



BENEDICTION ENTERPRISE CO., LTD.



BDI-2008

Weighing Indicator & Controller

User's Manual

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CHAPTER 1 INTRODUCTION

§ 1-1 Welcome

The **BDI-2008** weighing indicator is to fulfill the Push-pull (Tensile-Compression) Measuring purpose. It is equipped with 2 sets of load cell sensors with two individual capacities. The load cell input voltage ranges from -32mV to + 32mV. Fully Digital Calibration makes calibration an easy task. Additional optional Interfaces are so easy to connect that users can perform various applications.

With sincere gratitude for your using of our products, our company places great emphasis on after sales service. Once any question or problems occurred, please contact us immediately for further services.

§ 1-2 Features

BDI-2008 Push-Pull Measuring Indicator & Controller Features:

- BDI-2008 connected to 2 sets of load cell sensors with two separate capacity and calibration (SRAM will store two set of parameters).
- 1/10,000 display resolution, A/D conversion rate 120 times/Sec.
- 5 testing modes for test: Last mode, Manual Hold, Hold positive peak, Hold negative peak, Hold both positive and negative peak, and Burn-in test.
- "Watchdog" virtually eliminates malfunctions that associated with computerized equipment or software failure.
- Full Digital Calibration makes setting ZERO and SPAN Calibration an easy task.
- Drives up to 8 parallel connecting load cells, or a scale structure of 2-sets of load cells (each set with 4 load cells).
- 8k bytes SRAM with Li-battery backup. Information will not disappear even power failure.
- The settings of function and weighing parameters are all stored in the EEPROM, with storage duration over 40 years.
- Important values and parameters can have storage backup.
- Users can adjust the intensity of digits filter to avoid mechanical vibration that caused by external environments to achieve high-speed and accurate measurement.
- Control Inputs: ZERO Input, START/STOP, Select P1/P2, and Print.
- Control Outputs: ZERO Band output, HI output, LO Output, FR output, RUN output, and ERROR.
- Standard Serial Output (20mA Current Loop) for remote display.
- Optional printer interface can automatically print or output data (Date & time).
- Optional:
 - OP-01 I/O Interface
 - OP-02 Bi-dimensional RS-232
 - OP-03 Printer Interface: Centronic
 - OP-04 Binary Coded Decimal
 - OP-05 Analog Output

§ 1-3 System Function Introduction

SYSTEM CHECK:

- ※ CHECK DISPLAY
- ※ CHECK SARM, EEPROM
- ※ CHECK INPUT, CODE
- ※ CHECK OUTPUT
- ※ CHECK KEY

SETTING FUNCTIONS:

- ※ SETTING GENERAL FUNCTIONS (F0XX, FCXX)
- ※ SETTING CONTROLS (F1XX)
- ※ SETTING SERIAL INTERFACE (F2XX)
- ※ SETTING PRINTER (F3XX)
- ※ PARAELE OUTPUT (BCD) (F4XX)
- ※ ANALOGE OUTPUT (F5XX) (4~20 mA , 0~10 V)

CALIBRATION:

- ※ CAL Setting Minimum Division
 Setting Decimal
 Setting Maximum Capacity
 ZERO Adjust
 SPAN Adjust

KEY LOCK: Disable unimportant or useless keys.

SYSTEM PARAMETER BACKUP: BDI-2008 Prepare another copy of preset parameters.

SYSTEM PARAMETER RESTORATION: Restore preset parameters.

SYSTEM INITIALIZE: Re-install resets the BDI-2008 to the initial factory setting.

CHAPTER 2 INSTALLATION

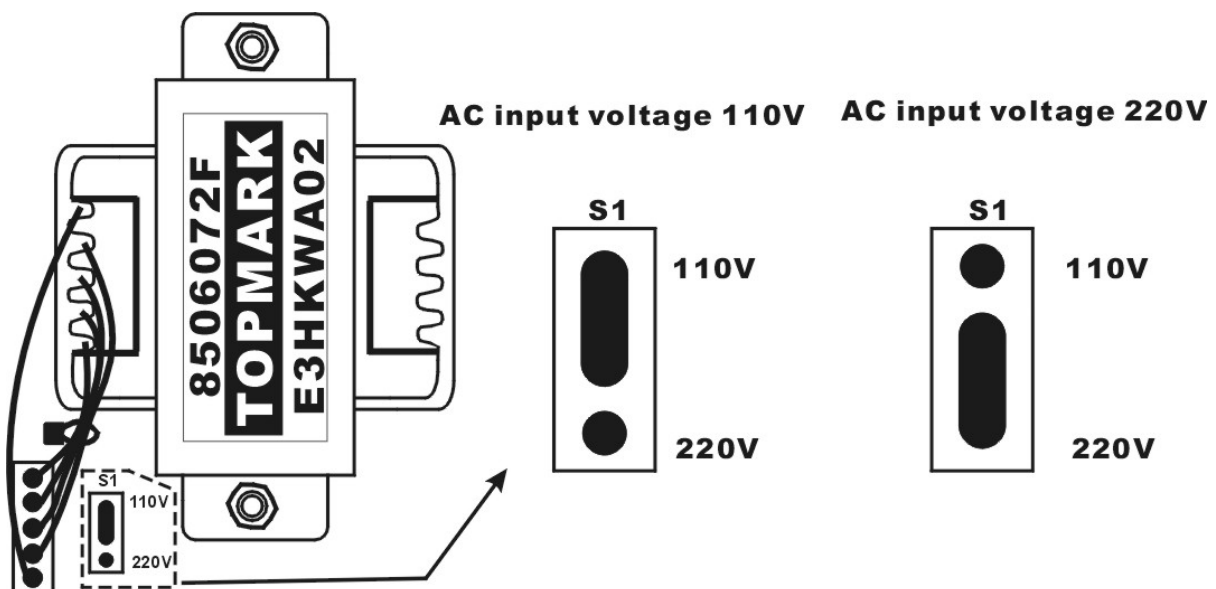
§ 2-1 Best Conditions For Use

When installing and wire connecting on **BDI-2008**, please follow the points and guide for preventing any abnormal situation occurred.


- ⊙ Before connecting the Electric Power Supply, please identify the input electric voltage type is AC 110V or AC 220V input.
- ⊙ The Grounding Wire should be properly connected .
- ⊙ The Operation Temperature shall range within 0℃ ~ 45℃ , please DO not install in any place of direct sun-light .
- ⊙ Due to the minute output signal from Load Cell, please use isolated cables. Also, separate Load Cell cable from power supply cable and control I/O cable.
- ⊙ The input power shall be AC 110V or AC 220V±10%, if the Electric Power Supply is not stable or the interference signal exists, that may cause uncertain actuation or reaction, even damages .
Therefore, please utilize Electric Power Supply Stabilizer of adequate capacity.

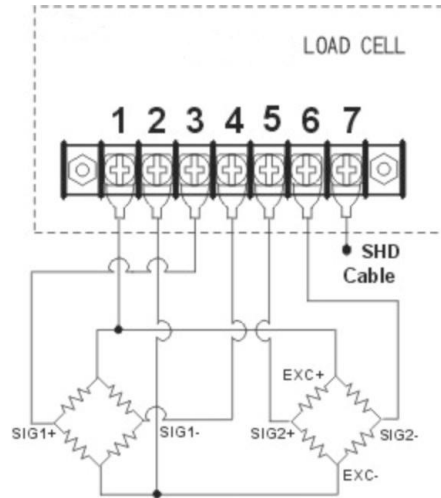
§ 2-2 Power Supply Connecting

- ⊙ Open the case, there is a jumper [S1] near the transformer, please insert a short-circuit pin to the available side.





§ 2-3 Connecting the Load Cell

 Do not plug in your power supply cable until you have completely connected the load cell.

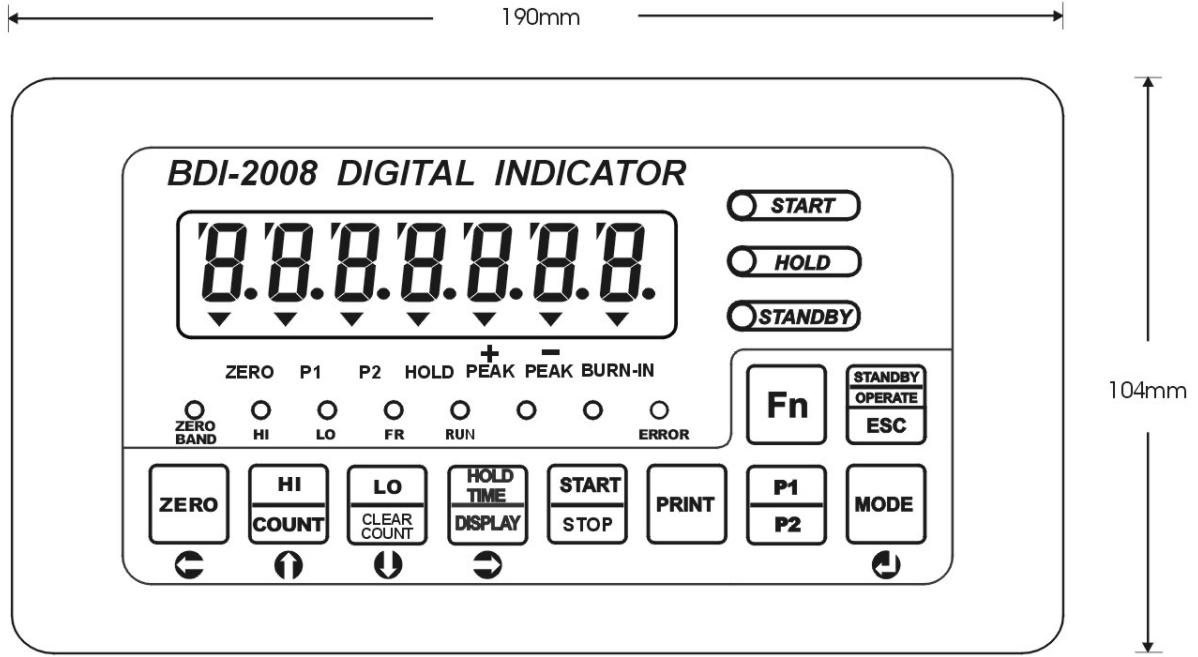


Screw	Signal
1	Positive Excitation Voltage, EXC+
2	Negative Excitation Voltage, EXC-
3	Positive Signal Voltage, SIG1+
4	Negative Signal Voltage, SIG1-
5	Positive Signal Voltage, SIG2+
6	Negative Signal Voltage, SIG2-
7	Shield, SHD

