BONGSHIN®

OPERATIONAL MANUAL

BS-5205

DIGITAL INDICATOR

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INTRODUCTIONS

1. INTRODUCTION

We greatly appreciate your purchase of the BONGSHIN industrial indicator. These goods perform excellently and exhibit splendid properties through strike tests.

BONGSHIN indicator is delicately designed to coincide with the special requirements of several industrial fields and includes many functions and various external interfaces. Also, it is programmed for the user's convenience and contains help display functions that are easily accessible.

Before using BS-5205, 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℃~50℃
- 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.

THE FEATURES OF BS-5205

1. Features

- Appropriate for weight and measurement system.
- Easy operation and various options.
- Simple full digital calibration.
- Self check & Watch-dog function
- Weight Back-up (power on actual weight)

2. Main Function

- Various specification of weight conversion speed.

  (Digital Filter Function)
- Various printer connection. (RS-232C Serial Printer)
- RS-232C Serial Output standard
- User can set the max. weight which users want to and division at one's disposal.

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TECHNICAL SPECIFICATION

1. Analog Input & A/D Conversion

Load cell excitation Voltage	DC 5V ±5%, 60㎃ up to 4 x 350ohm load cells
Input sensitivity	0.2 μV/D
System linearity	Within 0.01% F.S.
Zero adjust range	0㎷ ~ ±20㎷ (±4mV/V)
Input Voltage	Max. 20㎷ Min. 5㎷
Accuracy	Zero drift : ±0.1μV/℃ RTI max. Span drift : 20ppm/℃ max.
Input Noise	±0.3 μV p.p or less
Input Impedance	10 ㏁ (Min.)
A/D converter	Sigma-Delta system
A/D internal resolution	Approximately 200,000 counts
A/D external resolution	1/20,000 (Max.)
A/D conversion speed	10 times/sec
Max. resolution	1/20,000

2. Digital Part

Display	7 Segment LED, 6-Digits, 14.22mm(Height)
Maximum Display	-99999 ~ +99999
Display below zero	"-"minus signal
Additional symbols	Zero, Stable, Net, Tare, Hold
Min. Division	1, 2, 5, 10, 20, 50 selectable
Decimal Point	Selectable to any points

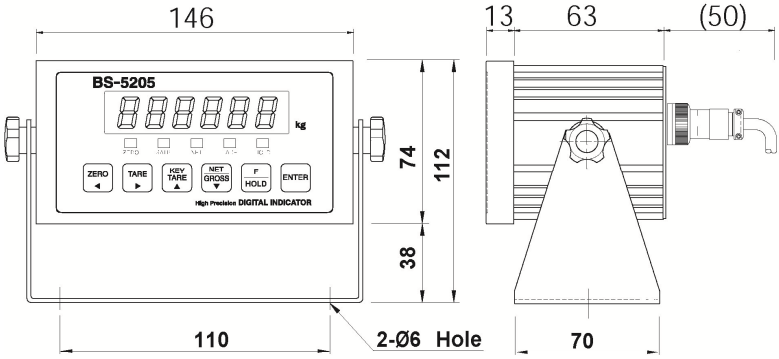
3. Technical

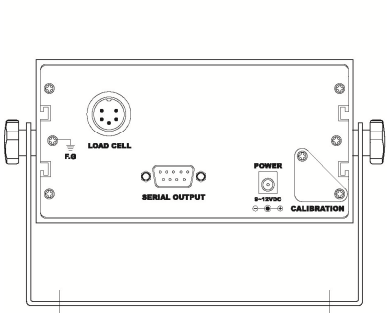
AC adapter	DC 9~12V (AC 110/220V, DC 9V 1000mA Adapter)
Power consumption	1 VA
Operating temperature	-10℃~+50℃
Humidity	85% Rh Max.
Overall dimensions	146(W) x 63(D) x 74(H)
Weight	800 g

