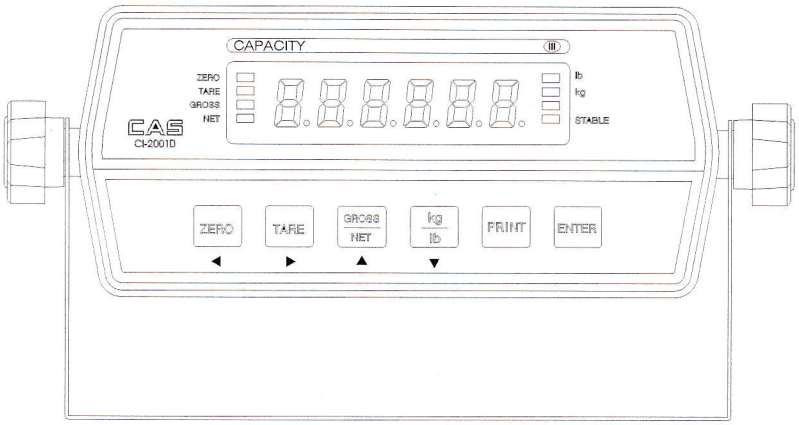
DIGITAL LOAD CELL INDICATOR

MODEL CI-2001D

OPERATION MANUAL



CAS CORPORATION

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1. Technical Specification

■ Analog Part

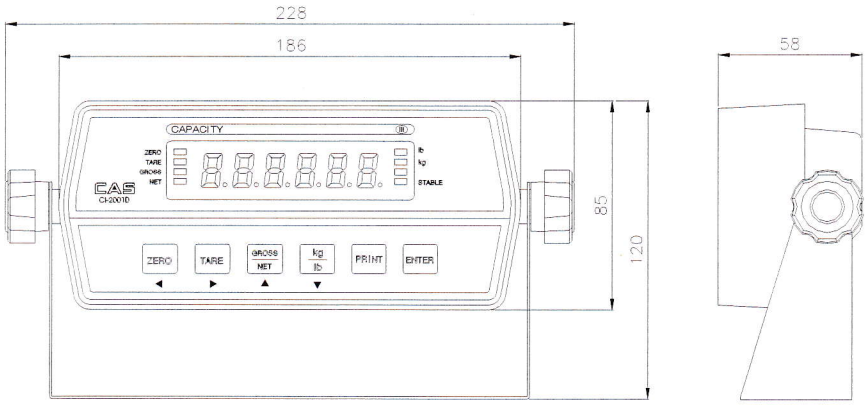
Load Cell Excitation Voltage (Standard)	12VDC 1A, Up to 8 digital load cells
Display divisions	(1) NTEP,OIML:10,000dd (2) Non NTEP,OIML:900,000dd
Update rate	10 times/sec

■ Digital Part

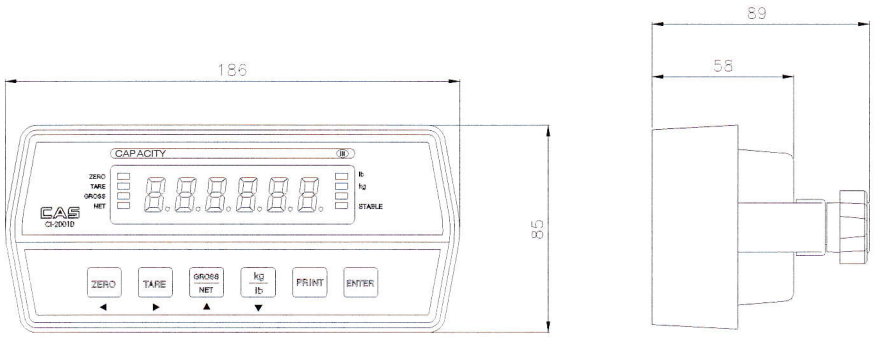
Display	6 Digit Red LED (14 mm)
Display below zero	"-" minus signal
Additional Symbols	Zero, Tare, Gross, Net, Stable, lb, kg
AC Adapter	120VAC (Output : DC 12V, 1.5A)
Power Consumption	10 W
Operating Temperature	-10℃ to + 40℃
Overall Dimensions	85mm x 186mm x 58mm
Weight	0.5 kg
Serial Interface	RS-232C (Serial Printer, PC, Remote Display)