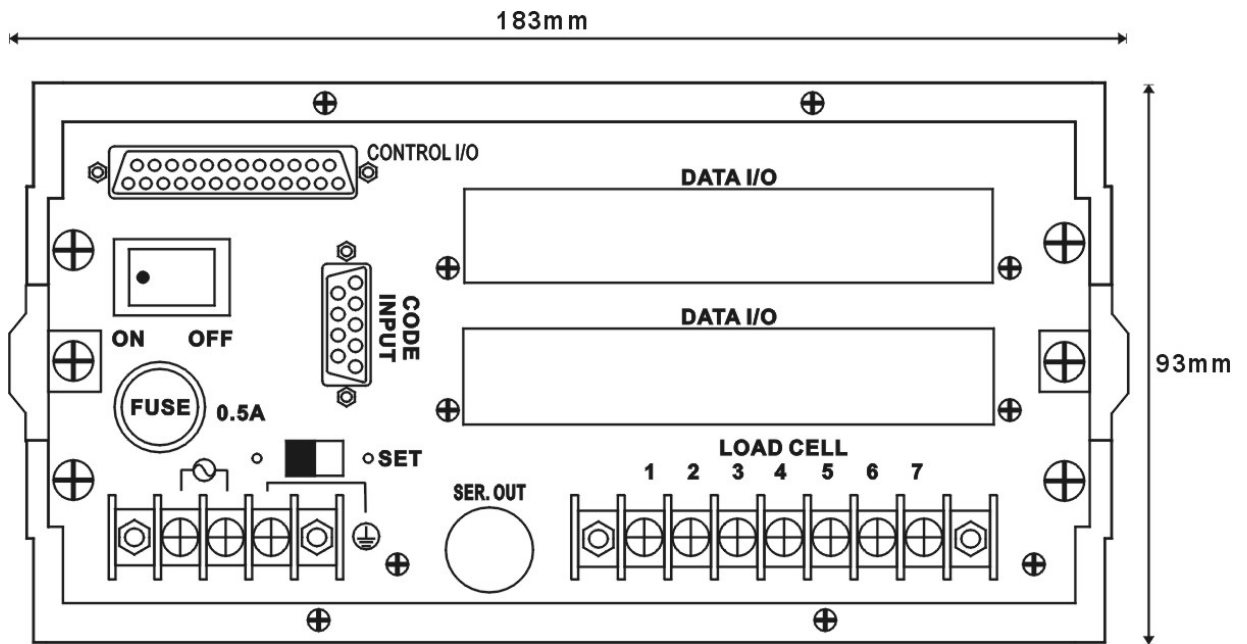
 To connect your load cell to the weighing Indicator use a six-wire cable with shield-connect the wires as indicated above. If the BDI-2008 is located near the Load Cells (Within five meters or a few yards) you may use a 4-wire cable with shield, but first connect screws 1&2 and 3&4 with independent jumper leads.

 The analogue output from the Load Cell and input/output signals are sensitive to electrical noise. Do not bind these cables together as it could result in cross-talk interface. Please also keep them away from AC power cables.

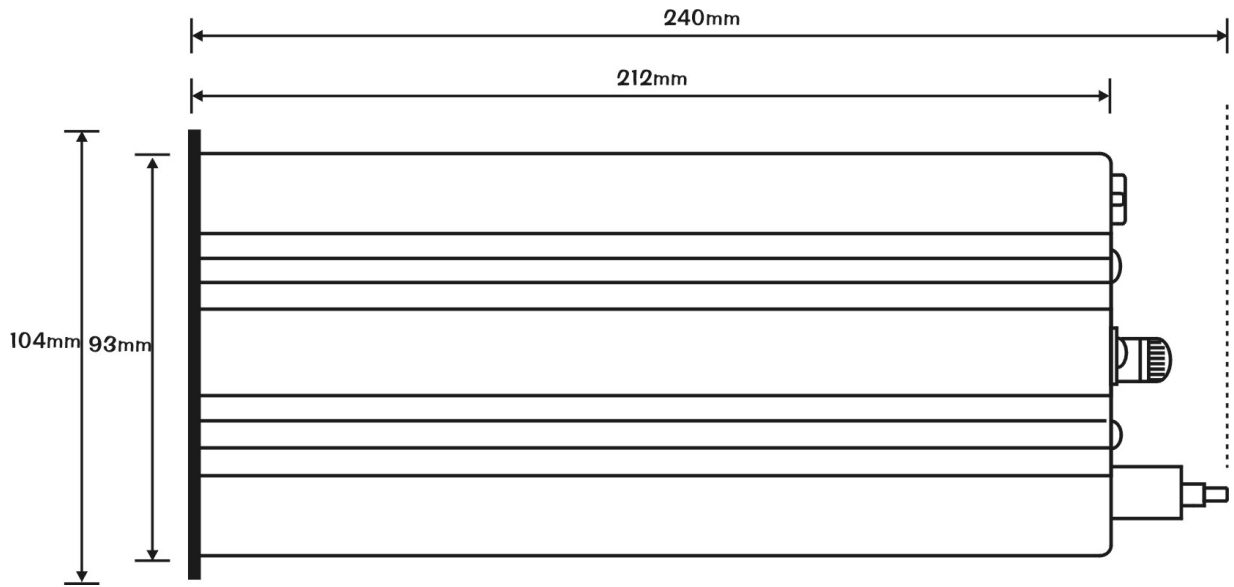
§ 2-4 Front and Rear Panel Dimensions



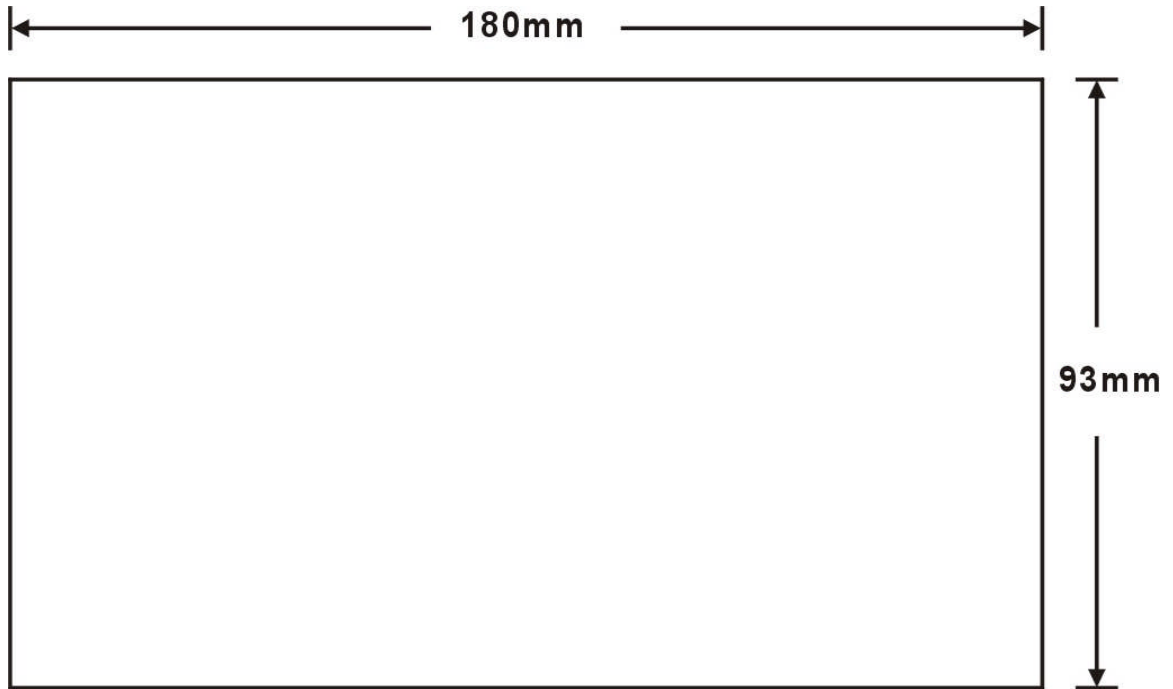
FRONT VIEW



REAR VIEW



SIDE VIEW



For Mounting

CHAPTER 3 SPECIFICATIONS

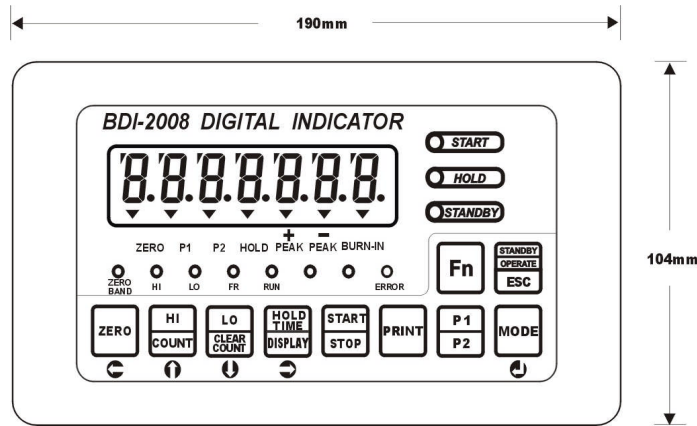
§ 3-1 Analog Input and A/D Conversion

◎ Analog Input and A/D Conversion	
Type	BDI-2008
Input Sensitivity	0.3uV/D
ZERO Adjustment Range	0mV ~ 24mV
Max. Load Cell Input Voltage	32mV
Load Cell Excitation	10V
Non-Linearity	±0.01 % F.S.
A/D Conversion Method	$\Delta \Sigma$
A/D Resolution	$\cong 1/1,000,000$
A/D Conversion Rate	Approx. 120 Times / Sec.