4. Option

Standard	Serial Interface : RS-232C
Option	Serial Interface : RS-485

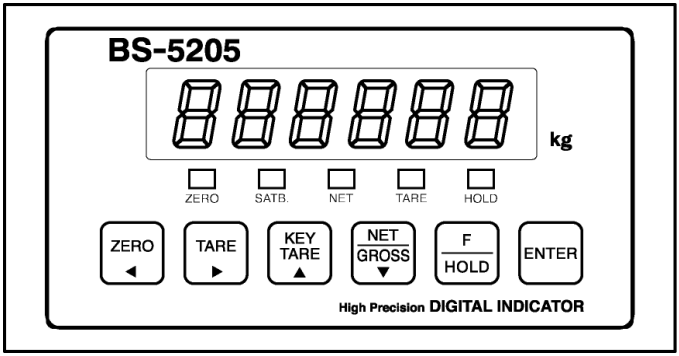
6 DIMENSIONS





Front Panel

1. Display Lamp (▭)



▭ **ZERO lamp** : ON when the current weight is 0 kg.

▭ **STABLE lamp** : ON when the weight is stable.

▭ **NET lamp** : ON when the current weight is NET weight.

▭ **TARE lamp** : ON when the tare weight is stored.

▭ **HOLD lamp** : Lamp is on when moving object is weighed.

2. Keyboard

▲ Available keys instead of numeric keys.

Change the set value

▼ Increases (Decrease) the first place value to 1.

▶ Change the digit of the set value.

Move to the right (left) by 1 place.

◀ Usage-input the numeric value in CAL, SIM, SET mode.

Returns the display to 0

- automatic tare weight input -

Use container in weighing.

Current weight is memorized as tare weight.

If you press TARE key in unload condition, Tare setting is released automatically.

- manual tare weight input -

When you already know the tare weight, press key tare and input tare weight with arrow keys and memorize it by pressing ENTER key.

- NET/GROSS Conversion -

Use container in weight.

NET lamp off – gross weight

NET lamp on –net weight

In case tare weight is registered, tare and item's total weight is G. weight and only item's weight is N. weight.

■ **Hold not used** → Set in F23 : 0

■ **Hold key** → Set in F23 : 1

■ **SET mode**

→ By pressing " F/HOLD" key more than 3 seconds.

■ **ENTER key**

→ Store current condition and exit.

3. How to enter SET mode

By pressing **" F/HOLD "** key more than 3 seconds.

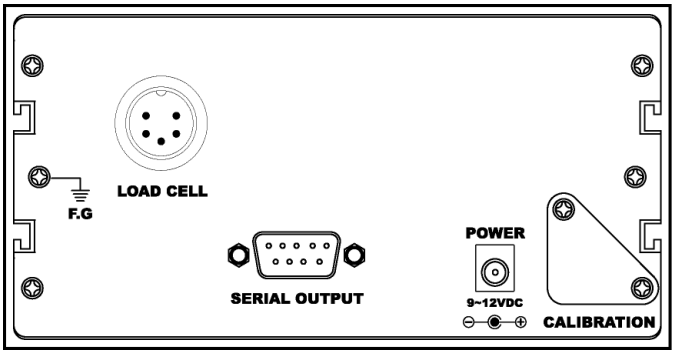
4. How to enter CAL mode

Slid switch usage

■ **Dip slide SW 1 ON – CAL Mode**

■ **Dip slide SW 2 ON – SIM Mode**

10 Rear Panel



■ **SERIAL OUTPUT** : Serial interface RS-232C & RS-485 port.

■ **POWER** : DC 9 ~ 12V

Use a stable power supply AC110/220V DC9V 1000mA

- Set up voltage AC220V

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

Pin no.	SIGNAL	
1	Load cell Input Voltage (+)	EXC+ (Red)
2	Load cell Input Voltage (-)	EXC- (White)
3	Load cell output (+)	SIG+ (Green)
4	Load cell output (-)	SIG- (Blue)
5	Shield	SHIELD

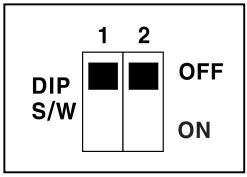
The wire color of load cell according to a manufactures.

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

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

■ **CALIBRATION** : Slid switch

REAR SLIDE SWITCH USAGE



■ **Dip slide sw 1** : CALIBRATION mode

SW 1 ON : Shift to calibration mode.

Turn sw1 off after calibration, It returns to weighing mode.

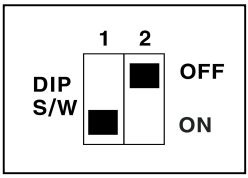
■ **Dip slide sw 2** : SIMURATION CALIBRATION mode

SW 2 ON : Shift to simulation calibration mode.