■ Dimensions

■ CI-2001D Wall Mount Type

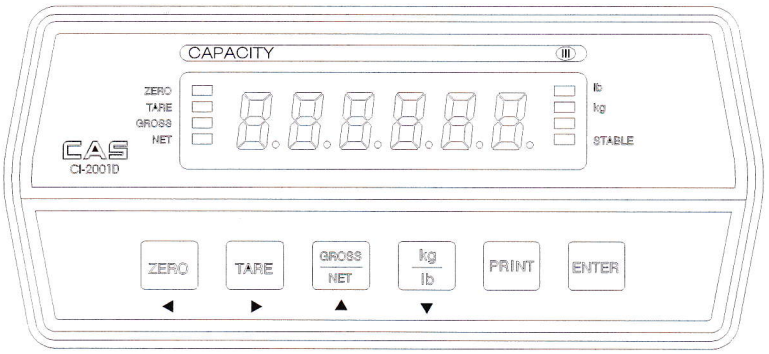


■ CI-2001D(P) Wall Mount Type (Cut Out Size : 166mm x 76mm)



2. Description Front & Rear Panel

■ Front Panel



(1) Display lamp (■)

□ lb lamp : ON when the weight unit is pound [lb]

□ kg lamp : ON when the weight unit is kilogram [kg]

□ STABLE lamp : ON when the weight is stable.

□ GROSS lamp : ON when the current weight is GROSS weight.

□ NET lamp : ON when the current weight is NET weight.

□ TARE lamp : ON when the tare weight is stored.

□ ZERO lamp : ON when the current weight is 0 lb.

(2) Keyboard

□ ▲, ◀Key : Available keys instead of numeric keys.

- ▲ : Change the set value. Increase the first place value to 1
- ◀ : To move the selected digit to the left. Move to the left by 1 place
- USAGE : Input the numeral value in TEST, CAL, SET mode.

□ ZERO Key : Return the display to 0.

□ TARE Key : Use container in weighing.

- Current weight is memorized as tare weight.
- If you press TARE key in unload condition, Tare setting is released.

□ GROSS/NET Key : Display gross and net weight by turn.

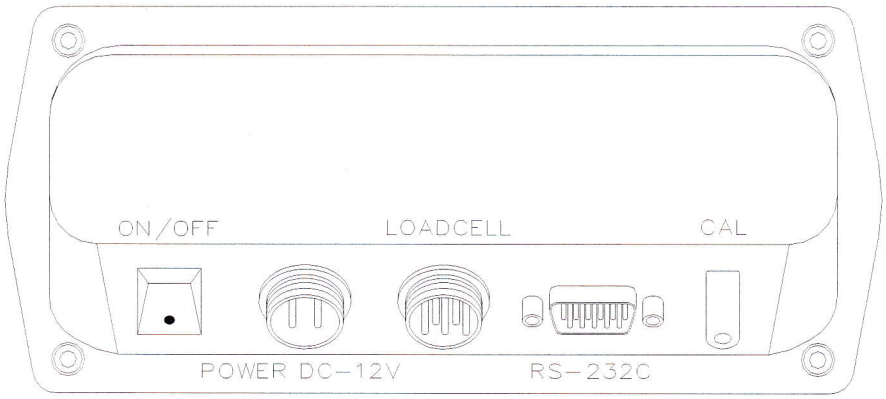
- GROSS lamp on - Display gross weight
- NET lamp on - Display net weight

□ kg/lb Key : Toggles between lb and kg units.

□ PRINT Key : PRINT Key

□ ENTER Key : In CALIBRATION, TEST, SET mode store current condition and exit.

■ Rear Panel



□ ON/OFF : Power ON/OFF switch.

□ DC ADAPTOR : Port for DC power. (DC 12V adaptor is available)

□ LOADCELL : Port(RS-485) for connecting digital load cells using ALCP protocol.

□ RS-232C PORT : Serial interface port. (Computer, printer)

□ CAL S/W : Using in calibration starts.