§ 3-2 General

◎ General	
Type	BDI-2008
Power Requirements	AC 110V or AC 220V $\pm 10\%$, 50 / 60Hz, Approx. 17VA
Net weight	Approx. 3.2 kg (7.054lb)
Operation Temperature	-10°C ~ 45°C
Maximum Humidity	85% [non-condensing]
Physical Dimensions	240 (D) ×190 (W) ×104(H) mm

§ 3-3 Front Panel Description



◎ DIGITAL SECTION		
Main Display [Green Tube]	7-segment , 7-digit display, VFD screen with a 13mm character size, displays the weight.	
Minimum Division	x1 、 x2 、 x5 、 x10 、 x20 、 x50	
Maximum Display	+500450	
Under ZERO Indicator	"—" minus sign	
"ZERO" ▼Green tube Ind.	Center of Zero	
"P 1" ▼Green tube Ind.	Sensor 1 ON	
"P 2" ▼Green tube Ind.	Sensor 2 ON	
"HOLD" ▼Green tube Ind.	Manual HOLD Mode	
" + PEAK" ▼Green tube Ind.	Hold Positive Peak	Hold both Positive & Negative Peak Value
" - PEAK" ▼Green tube Ind.	Hold Minus Peak	
" BURN-IN " ▼Green tube Ind.	Burn-in (Fatigue testing) Mode	
" START " ●LED	Ready to test	
" HOLD " ●LED	Measured value is held displayed.	
" STANDBY " ●LED	Standby Status	
"ZERO / ⌂" Key	Stable ZERO / Left shift key	
"HI/COUNT / ⬆" Key	Set Over limit / Set count value / Increase the number	
"LO/CLEAR COUNT / ⬇" Key	Set Under limit/ Clear count / Decrease the number	
"HOLD TIME/DISPLAY / ⬇" Key	Hold time/Display the value / Right shift Key	
"START/STOP" Key	Start testing / Stop testing	
"PRINT" Key	Print data will send once	
"P1/P2" Key	Shift from Sensor 1 to Sensor 2 and vise versa	
"Fn" Key	Unused	
"MODE / ⬇" Key	Change Mode / Enter Key	
"STANDBY / ESC Key	Standby Status / leave the current status	

§ 3-4 Quick Function Table

◎ WEIGHT FUNCTION TABLE		
F 000	Decimal Point Adjustment	① No Decimal ↖ 1 Decimal ✖ 2 Decimal ‡ 3 Decimal † 4 Decimal
F 001	Display Update rate	↖ 15 times/Sec ② 30 times/Sec ③ 60 times/Sec † 120 times/Sec
F 002	Digital Filter	0 ~ 5 step digital filter
F 003	Auto. ZERO track. Comp.	0 ~ 5 step digital filter
F 004	Set Zero Range	↖ ±5% ✖ ±10% ‡ ±20% † ±30% of Max. capacity
F 005	Testing Mode	▶ Last Mode ↖ Hold ✖ Hold + PEAK † Hold - PEAK † Hold + PEAK and -PEAK ● Burn-in Mode

◎ 20 mA Current Loop STANDARD		
F C00	Output data	③ Same as display ✖ Weight
F C01	Output Mode	③ Stream ✖ Manual print mode

◎ Control		
F 100	Zero Band	6 digit Zero band value (Initial "000.000")
F 101	Start/Comparator Inhibitor mode	③ Pulse Width ✖ Level
F 102	Select measuring type	③ Panel key ✖ Control I/O † OP-02

◎ SERIAL [RS-232] OP-02		
F 200	Baud Rate	↖ 1200 BPS ③ 2400 BPS † 4800 BPS † 9600 BPS
F 201	Parity	↖ Non-parity ③ Even Parity † Odd Parity
F 202	Output Data	③ Same as display ✖ Weight
F 203	Output Mode	③ Stream ✖ Manual Print Mode † Command Mode









◎ PRINTER OP-03		
F 300	Setting Date, Time	Setting Year, Month, day, hour, minute, second

◎ BCD OPTIONAL NO.-04		
F 400	Output Data	③ Same as display ✖ Weight
F 401	Output Mode	③ Stream ✖ Manual print mode
F 402	Output Logic	③ Positive Logic ✖ Negative Logic

◎ Analog Output OPTIONAL NO.-05		
F 500	Analog Output Data	① Output 4~20 mA ② Output 0~+10 V
F 501	Output Mode	③ Same as display ✖ Weight
F 502	Output current when display ZERO	0.0mA through 9.99mA (Initial 12mA)
F 503	Output current at Full Capacity	0.0mA through 9.99mA (Initial 20.0mA)
F 504	Output Volt when display ZERO	-2.5V through +59.9V (Initial 5.0 V)
F 505	Output Volt at Full Capacity	-2.5V through +59.9V (Initial 10.0 V)

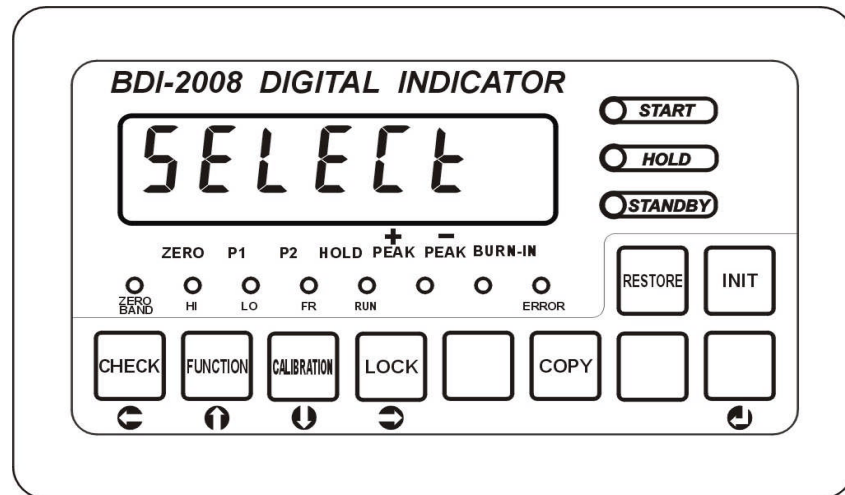
§ 3-5 Panel Key Function Table

Key Function	Function Position		Status
ZERO	Panel Key	ZERO	BDI - 2008 returns to the center of ZERO if the weight value within F004 set ZERO range.
	Control I / O	Pin 25 +(Pin 16 or 17)	
	OP-02 (Command Mode)	Z Cr Lf	
HI	Panel Key	HI/COUNT	Setting Over limit Value
	OP-02 (Command Mode)	S Cr Lf	
LO	Panel Key	LO/CLEAR COUNT	Setting Under limit Value
	OP-02 (Command Mode)	S Cr Lf	
HOLD TIME	Panel Key	HOLD TIME / DISPLAY	Setting Hold Time
COUNT	Panel Key	HI / COUNT	Setting testing count under Burn-in mode
CLEAR COUNT	Panel Key	LO/ CLEAR COUNT	Clear count value
PRINT	Panel Key	PRINT	Print testing value
	Control I / O	P21 + (Pin 16 or 17)	
DISPLAY	Panel Key	HOLD TIME /DISPLAY	In the burn-in mode, BDI-2008 shift testing value to count value or vise versa
P1/P2	Panel Key	P1/P2	Select Pressure1 (load cell sensor 1) or Pressure 2 (load cell sensor 2)
	Control I / O	P23 + (Pin 16 or 17)	
	OP-02 (Command Mode)	P1 ~ P2 Cr Lf	
START/STOP	Panel Key	START/STOP	Start or stop the current testing mode
	Control I / O	P24 + (Pin 16 or 17)	
	OP-02 (Command Mode)	B H Cr Lf, S T Cr Lf	

Key Function	Function Position		Status
MODE	Panel Key	MODE	Change testing modes (▶Last Mode ←Hold ✱Hold + PEAK ✱ Hold - PEAK ↓Hold +PEAK and -PEAK ●Burn-in Mode)
	OP-02 (Command Mode)	M1 ~ M5 Cr Lf	
STANDBY	Panel Key	STANDBY/ OPERATE/ESC	Standby Mode will Pause all operation.
OPERATE	Panel Key	STANDBY/ OPERATE/ESC	Starts operation.
ESC	Panel Key	STANDBY/ OPERATE/ESC	Escape setting
Fn	Panel Key	Fn	Unused
	Panel Key		Right shift key while setting
	Panel Key		Left shift key while setting
	Panel Key		Increase value while setting
	Panel Key		Decrease value while setting
8	Panel Key	8	Enter key while setting

※Please refer to chapter 5 on Control I/O and OP-02

CHAPTER 4 SYSTEM FUNCTIONS



§ 4-1 System Check

A system check should be run: after initial installation, after moving your BDI-2008, after connecting or disconnecting an attachment from the Rear Panel and as means of locating any unexplained system error. An occasional self-check to make sure everything is working properly is a good maintenance practice as well.