Turn sw2 off after calibration, It returns to weighing mode.

12 Calibration mode

1. How to Enter



Turn on the power while CAL switch 1 on the rear panel of the indicator and CAL mode starts.

2. Available Keys

▲ ▼ Increase the first place set value to1.

◀ ▶ Move to the left by 1 place of the set value.

ENTER Move into next menu.

3. Calibration Menu (CAL 1 ~ CAL 5)

CAL 1 : Maximum Capacity Set

CAL 2 : Minimum Division Set

CAL 3 : Setting Weight in span calibration

CAL 4 : Zero Calibration

CAL 5 : Span Calibration

■ CAL 1

- Function : **Maximum Capacity Set**

Range → 1 ~ 99,999kg

Key	Display	Description
▲▼ : Increase ◀▶ : Shift of digit "ENTER" key : Store and move into next menu	CAL 1 C 100 C 10000	CAL 1 condition. 100 kg 10000kg

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

■ CAL 2

- Function : **Minimum Division Set**

Range → 1 ~ 50

Key	Display	Description
▲▼ : Increase "ENTER" key : Store and move into next menu	CAL 2 d 1 d 1	CAL 2 condition. 1 kg (Decimal point : 0) 0.01kg (Decimal point: 2)

☞ 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 1/30,000.

■ CAL 3

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

Range → 1~ 99,999kg

Key	Display	Description
▲▼ : Increase	CAL 3	CAL 3 **"ENTER" key** :
◀▶ : Shift of digit	L 100	100 kg
"ENTER" key :	L 10000	10000kg
Store and move into next menu		Setting Weight

☞ 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.

■ CAL 4

- Function : **Zero Calibration**

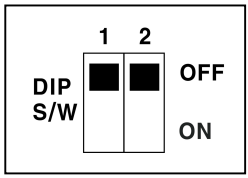
Key	Display	Description
"ENTER" key :	CAL 4	CAL 4 condition.
Zero calibration	UnLoAd	Unload the tray and press **"ENTER" key**
and move into	------	Under zero calibration
next menu	SUCCES	Zero calibration is completed.

☞ REF 1. If zero calibration is done without any error, "SUCCESS" message is displayed and program moves into CAL 5 automatically.

☞ REF 2. If the "ZERO" key is pressed, only zero calibration is completed and program moves SAVE & EXIT mode. Turn sw1 off.

■ CAL 5

- Function : **Span Calibration**

Key	Display	Description
"ENTER" key : Span calibration and move into next menu	CAL 5 LoAd ------ SUCCES	CAL 5 condition. Load the weight which was set in CAL3 and press "ENTER" key. Under span calibration Span calibration is completed. Turn sw1 off. (Save & exit CAL mode) 

☞ REF 1. If zero calibration is done without any error, "SUCCESS" message is displayed the weight of setting weight is displayed on LED screen. Check the weight.

☞ REF 2. Check the weight of setting weight and turn sw1 off and calibration is completed.

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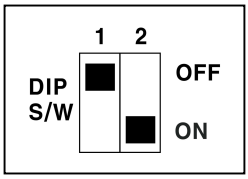
Simulation Calibration mode

1. How to Enter



Turn on the power while CAL switch 2 on the rear panel of the indicator and CAL mode starts.

2. Available Keys

Increase the first place set value to1.

Move to the left by 1 place of the set value.

Move into next menu.

3. Calibration Menu (Sim 1 ~ Sim 4)

Sim 1 : Maximum Capacity Set

Sim 2 : Minimum Division Set

Sim 3 : Rated Output Set

Sim 4 : Zero Calibration

■ Sim 1

- Function : **Maximum Capacity Set**

Range → 1 ~ 99,999kg

Key	Display	Description
▲▼ : Increase	SIM 1	Sim 1 condition.
◀▶ : Shift of digit	L 100	100 kg
"ENTER" key : Store and move into next menu	L 10000	10000kg

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

■ Sim 2

- Function : **Minimum Division Set**

Range → 1~ 50

Key	Display	Description
▲▼ : Increase	SIM 2	Sim 2 condition.
"ENTER" key : Store and move into next menu	d 1	1 kg (Decimal point : 0)
	d 1	0.01kg (Decimal point: 2)

☞ 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 1/20,000.

