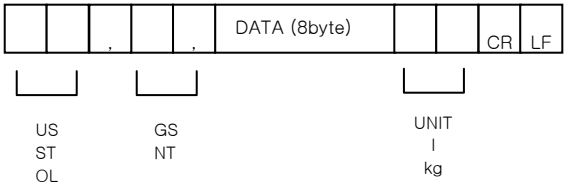
■ Method : Full-Duplex , Asynchronous, Bi-direction

■ Baud rate : 2400bps (Baud-Rate)

■ Format :

① Data Bit	:	7
② Start/Stop	:	1 bit
③ Parity Bit	:	1 (Even)
④ Code	:	ASCII

■ Data Format



① Header 1
- US : WEIGHT UNSTABLE
- ST : WEIGHT STABLE
- OL : OVER LOAD

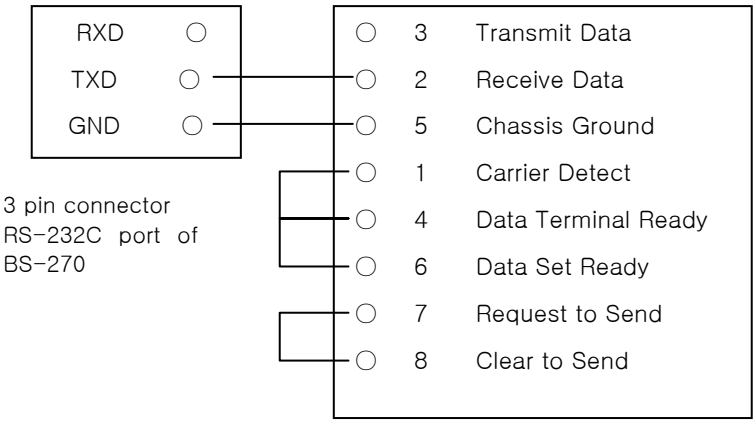
② Header 2
- GS : GROSS WEIGHT MODE
- NT : NET WEIGHT MODE

③ WEIGHT (8 byte)
- SIGNAL (+ or -)
- WEIGHT (Included Decimal point)
  - 100.0 kg : '0' , '0' , '0' , '1' , '0' , '0' , '.' , '0',
  - 150.5 kg : '0' , '0' , '0' , '1' , '5' , '0' , '.' , '5',
  - 165.3 kg : '-' , '0' , '0' , '1' , '6' , '5' , '.' , '3',

  Each ASCII code of weight transmitted by 8 byte.('0' : 0 x 20)

④ Unit
- k g : Unit of kilogram

▶ RS-232C port connection



Analog output (option)

1. Voltage (0~10V) Analog Output

* The voltage output occurs proportionally the voltage according to the size of a weight
In 0V ~10V.

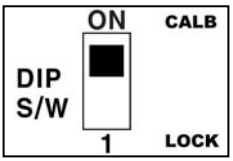
▣ SPECIFICATION

output Voltage	0 ~ 10V DC out
Precision	Max 1/1000
Min Impedance	Over 1 kΩ

▣ Analog Out Standard Weight Selecting.

Analog max out value when weight setup.
The indicator will enter into user's CALB mode.
Slid switch usage

■ **Dip slide SW CALB. – CALIBRATION Mode**



Pressing 

the key and set mode start.

Dip slide sw : CALB mode

SW ON (up) : Shift to CALB mode. (calibration mode)

▣ Maximum Capacity set

Range → 1 ~ 99,999

Key	Display	Description
ENT : move into LOW △ : Increase HIGH ▷ : Shift of digit ENT : Store and move into next menu	FULL 020.00	Maximum capacity 20.00 ton example) 0.00 ton---→ 0V 20.00 ton---→ 10V

☞ REF 1. The maximum capacity means the maximum weight that scale can measure.

▣ Adjustment

* The voltage out is to 0V when the weight is displayed 0 kg in indicator.
* The voltage out is to 10V when the weight is displayed max. capacity in indicator.
* If analog output is not correct,
  You can make a fine adjustment with **"ZERO"** VR(Zero adjustment) and **"GAIN"** VR(Span adjustment) on analog pc board by multi meter.
  (Recommended accuracy : 1/1,000)

2. Electric current (4~20mA) Analog Output

* The voltage output occurs proportionally the voltage according to the size of a weight
In 4mA ~20mA.

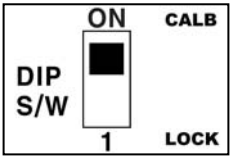
▣ SPECIFICATION

output Voltage	4 ~ 20 mA DC Current out
Precision	Max 1/1000
Min Impedance	Under 500 Ω

▣ Analog Out Standard Weight Selecting.

Analog max out value when weight setup.
The indicator will enter into user's CALB mode.
Slid switch usage

■ **Dip slide SW CALB. – CALIBRATION Mode**



Pressing 

the key and set mode start.

Dip slide sw : CALB mode

SW ON (up) : Shift to CALB mode. (calibration mode)

▣ Maximum Capacity set

Range → 1 ~ 99,999

Key	Display	Description
ENT : move into LOW △ : Increase HIGH ▷ : Shift of digit ENT : Store and move into next menu	FULL 020.00	Maximum capacity 20.00 ton example) 0.00 ton---→ 4 mA 20.00 ton---→ 20 mA

☞ REF 1. The maximum capacity means the maximum weight that scale can measure.

▣ Adjustment

* **How to calibrate for output rate between 4mA and 20mA.**
The current out is to 4 mA when the weight is displayed 0 kg in indicator.
The current out is to 20 mA when the weight is displayed max. capacity in indicator.
If analog output is not correct,
You can make a fine adjustment with **"ZERO"** VR(Zero adjustment) and **"GAIN"** VR(Span adjustment)
On analog pc board by multi meter.

3. How to enter Weighing mode

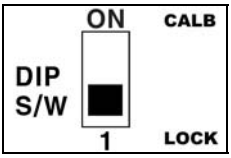
- Function : **END**

The "Good" message is displayed, all relay adjustment is end.
Press **"ENT"** key after put down of span standard weight on the crane.
The indicator will enter into user's weighing mode.

Key	Display	Description
F : mode ENT : Store and move into weighing mode	Good	Each times are press the "F" mode key which is changed preset conditions as followed. END

Slid switch usage

■ **Dip slide SW LOCK – Weighing Mode**



30

Error Message and Trouble Shooting

ERROR	CAUSE	A/S	Reference.
Waving a weight Value. Appear **"no.LC"**	① Load cell damage ② Insulation resistance badness of load cell. ③ Weighing part error	① Checking for Input, Output of load cell. Resistance Value. ② Checking Insulation Resistance value of Load cell.	① Input resistance : about 1130Ω ② Output resistance : about 1000Ω ③ Insulation Resistance : over100MΩ
A. Changing a Weight value, B. Not return to ZERO Appear **"Ovr "** (OVER LOAD)	① Load cell damage.	① Checking Insulation Resistance value of Load cell. (Normal Max 100MΩ or -Ovr-appear)	
	① Disconnected to Load Cell.	① Confirm a connect of Load cell ② Checking a single wire Of load cell cable	
Weight (-) changed Appear **"-Ovr "** (OVER LOAD)	① Load cell output (SIG+,SIG-)changed.	① Load cell connector	
Appear **"Ovr"** or **"-Ovr "**	① Load cell damage ② Connection Error	① Load cell damage ② Load cell connector	
	① Excess Max weight	① Remove excess weight	