STEP 1: Turn the Power Switch OFF on the Rear Panel. Slide the **SET** switch to the set side.

STEP 2: Turn the power supply ON, the display will show blinking **SELECT**.

STEP 3: Press the **ZERO** key and the screen will show blinking **CHEC**, and press \downarrow key to start system check.

STEP 4: The system will check Green Tube and LED in sequence.


STEP 5: Check MEMORY [EEPROM 、 SRAM]

When the screen shows **SRAN**, please press \downarrow key. The screen will subsequently show a series of blinking dots [.....] indicating system checking in process. If the screen shows **PASS**, it means checking passed. If the screen shows **FAIL**, it means system error.

STEP 6: System check will go to **EEPRON 1** checking. The screen will show **EE-1**. Please press \downarrow key and the screen will subsequently show a series of blinking dots [.....] indicating system checking in process. If the screen shows **PASS**, it means checking passed. If the screen shows **FAIL**, it means system error.

STEP 7: System check will go to **EEPRON 2** checking. The screen will show **EE-2**. Please press \downarrow key and the screen will subsequently show a series of blinking dots [.....] indicating system checking in process. If the screen shows **PASS**, it means checking passed. If the screen shows **FAIL**, it means system error.

STEP 8: System check will go to **Input/Output** checking. When the screen shows **I-O**, please enter **↵** key. Subsequently, the screen will show **INPUT 0** with the 0 blinking. Please make SHORT-CIRCUIT test on 25-Pin **D** shape Code Input on the rear panel. When short-circuiting COM17 or COM16 with pin18~pin25, the short-circuit pin will light up a specific LED on the screen. If not, there suggests an error occurred.

 When short-circuiting COM17 or COM16 with pin18~pin25 , the short-circuit pin will light up a specific LED on the front panel. If two or more LED light up or turned off at the same time, there suggests an error occurred.

STEP 9: Please press the **↵** key after checking **Input/Output**. The screen will show **[]**. When press a key on the front panel, the key number will show in the middle of the screen. The lower side from left to right: **KEY 001~ KEY 008**. The upper side from left to right: **KEY 009~KEY 010**. If the key number does not match, it suggests an error occurred. Please contact us.

STEP 10: Slide the **SET** switch to the original side. Finish checking, the screen will display **END**.



Above testing if any **FAIL** or error shows on the screen, please contact us or distributors.

§ 4-2 Functions

STEP 1: Turn the Power Switch OFF on the Rear Panel, Slide the **SET** switch to the set side.

STEP 2: Turn the power supply ON, the display will show blinking **SELECT**.

STEP 3: Press **HI/COUNT** key and screen will show blinking **FUNC-P1**.

STEP 4: Please press **↑** or **↓** key to select **P1** (Load cell sensor No. 1: **P**ressure **1**) or **P2** (Load cell sensor No. 2: **P**ressure **2**). Please press the **↓** Key to select the load cell sensor.

STEP 5: Please press **↑** or **↓** key to move through the function category (F000, F200, F300, F400, or F500). Then press the **↓** Key to enter the category.

STEP 6: Use the **↑** or **↓** key to choose specific function (F000 ~ FC01, F100 ~ F102, F200 ~ 204, F300, F400 ~ F402, or F500 ~ F505).

STEP 7: In each function, please use **↑** or **↓** key to set function value. Press **↓** key to confirm. If you want to return to previous function category, please press **ESC** key.

ⓘ If any errors occurred, please check if entered value within effective range.

STEP 8: When you finished changing the Function setting, slide **SET** Switch to the original side. The screen will show **END**.

⊙ General Functions

ⓘ note : ● Indicates initial factory setting.

F000	Decimal Point Adjustment		
	0	No Decimal	1234567
	1	1 Decimal	123456.7
	2	2 Decimal	12345.67
●	3	3 Decimal	1234.567
	4	4 Decimal	123.4567

F001	Display Update Rate	
	1	15 times/Sec
●	2	30 times/Sec
	3	60 times/Sec
	4	120 times/Sec

F002 Digital Filter					
			Filter	Environmental Vibration	Response Speed
	0	No stage	Weak	Bad	Fast
	1	1 st stage			
	2	2 ^{ed} stage	▲	▲	▲
●	3	3 rd stage	▼	▼	▼
	4	4 th stage			
	5	5 th stage	Strong	Good	Slow

F003 Automatic ZERO Tracking Compensation		
●	0	OFF
	11	1 SEC 0.5 DIV
	12	1 SEC 1.0 DIV
	13	1 SEC 1.5 DIV
	14	1 SEC 2.0 DIV
	15	1 SEC 2.5 DIV
	16	1 SEC 3.0 DIV
	17	1 SEC 3.5 DIV
	18	1 SEC 4.0 DIV
	21	2 SEC 0.5 DIV
	22	2 SEC 1.0 DIV
	23	2 SEC 1.5 DIV
	24	2 SEC 2.0 DIV
	25	2 SEC 2.5 DIV
	26	2 SEC 3.0 DIV
	27	2 SEC 3.5 DIV
	28	2 SEC 4.0 DIV

F004 Set ZERO Range		
	1	±5% of weighing platform Full Capacity
	2	±10% of weighing platform Full Capacity
●	3	±20% of weighing platform Full Capacity
	4	±30% of weighing platform Full Capacity

F005 Testing Modes		
●	0	Last Mode
	1	Hold
	2	Hold positive peak
	3	Hold negative peak
	4	Hold both positive and negative positive
	5	Burn-in Mode

◎Standard 20 mA Current Loop

FC00 Output Data		
●	1	Same as display
	2	Weight

FC01	Output Mode	
●	1	Stream
	2	Manual Print Mode

◎Control

F100	Set ZERO Range	
	6 digit Zero band value (● Initial "000.000")	

F101	Start/ Comparator Inhibitor mode	
●	1	Pulse Width
	2	Level

F102	Select measuring type	
●	1	Panel key
	2	Control I/O
	3	OP-02 (Command Mode)

◎SERIAL (RS-232)

F200	Band Rate	
	1	1200BPS
☆	2	2400BPS
	3	4800BPS
	4	9600BPS

F201	Parity	
	1	Non-parity
☆	2	Even- Parity
	3	Odd- Parity

F202	Output Data	
☆	1	Same as display
	2	Weight

F203	Output Mode	
☆	1	Stream
	2	Manual Print Mode
	3	Command Mode

◎ Printer

F300	Setting Date, Time	
	YY / MM / DD	HH : MM : SS

◎ BCD

F400	Output data	
★	1	Same as display
	2	Weight

F401	Output Mode	
★	1	Stream
	2	Manual Print Mode

F402	Output Logic	
★	1	Positive Logic
	2	Negative Logic

◎ Analog Output

F 500	Analog Output Data	
★	1	Output 4~20 mA
	2	Output 0~+10 V

F501	Output data	
★	1	Same as display
	2	Weight

F 502	Output current when display ZERO	
0.0mA through 9.99mA		
●Initial 12.0mA		

F 503	Output current at Full Capacity	
0.0mA through 9.99mA		
●Initial 20.0mA		

F 504	Output Volt when display ZERO	
-2.5V through +59.9V		
●Initial 5.0 V		

F 505	Output Volt at Full Capacity	
-2.5V through +59.9V		
●Initial 10.0 V		

§ 4-3 CALIBRATION

1. Select FULL CALIBRATION :

STEP 1: Turn the Power Switch OFF on the rear panel. Slide the **SET** switch to the set side.

STEP 2: Turn the power switch ON. The screen will show blinking **SELECT**.

STEP 3: Please press **LO/CLEAR COUNT** key and a blinking **CAL** will show on the screen. Then press the \downarrow key.

STEP 4: The screen will show **F-CAL**. Please press the \downarrow key.

STEP 5: The screen will show **FCAL-P1**, Please press \uparrow or \downarrow key to select **P1** (Load cell sensor No. 1: **P**ressure **1**) or **P2** (Load cell sensor No. 2: **P**ressure **2**). Please press the \downarrow Key to select the load cell sensor.

[1] **Setting Minimum Division**

The display of **di 1** shows the smallest division. Use the \uparrow or \downarrow key to move through the available divisions. [1、2、5、10、20、50]. Press the \downarrow key to set the minimum division.

[2] **Setting Decimal** (ⓘ **F000 will change---see §4-2**)

The screen will show **dp** \rightarrow **d000.000**. A blinking decimal will show on the screen. Use the \leftarrow or \rightarrow key to move the position of the decimal **point**. Press the \downarrow key to set the decimal position.

[3] **Setting Maximum Capacity**

When setting maximum capacity, the screen will show **CAP** \rightarrow **C000.000**. Use the \uparrow or \downarrow key to set the numeric value, Use the \leftarrow or \rightarrow key to move through digits. Press the \downarrow key to finish the step.