■ Sim 3

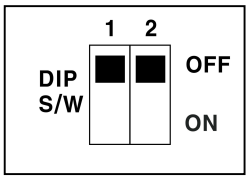
- Function : **Rated Output Set**

Range → 1mV/V ~ 3mV/V

Key	Display	Description
▲▼ : Increase ◀▶ : Shift of digit "ENTER" key : Store and move into next menu	SIM 3 r 1.0000 r 2.0000	Sim 3 condition. 1mV/V 2mV/V

■ Sim 4

- Function : **Zero Calibration**

사용 키	FND 화면	설 명
"ENTER" key : Zero calibration and move into next menu	SIM 4 UnLoAd ------ SUCCES	Sim 4 condition. Unload the tray and press "ENTER" key Under zero calibration Zero calibration is completed & Span calibration is completed. Turn sw2 off. (Save & exit CAL mode). 

☞ REF 1. If zero calibration is done without any error, “SUCCESS” message is displayed the weight of setting weight is displayed on LED screen. Check the weight.

☞ REF 2. Check the weight of setting weight and turn sw2 off and calibration is completed.

SET MODE

1. How to Enter

By pressing " F/HOLD " key more than 2 seconds.

At this time, **"F01"** message is displayed on FND screen after **"SET"** message.

① **"F01"** : Call the function which you want to convert.

② Input function no. to convert with arrow keys and press "ENTER" key.

③ **"F01-1"** : Means call the function which you would convert.

④ Input function no. to convert and press "ENTER" key.

2. How to Exit

By pressing " F/HOLD " key more than 2 seconds.

3. Available Keys

Increase the first place set value to1.

Move to the left by 1 place of the set value.

SET mode starts.

Store current condition and SET mode exit.

Move into next menu.

4. Set Value Conversion Menu (F01~F33)

▶ General Function

F01 Decimal Point Adjustment
F02 Weighing Unit Change
F03 Display Update Rate
F04 Digital Filter
F05 Motion Detection Condition
F06 Automatic ZERO Tracking Compensation
F07 Weight Backup
F08 Set ZERO Range
F09 ZERO & TARE Keys Availability
F10 Set Hold Type
F22 Device ID
F23 Designation of "HOLD" key usage

▶ Serial Interface Setting

F32 Designation of Baud Rate
F33 Designation of Output Mode

▶ General Function

Decimal Point Adjustment			
F01	0	No decimal point	0
	1	10^1	0.0
	2	10^2	0.00
	3	10^3	0.000

Weighing Unit Change			
F02	0	g	gram
	1	kg	kilogram
	2	t	ton
	3	lb	pound

Display Update Rate		
F03	0	10 Times/sec
	1	5 Times/sec

Digital Filter			
F04	1 ~ 9	1 : Less vibration ~ 9 : Much vibration	Adjust the set value according to the condition how many times converted digital value read and display.

Motion Detection Condition			
F05	0	No motion Detection Condition	
	1 ~ 9	1 : Less vibration ~ 9 : Much vibration	If weight change within given time is not bigger than the SET range, stable condition is displayed..
Automatic Zero Tracking Compensation			
F06	0	None automatic zero	
	1 ~ 9	1 : 0.5 digit 2 : 1 digit 3 : 1.5 digit 9 : 4.5 digit	Auto-zero tracking will automatically bring the display back to “0” when there are small deviations..

Weight Backup		
F07	0	Weight back-up is OFF (Power on zero)
	1	Weight back-up is ON (Display setting weight)

☞ REF. Memorize the current weight at sudden power failure.

Set Zero Range		
F08	0	3% : within 3% of MAX. weight
	1	10% : within 10% of MAX. weight
	2	100% : within 100% of MAX. weight

Zero & Tare keys Availability		
F09	0	Works when weight is stable
	1	Always

Set Hold Type		
F10	0	Average Hold : Compute the average weight of oscillating weights.
	1	Peak Hold : Compute the maximum weight of oscillating weights.
	2	Instant Hold : The instant display value can now be held by pressing button.

Device ID			
F22	00 ~ 99	00 : Device ID “0” 99 : Device ID “99”	It is used the no. of indicator when system is connected.