[4] **ZERO Adjust**


The Screen will display **ZERO**. Please remove the calibration mass and objects away on the Weighing device then press \downarrow key. A display of **.....** means finishing the Adjustment.

[5] **SPAN Calibration**

The screen will show **SPAN**. Press \downarrow key and place your calibration mass on the weighing device and input its weight value. Use the \uparrow or \downarrow key to set the available value, and the \leftarrow or \rightarrow key to move through digits. Please press the \downarrow key to finish the calibration. The screen will show **.....**.

STEP 6: The screen will show **END**. Please slide the **SET** switch to the original side.

2. Select Digital Calibration

 An easy way to make calibration by inputting Load Cell's Full Scale Output voltage.

STEP 1: Turn the Power Switch OFF on the rear panel. Slide the **SET** switch to the set side.

STEP 2: Turn the power switch ON. The screen will show blinking **SELECT**.

STEP 3: Please press **LO/CLEAR COUNT** key and a blinking **CAL** will show on the screen. Then press the **↵** key.

STEP 4: The screen will show **F-CAL**. Please use the **⏪** or **⏩** to choose **d-CAL** (Digital Calibration). Then press the **↵** key.

STEP 5: The screen will show **dCAL-P1**, Please press **⏪** or **⏩** key to select **P1** (Load cell sensor No. 1: **P**ressure **1**) or **P2** (Load cell sensor No. 2: **P**ressure **2**). Please press the **↵** Key to select the load cell sensor.

[1] **Setting Minimum Division**

The display of **di 1** shows the smallest division. Use the **⏪** or **⏩** key to move through the available divisions. [1 、 2 、 5 、 10 、 20 、 50] . Press the **↵** key to set the minimum division.

[2] **Setting Decimal** (**ⓘ F000 will change---see §4-2**)

The screen will show **dp → d000.000**. A blinking decimal will show on the screen. Use the **⏪** or **⏩** key to move the position of the decimal **point**. Press the **↵** key to set the decimal position.

[3] **Setting Maximum Capacity**

When setting maximum capacity, the screen will show **CAP → C000.000**. Use the **⏪** or **⏩** key to set the numeric value, Use the **⏪** or **⏩** key to move through digits. Press the **↵** to finish the step.

[4] **Setting Maximum Full Scale Output Voltage of the Load Cell Sensor**

When setting full scale output voltage of the load cell sensor, the screen will show **LC-CAP → L000.000**. Please use the **⏪** or **⏩** key to move through digits and the **⏪** or **⏩** key to set the numeric value. Press the **↵** to finish the step.

[5] **ZERO Adjust**

The Screen will display **ZERO**. Please remove the calibration mass and objects away on the Weighing device then press **↵** key. A display of **.....** means finishing the Adjustment.

[6] **d-SPAN Calibration**

The screen will show **d-SPAN**. Press **↵** key and place your calibration mass on the weighing device and input its weight value. Use the **⏪** or **⏩** key and the **⏪** or **⏩** key to enter Load Cell Output Volt. Please press the **↵** key to finish d-SPAN. The screen will show **.....**.

STEP 6: The screen will show **END**. Slide the **SET** switch to the original side.

※An example of selecting **FULL CALIBRATION (P1, Div 2, 3 decimal, Max cap.20)**

Key	Screen will display
Turn the Power Switch OFF	
Slide Set switch to the set side	
Turn the power ON	Blinking SECECT
Press LO/CLEAR COUNT	Blinking CAL
Press \downarrow key	Blinking F-CAL
Press \downarrow key	Blinking FCAL-P1
Press \downarrow key	di 01 (Blinking at 01)
Press \uparrow key	di 02 (Blinking at 02)
Press \downarrow key	dp \rightarrow d000.000 (Blinking at the Decimal Point ---- F000 will subject to change if \leftarrow or \rightarrow key been pressed)
Press \downarrow key	CAP \rightarrow C010.000 (Blinking at the latest decimal)
Press \leftarrow key 4 times	010.000 (Blinking at 1)
Press \uparrow key	020.000 (Blinking at 2)
Press \downarrow key	ZERO
Press \downarrow key \rightarrow SPAN
Press \downarrow key	000.000 (Blinking at the latest decimal)
Place 1kg Calibration Mass, press \leftarrow key 3 times, press \uparrow key	001.000 (Twinkle at 1)
Press \downarrow key \rightarrow End

§ 4-4 PANEL KEY DISABLE

Disable unimportant or unused keys.

STEP 1: Turn the Power Switch OFF on the rear panel. Slide the **SET** switch to the set side.

STEP 2: Turn the power switch ON. The screen will show blinking **SELECT**.

STEP 3: Please press **HOLD TIME/DISPLAY** key and a blinking **LOC** will show on the screen. After enter \downarrow key, a [] will show on the screen.


Please press the key you wish to disable. The screen will show the key's number. BDI-2008 will inquire if you want to lock or unlock the key:

[00] **u or L** (Key number [00] : Unlock or Lock the key).

STEP 4: Use the \uparrow or \downarrow key to choose lock or unlock the key and press \downarrow key for confirmation.

STEP 5: Slide the **SET** switch to the original side for finishing the step.

§ 4-5 COPY SYSTEM PARAMETERS

 A backup can be stored to prevent data loss.

⊗ System Parameter: includes functions FXXX, Calibration parameters, disable keys.

STEP 1: Turn the Power Switch OFF on the rear panel. Slide the **SET** switch to the set side.


STEP 2: Turn the power switch ON. The screen will show blinking **SELECT**.

STEP 3: Please press **PRINT** key and a blinking **COPY** will show on the screen. Please enter **↵** key.

STEP 4: Use the **↑** or **↓** key to choose **NO** or **YES**. If **NO** is entered, the screen will show **END**. If **YES** is entered, the screen will show **.....** → **END**.

STEP 5: Slide the **SET** switch to the original side for finishing the step.

§ 4-6 RESTORE SYSTEM PARAMETERS

 Restoration can be used when system failed or human operation error happens.

⊗ System Parameter: includes functions FXXX, Calibration parameters, disable keys.

STEP 1: Turn the Power Switch OFF on the rear panel. Slide the **SET** switch to the set side.


STEP 2: Turn the power switch ON. The screen will show blinking **SELECT**.

STEP 3: Please press **Fn** key and a blinking **RESTORE** will show on the screen. Please enter **↵** key.

STEP 4: Use the **↑** or **↓** key to choose **NO** or **YES**. If **NO** is entered, the screen will show **END**. If **YES** is entered, the screen will show **.....** → **END**.

STEP 5: Slide the **SET** switch to the original side for finishing the step.

§ 4-7 SYSTEM INITIALIZATION

 Re-install resets the BDI-2008 to the initial factory settings. Use Re-install only if you want to return Function, Set Point or Calibration to their initial settings.

STEP 1: Turn the Power Switch OFF on the Rear Panel, and slide **SET** switch to the set side.

STEP 2: Turn the power switch ON. The screen will show blinking **SELECT**.

STEP 3: Please press **ESC** key and a blinking **INIT** will show on the

screen. Please enter **↵** key.

STEP 4: Use the **⏪** or **⏩** key to choose **NO** or **YES** . If **NO** is entered, the screen will show **END**. If **YES** is entered, the screen will show **.....** → **END** .

STEP 5: Slide the **SET** switch to the original side for finishing the step.

◎ Calibration Errors

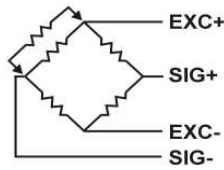
C. Err 1 : The resolution exceeds 1 : 10,000.

⇒ Change the minimum division and maximum capacity within 1 / 10,000.

Resolution ratio= Minimum division / maximum capacity

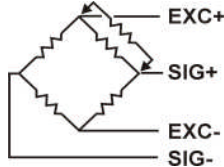
C. Err 2 : The load cell output is too large at ZERO calibration.

⇒ Add an additional resistor(50kΩ ~ 500KΩ) between EXC+ and SIG—.



C. Err 3 : The load cell output is too small at ZERO calibration.

⇒ Add an additional resistor(50kΩ ~ 500KΩ) between EXC+ and SIG+.



C. Err 4 : The calibration mass has been mistakenly entered as a value greater than the maximum capacity.

⇒ Please reduce the weight of calibration mass, and re-enter the weight value.

C. Err 5: The calibration mass has been wrongly entered zero or it is smaller than the minimum capacity.

⇒ Please increase the weight of calibration mass, and re-enter the weight value.

C. Err 6: The load cell output is too low.

⇒ Replace your load cell with a more sensitive one or adjust the minimum division.

C. Err 7: The load cell signal pins are reversed, or the load cell output voltage is too low.

⇒ Check the load cell connections if reversed or load cell failure.

C. Err 8: The load cell output voltage at maximum capacity is too high.

⇒ Check the load cell specification or load cell failure.

C. Err 9: The maximum, capacity has been wrongly entered as a value smaller than 300.

⇒ Check Resolution Table.

C. Err 10: The maximum, capacity has been wrongly entered as a value greater than 750,000.

⇒ Check the load cell specification or load cell failure.

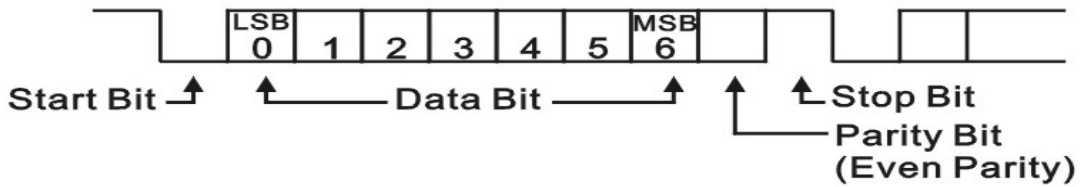
◎Display Resolution Table

Maximum Capacity	Resolution					
	1 Min. Div.	2 Min. Div.	5 Min. Div.	10 Min. Div.	20 Min. Div.	50 Min. Div.
300	1 / 300	-----	-----	-----	-----	-----
400	1 / 400	-----	-----	-----	-----	-----
500	1 / 500	-----	-----	-----	-----	-----
600	1 / 600	1 / 300	-----	-----	-----	-----
800	1 / 800	1 / 400	-----	-----	-----	-----
1,000	1 / 1000	1 / 500	-----	-----	-----	-----
1,200	1 / 1200	1 / 600	-----	-----	-----	-----
1,500	1 / 1500	1 / 800	1 / 300	-----	-----	-----
2,000	1 / 2000	1 / 1000	1 / 400	-----	-----	-----
2,500	1 / 2500	1 / 1200	1 / 500	-----	-----	-----
3,000	1 / 3000	1 / 1500	1 / 600	1 / 300	-----	-----
4,000	1 / 4000	1 / 2000	1 / 800	1 / 400	-----	-----
5,000	1 / 5000	1 / 2500	1 / 1000	1 / 500	-----	-----
6,000	1 / 6000	1 / 3000	1 / 1200	1 / 600	1 / 300	-----
8,000	1 / 8000	1 / 4000	1 / 1500	1 / 800	1 / 400	-----
10,000	1 / 10000	1 / 5000	1 / 2000	1 / 1000	1 / 500	-----
12,000	-----	1 / 6000	1 / 2500	1 / 1200	1 / 600	-----
15,000	-----	1 / 8000	1 / 3000	1 / 1500	1 / 800	1 / 300
20,000	-----	1 / 10000	1 / 4000	1 / 2000	1 / 1000	1 / 400
25,000	-----	-----	1 / 5000	1 / 2500	1 / 1200	1 / 500
30,000	-----	-----	1 / 6000	1 / 3000	1 / 1500	1 / 600
40,000	-----	-----	1 / 8000	1 / 4000	1 / 2000	1 / 800
50,000	-----	-----	1 / 10000	1 / 5000	1 / 2500	1 / 1000
60,000	-----	-----	-----	1 / 6000	1 / 3000	1 / 1200
80,000	-----	-----	-----	1 / 8000	1 / 4000	1 / 1500
100,000	-----	-----	-----	1 / 10000	1 / 5000	1 / 2000
120,000	-----	-----	-----	-----	1 / 6000	1 / 2500
150,000	-----	-----	-----	-----	1 / 8000	1 / 3000
200,000	-----	-----	-----	-----	1 / 10000	1 / 4000
250,000	-----	-----	-----	-----	-----	1 / 5000
300,000	-----	-----	-----	-----	-----	1 / 6000
400,000	-----	-----	-----	-----	-----	1 / 8000
500,000	-----	-----	-----	-----	-----	1 / 10000
600,000	-----	-----	-----	-----	-----	-----
700,000	-----	-----	-----	-----	-----	-----
750,000	-----	-----	-----	-----	-----	-----

§ 4-8 20mA Current Loop

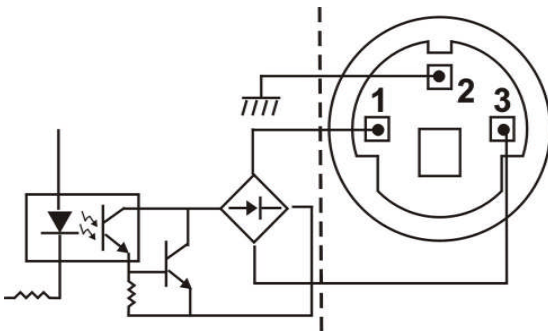
20 mA Current Loop Specifications

1. Baud Rate : 1200 bps
2. Data bit : 7 bit
3. Parity : Even Parity
4. Stop bit : 1 bit
5. Output Code : ASCII



CURRENT LOOP	
1	20 mA
0	0 mA

Pin Assignment



- Pin 1** : Serial Output
- Pin 2** : Frame Ground
- Pin 3** : Serial Output

**Output has no polarity = bi-directional.

Output Data



P	1	,	W	T	,	+	1	2	3	.	4	5	0	Cr	Lf
≤Header 1			≤Header 2			≤Value (8 Digit)									

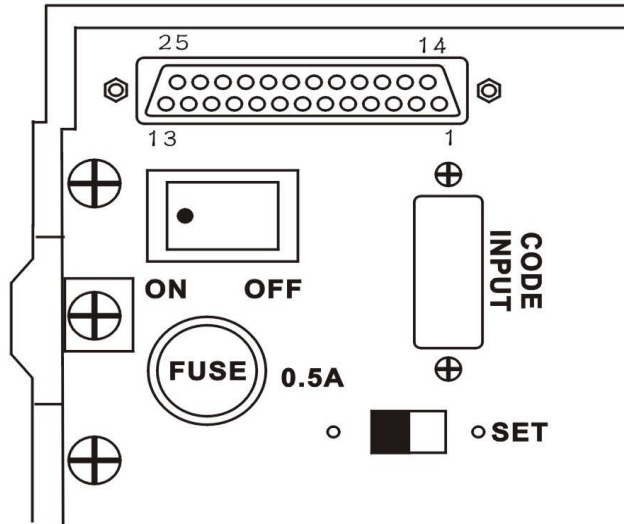
※HEADER 1	
P1	' Select Pressure 1 (Load Cell)
P2	' Select Pressure 2 (Load Cell)

※HEADER 2		
O	L	' Over or Lower than maximum capacity
W	T	' Value (Weight, Pressure, etc.)
H	D	' Value Held

CHAPTER 5 OPTIONS

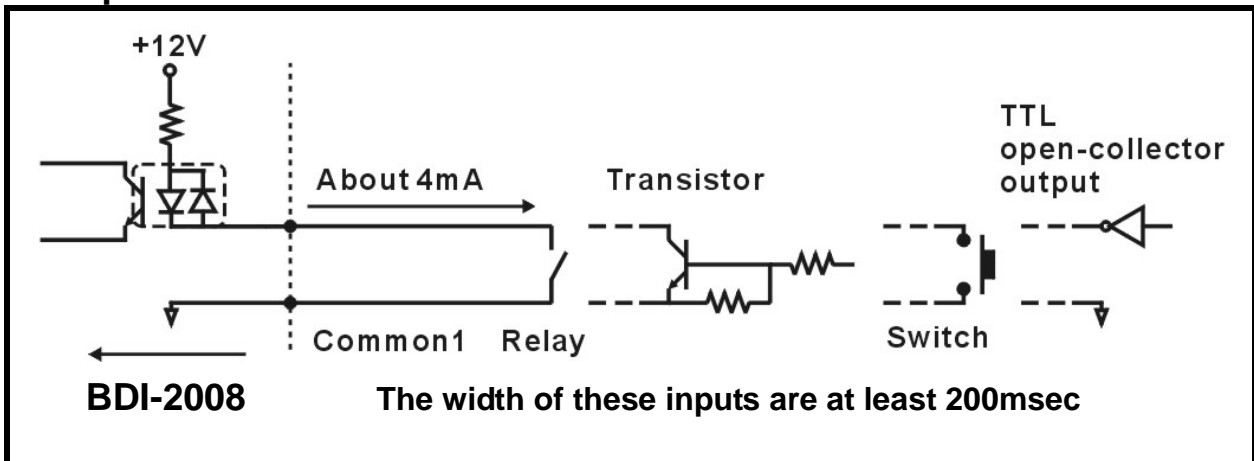
§ 5-1 I/O INTERFACE

-  **HI"Over Limit**
 Testing weight > Over Limit Value
-  **LO"Under Limit**
 Testing weight < Under Limit Value