“PRINT” key usage		
F23	0	Not used
	1	Print key
	2	Hold key

▶ RS-232C Interface Setting

Baud Rate		
F32	0	600 bps (bit per second)
	1	1200 bps
	2	2400 bps
	3	4800 bps
	4	9600 bps

Output Mode (unit of speed in data transmission)		
F33	0	No data output
	1	Stream mode
	2	Transmit only in stable condition
	3	Transmit when data is required → Request signal : device ID(F22 : Device ID) → In case F22 : 1, send hex value 01H in computer

Serial Interface (Standard)

1. RS-232C Serial Interface

TRANSMIT MODE		
F32	Baud Rate	600, 1200, 2400, 4800*, 9600* bps
F33	Output Mode	Stable, Unstable, Data is required

▶ Signal Format

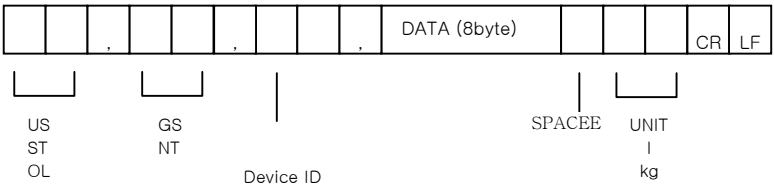
■ Type : EIA-RS-232C

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

■ Baud rate : 600, 1200, 2400, 4800, 9600bps (Baud-Rate)

■ Format : ① Data Bit : 8 (NO Parity)
② Start/Stop : 1 bit
③ Parity Bit : None
④ Code : ASCII

■ Data Format (22 byte)



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

② Header 2

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

③ Device ID

Transmit 1 byte device ID so that the receiver can receive data selectively which indicator send.

Insert in case of except SETUP F22–"00"

④ 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)

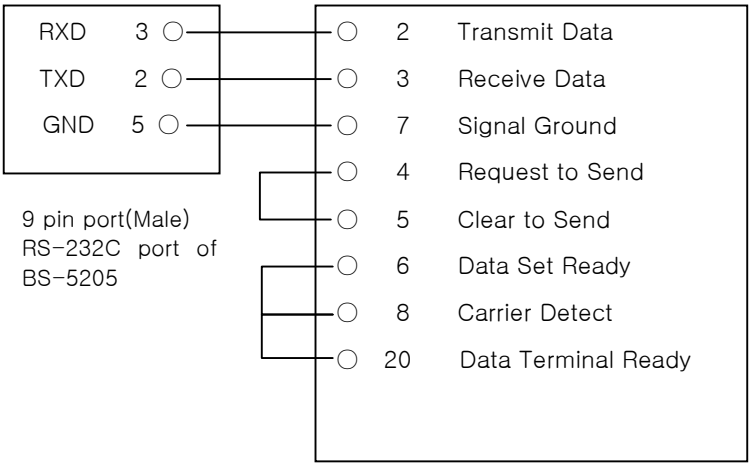
⑤ Data for Number

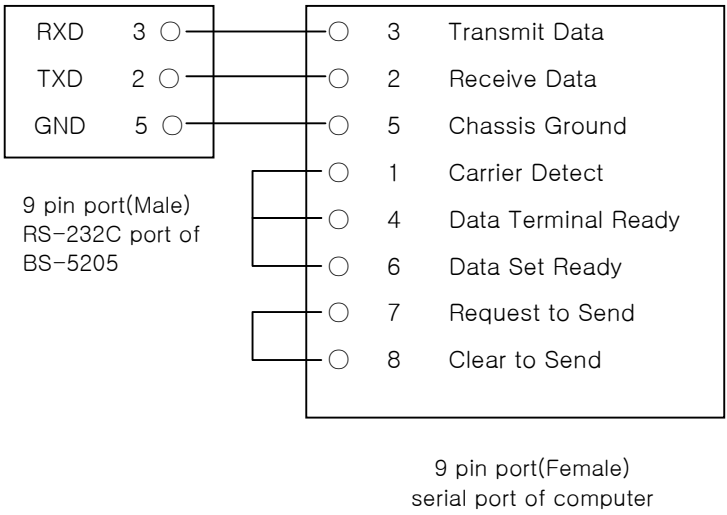
- 2B(H) " + " : PLUS
- 2D(H) " – " : MINUS
- 2O(H) " " : SPACE
- 2E(H) " . " : Decimal Point