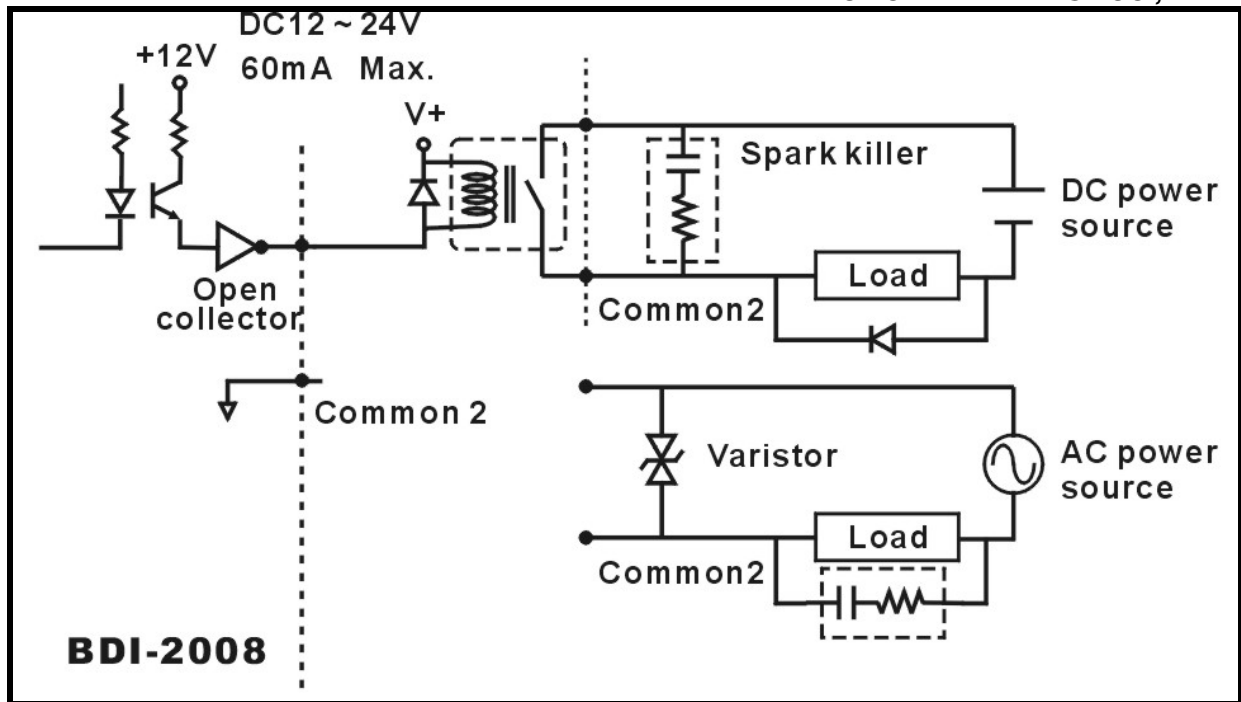


◎ Control I / O

Input



Output



© Input

Screw	Screw Name	Signal	Description
Pin25	ZERO Input	Pulse	BDI-2008 returns to the center of ZERO when F004 within set ZERO range
Pin24	START / STOP	F101=1 Pulse F101=2 Level	START / STOP the current testing mode
Pin23	Select P1 / P2	Level	F102=2 P1 ON or P2 OFF
Pin22	"N" unused		
Pin21	PRINT	Pulse	Print Data
Pin20	Unused		
Pin19	Unused		
Pin18	Unused		
Pin17、16	Command Input (COM1)		

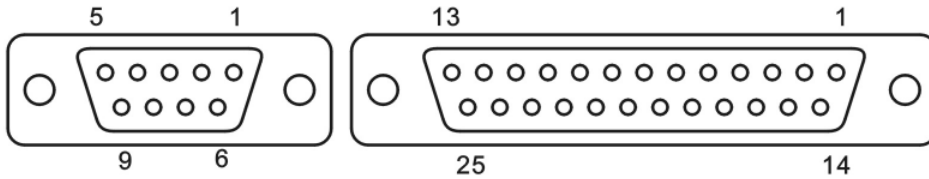
© Output

Screw	Screw Name	Signal
Pin13	ZERO Band	±ZERO Band Testing Value < ZERO Band
Pin12	HI	Testing Value > Over Limit ON
Pin11	LO	Testing Value < Under Limit ON
Pin10	FR	When the testing value exceeds both HI and LO for one time, Output signal will reverse.
Pin9	RUN	When start testing mode , Output ON When stop testing mode , Output OFF
Pin8	Unused	
Pin7	Unused	
Pin6	ERROR	Error will show on the screen when ✖ maximum ±testing value out of range, ✖ set ZERO range ineffective, or ✖ printer error.
Pin3 、 4	Output 12V	
Pin1 、 2	Output Common	

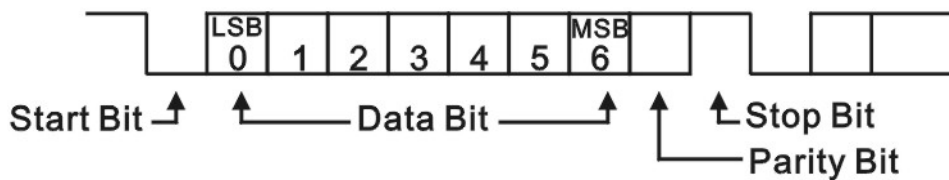
§ 5-2 SERIAL OUTPUT

◎ RS-232		OP-02
F200	Baud Rate	↖ 1200BPS ⇄ 2400BPS ↗ 4800BPS ↓ 9600BPS
F201	Setting Parity	↖ Non-parity ⇄ Even-parity ↗ Odd-parity
F202	Output Data	Ⓢ Same as Display ✖ Weight
F203	Output mode	Ⓢ Stream ✖ Manual Print Mode ↗ Command Print Mode

◎OP-02

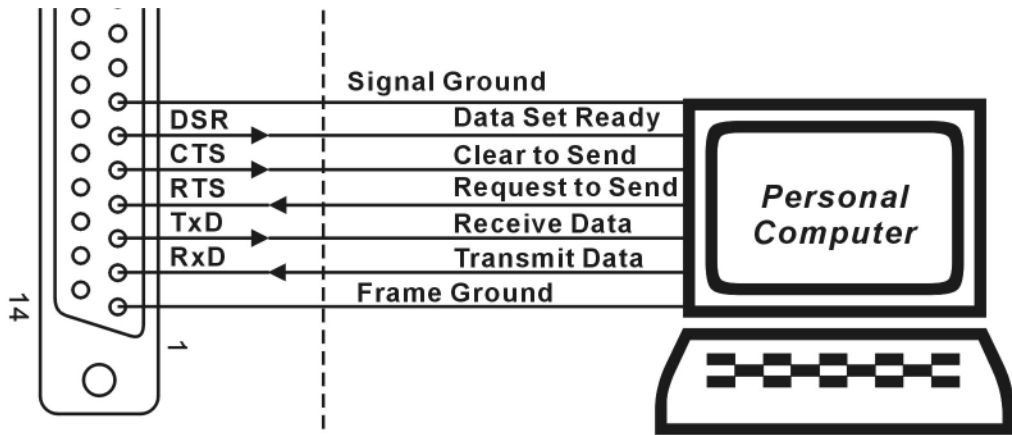


Specifications	
Type	EIA-RS-232C 12V
Transmission	Half Duplex, Asynchronous Transmission
Baud Rate	1200BPS · 2400BPS · 4800BPS · 9600BPS
Bit	8 bit non- parity
Parity	7 bit even parity, odd parity
Stop Bit	1 bit
Output Code	ASC II

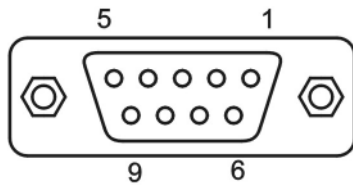


◆ I/O Specifications

① 25 Pin D- Shape



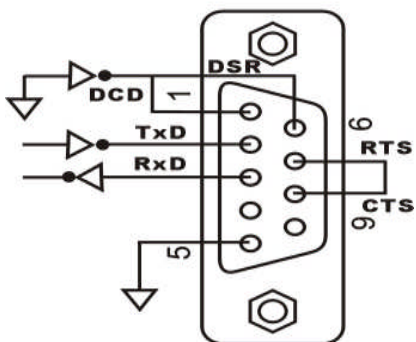
② 9 Pin D- Shape



Pin 2 TxD (Transmit Data)
Pin 5 SG (Signal Ground)

◆ Serial Interface [OP-02] Data Format.

◎ OP-02A1



Pin 2 Tx D
Pin 3 R x D
Pin 5 Signal Ground

Serial Interface [OP-02] Data Format Output Data

P	1	,	W	T	,	+	1	2	3	.	4	5	0	Cr	Lf
---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

≤Header 1 ≤ Header 2 ≤ Value (8 Digit)

✖️ HEADER 1	
P1	<input type="checkbox"/> Select Pressure 1 (Load Cell)
P2	<input type="checkbox"/> Select Pressure 2 (Load Cell)

✂️ HEADER 2		
O	L	<input type="checkbox"/> Over or lower than maximum capacity
W	T	<input type="checkbox"/> Value (Weight, Pressure, etc.)
H	D	<input type="checkbox"/> Value Held

Data in ASCII shows as follows:

“ 0 ”	~	“ 9 ”	
“ ”			Space (20H)
“ . ”			Decimal Point (2EH)
“ - ”			Minus (2DH)
“ + ”			Plus (2BH)

✂️ Command List Table

Sending Command to BDI-2008	BDI-2008 response
R Cr Lf < READ WEIGHT >	Sending latest data once (Data format depends on F202)
Z Cr Lf < ZERO >	BDI-2008 display will ZERO. Z Cr Lf will be sent by BDI-2008.
BH Cr Lf < Begin Hold >	BDI-2008 begins testing mode. BH Cr Lf will be sent by BDI-2008. If BH Cr Lf was sent by BDI-2008, testing will begin.
ST Cr Lf < STOP testing >	BDI-2008 stops testing mode. ST Cr Lf will be sent by BDI-2008.
P1 Cr Lf < Select Pressure 1 >	BDI-2008 will receive signal from pressure 1. P1 Cr Lf will be sent by BDI-2008.
P2 Cr Lf < Select Pressure 2 >	BDI-2008 will receive signal from pressure 2. P2 Cr Lf will be sent by BDI-2008.
RC Cr Lf (Read the current condition)	BDI-2008 responses to the current testing mode in processing, start the current testing, or in stop condition.
RA Cr Lf (Read Accessories)	BDI-2008 sends back ZERO Band data.
SA Cr Lf (Set Zero Band)	Signal “SA Cr Lf” will send back by BDI-2008. BDI-2008 will wait the host’s ZERO band values and sends it back.
RS Cr Lf (Read over and under limit values)	“Over and under limit values” will send back by BDI-2008
S Cr Lf (Setting over and under limit values)	Signal “S Cr Lf” will send back by BDI-2008. BDI-2008 will wait the host’s values and sends it back.
M1 (Testing Mode 1)	BDI-2008 sets at testing mode 1. Signal “M1” will send back by BDI-2008.
M2	BDI-2008 sets at testing mode 2. Signal “M2” will send back

(Testing Mode 2)	by BDI-2008.
M3 (Testing Mode 3)	BDI-2008 sets at testing mode 3. Signal "M3" will send back by BDI-2008.
M4 (Testing Mode 4)	BDI-2008 sets at testing mode 4. Signal "M4" will send back by BDI-2008.
M5 (Testing Mode 5)	BDI-2008 sets at testing mode 5. Signal "M5" will send back by BDI-2008.

※Invalid Command or Invalid data received → Cr Lf

※Command incomplete → I Cr Lf

※Command Format **SA Cr Lf** , **RA Cr Lf**

0	0	3	4	5	6	Cr	Lf
---	---	---	---	---	---	----	----

ZERO Band setting value

※Command Format **RS Cr Lf** , **S Cr Lf**

+	0	0	0	0	0	0	,	-	0	0	0	0	0	0	0	Cr	Lf
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

※Command Format **RC Cr Lf**

P	n	,	M	n	,	B	H	Cr	Lf
---	---	---	---	---	---	---	---	----	----

□1、2

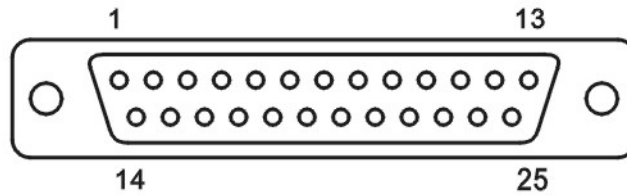
□1~5

S

T

§ 5-3 **PRINTER INTERFACE (INCLUDING DATE AND TIME)**

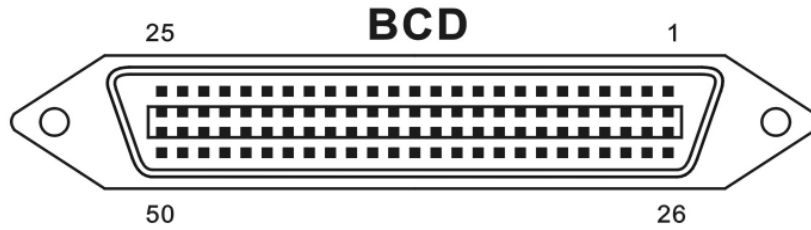
©PRINTER		OP-03
F 300	Setting Date, Time	Setting Year, Month, day, hour, minute, second

◆ **PIN ASSIGNMENTS:**

PIN	PIN NAME	PIN	PIN NAME
1	/STROBE	14	NC
2	DATA1	15	/ERROR
3	DATA2	16	/INIT
4	DATA3	17	NC
5	DATA4	18	NC
6	DATA5	19	NC
7	DATA6	20	GROUND
8	DATA7	21	GROUND
9	DATA8	22	GROUND
10	/ACKNLG	23	GROUND
11	NC	24	GROUND
12	NC	25	GROUND
13	NC		

§ 5-4 PARALLEL BCD INTERFACE

◎ BCD		OP-04
F 400	Data type	☑ Same as display ✖ Gross data ✚ NET data † TARE data
F 401	Output Mode	☑ Stream ✖ Stable and print ✚ Manual print mode † Accumulate and print
F 402	Output Logic	☑ Positive Logic ✖ Negative Logic



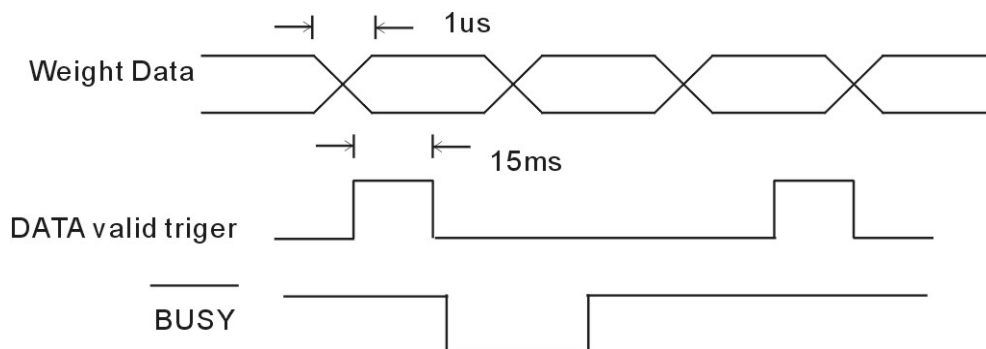
Pin	Pin Name	Pin	Pin Name
1	GROUND	26	NC
2	1x1	27	Hi=NET , Lo=GROSS
3	2x1	28	NC
4	4x1	29	NC
5	8x1	30	NC
6	1x10	31	NC
7	2x10	32	NC
8	4x10	33	Lo=MOTION
9	8x10	34	1x1 CODE
10	1x100	35	2x1 "
11	2x100	36	4x1 "
12	4x100	37	8x1 "
13	8x100	38	1x10 "
14	1x1000	39	2x10 "
15	2x1000	40	4x10 "
16	4x1000	41	8x10 "
17	8x1000	42	Lo=Negative Polarity
18	1x10000	43	/ Decimal Point 1
19	2x10000	44	/ Decimal Point 2
20	4x10000	45	/ Decimal Point 3
21	8x10000	46	/ Decimal Point 4
22	1x100000	47	Hi=Overload
23	2x100000	48	NC
24	4x100000	49	PRN 1
25	8x100000	50	/ Busy (input)

※OPEN COLLECTOR TYPE

☑ Maximum Voltage : 30V

☑ Maximum Current : 24mA

※Please add a pull-up resistance if connected to a TTL LOGIC.





§ 5-5 ANALOG OUTPUT

⊙ Analog Output		
F 500	Analog Output Data	① Output 4~20 mA ② Output 0~+10 V
F 501	Output data	Ⓢ Same as display ✖ Weight
F 502	Output current when display ZERO	0.0mA through 9.99mA (Initial 12.0mA)
F 504	Output current at Full Capacity	0.0mA through 9.99mA (Initial 20.0mA)
F 505	Output Volt when display ZERO	-2.5V through +59.9V (Initial 05.0 V)
F 506	Output Volt at Full Capacity	-2.5V through +59.9V (Initial 10.0 V)

OP-5 OUTPUT 4 ~ 20 mA Specifications

Output Level	4~20 mA effective range. Output range is approximately 2 to 22 mA
Resolution	More than 1 / 1000
Temperature Coefficient	$\pm(0.015 \% / ^\circ\text{C} \text{ of rdg} + 0.01\text{mA}) / ^\circ\text{C}$
Maximum resistance	500 Ω Maximum

 If you add a 250 Ω resistor, the output will be 1V to 5V (4~20mA)

 This resistor must be large enough for proper power consumption.

Use the following formula: $W = I^2 \times R$ where

W: Power

I: Output Current

R: Resistor

For example: If a 500 Ω resistor is used, power consumption will be :

$$W = (0.02)^2 \times 500 = 0.2 \text{ when the Output Current is set to 0.2mA}$$

The resistor should have a power greater than "0.5" ($w = 0.5$) and have a very low temperature coefficient. In this example power consumption is "0.2" and thus, the 500 Ω resistor is adequate.

 Setting Output Current

$$I_{\text{OUT}} = I_z + (\text{weight} / \text{capacity}) * (I_M - I_z) \quad (\text{if } 2 \leq I_{\text{OUT}} \leq 22 \text{ mA})$$

I_{OUT} : Output Current

I_z : Output at ZERO (F501)

I_M : Output at Maximum Capacity (F502)

For example: A weighing system has a Maximum Capacity of 10,000kg. If you want the Output current to be 4mA at ZERO display, and 20mA at 1/2 Maximum Capacity then:

$$I_M = \text{capacity} / \text{simulated} \times (I_{\text{OUT}} - I_z) + I_z$$

$$I_M = 10000 / 5000 \times (20 \text{ mA} - 4 \text{ mA}) + 4 \text{ mA} = 36 \text{ mA}$$


When Output at Full Scale is set at 36mA, and Output Current at Display


ZERO is set at 4mA, then at 1/2 Capacity (5000kg) the Output Current will be 20mA.

NOTE: The Maximum Output will be saturated at 22mA.

OP-6 ANALOG OUTPUT 0~10V

Output Level	0~+10 V effective range. Output range is approximately -1.25~11.25 V
Resolution	More than 1 / 1000
Temperature Coefficient	$\pm(0.015 \% / ^\circ\text{C}$ of rdg + 0.01mA) / $^\circ\text{C}$
Minimum resistance	5 K Ω Minimum

 If you add a 10 K Ω resistor , the output will be 0mA to 1mA (0~10 V)

 This resistor must be large enough for proper power consumption.

Use the following formula:

$$W = V^2 / R \quad \text{where}$$

W: Power

V: Output Voltage

R: Resistor

 Setting Output Voltage

$$V_{\text{OUT}} = V_z + (\text{weight} / \text{capacity}) * (V_M - V_z) \quad (\text{if } 0 \leq V_{\text{OUT}} \leq 10 \text{ V})$$

V_{OUT} : Output Voltage

V_z : Output at ZERO (F505)

V_M : Output at Maximum Capacity (F506)

NOTE: The Maximum Output will be saturated at 11.25.