⑥ Unit

- g : Unit of gram
- kg : Unit of kilogram
- t : Unit of ton
- lb : Unit of pound

▶ RS-232C port connection





▶ Simple Interface Program

■ Basic Program

```
10 OPEN "COM1:9600,N,8,1" As #1
20 IF LOC(1) = 0 THEN 60
30 A$ = INPUT$(1,1)
40 PRINT A$ ; " ";
50 GOTO 20
60 B$=INKEY$ : IF B$ = " " THEN 20
70 PRINT B$ ; " ";
80 PRINT #1,B$;
90 GOTO 20
```

■ C Program

```
#include <bios.h>
#include <conio.h>
#define COM1            0
#define DATA_READY   0×100
#define TRUE             1
#define FALSE            0
#define SETTINGS        0×E3
int main(void)
{
    int in, out, status, DONE = FALSE;
    bioscom(0, SETTINGS, COM1);
    cprintf("…BIOSCOM [ESC] to exit …₩n");
    while (!DONE)
    {
```

```
        status = bioscom(3, 0, COM1);
        if (status & DATA_READY)
            if ((out = bioscom(2, 0, COM1) & 0×7F) != 0)
                putch(out);
            if (kbhit())
            {
                if ((in = getch()) == '₩×1B')
                    DONE = TRUE;
                bioscom(1, in, COM1);
            }
    }
    return 0;
}
```

Option

OPTION : RS-485 Serial Interface

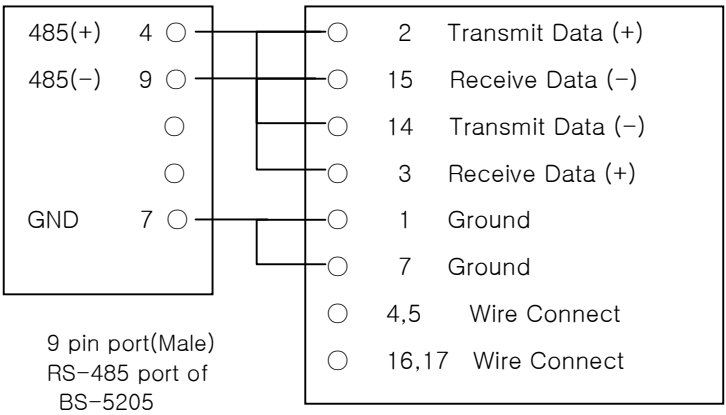
- RS-485 is to transmit the signal by the power difference.
  Also, it is more safety rather other interface system for a electric noise.
- Specially please use the cable with shield coax cable surely.
- Recommended distance is under 1.2 km.
- Both end side of a wire must be connected by the termination of 300Ω.

TRANSMIT MODE		
F32	Baud Rate	600, 1200, 2400, 4800*, 9600* bps
F33	Output Mode	Stable, Unstable, Data is required

▶ **Signal Format** : Same as RS-232C

▶ **Data Format** : Same as RS-232C

▶ **Connecting method of RS-485 port**



Error Message and Trouble Shooting

1. Error in Weighing Mode

■ no LC

☞ Reason

Failure in load cell connection or error in A/D conversion part.

☞ Trouble shooting

Check the load cell connector so that you may see if the polarity of signal is reversed.

■ Over

☞ Reason

The weight on platform us too heavy to be measured.

☞ Trouble shooting

Do not load the item exceeds the maximum tolerance.

If the load cell is damaged, the load cell should be replaced.

■ BUZZER

☞ Reason

Current weight deviates from zero range.

☞ Trouble shooting

Press the ZERO key within 10% of the maximum capacity.

(Function : F11 - x)

2. Error in Calibration Mode

■ no LC , no 1

☞ Reason

Failure in load cell connection or error in A/D conversion part.

☞ Trouble shooting

Check the load cell connector so that you may see if the polarity of signal is reversed.

■ Over

☞ Reason

The weight on platform us too heavy to be measured.

The weight for span calibration is set to be exceeded 100% of the maximum capacity of the scale.

☞ Trouble shooting

Do not load the item exceeds the maximum tolerance.

If the load cell is damaged, the load cell should be replaced.

Set the weight for span calibration is set to be within the maximum capacity of the scale in CAL 1.