3. Load Cell Wiring

■ Connecting the Digital Load cells to the indicator.

Number of Pins (L/C Connector)	Description of Pins	Color
1	+12 VDC (1A)	Red
2	0 VDC	Black
3	RS-485(+)	White
4	RS-485(-)	Black
5	Ground	Shield

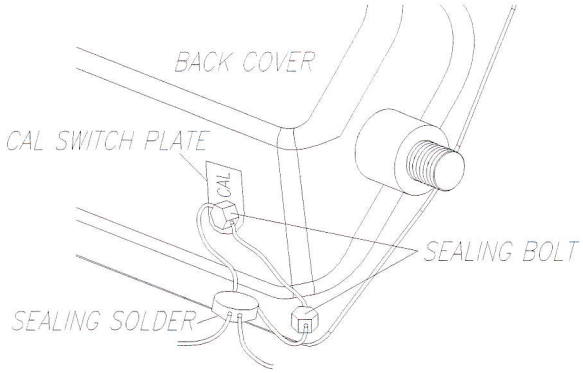
■ If 1 Load cell is connected to indicator, it must have address 01.

■ If 4 Load cells are connected to indicator, they must have addresses 01,02,03,04.

■ If 8 Load cells are connected to indicator, they must have addresses 01,02,03,04,05,06,07,08.

4. Install Legal Seal

■ Install the seal on the wire loop as shown in below Figure.



5. Setup Configure

(1) How to Enter

Turn on the power while pressing the "ENTER" key and SET menu starts.

(2) Available Keys & Converting Method

▲ KEY : Increase the first place set value to 1.

▼ KEY : Decrease the first place set value to 1.

ENTER KEY : Move into next menu.

(3) Set Value Conversion menu (F01 ~ F06)

F01

Function	Select number of Digital Load Cell		
Set value (1 ~ 8)	Example display	Meaning	
	F01 1	Cell 1ea	It is used for the multi digital load cells.
	F01 5	Cells 5ea	
	F01 8	Cells 8ea	

F02

Function	Select Power –on Zero mode	
Set value (0, 1)	Example display	Meaning
	F02 0	Power-on actual weight mode
	F02 1	Power-on zero mode

F03

Function	Automatic Zero Tracking Compensation		
Set value (0 ~ 9)	LED Display	Meaning	
	F03 0	Non Automatic Zero	Auto-zero tracking will automatically bring the display back to "0" when there are small deviations.
	F03 1	0.5digit	
	F03 9	4.5digit	

F04

Function	Serial Port Usage	
Set value (0 ~ 2)	LED Display	Meaning
	F04 0	Not use.
	F04 1	Connection with sub-display (CD-Series)
	F04 2	Connection with serial printer

F05

Function	Baud rate (RS-232C, 8 Data Bits, No Parity, 1 Stop Bits)	
Set value (0 ~ 5)	LED Display	Meaning
	F05 0	600 bps
	F05 1	1200 bps
	F05 2	2400 bps
	F05 3	4800 bps
	F05 4	9600 bps
	F05 5	19200 bps

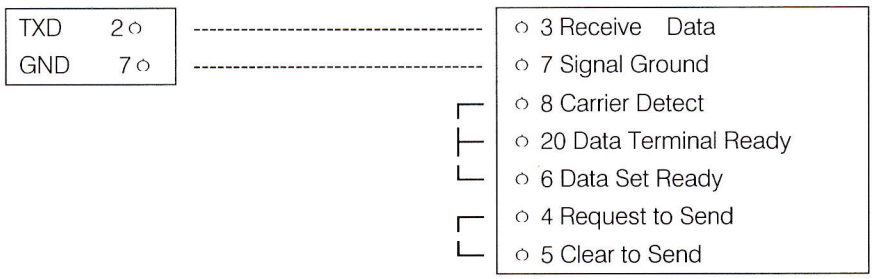
F06

Function	Select Printing Format	
Set value (0 ~ 2)	LED Display	Meaning
	F06 0	Print the Weight only
	F06 1	Print the Weight with sequence number
	F06 2	Print the Gross, Tare, Net Weight

REF 1. Press "ENTER" key to exit setup.

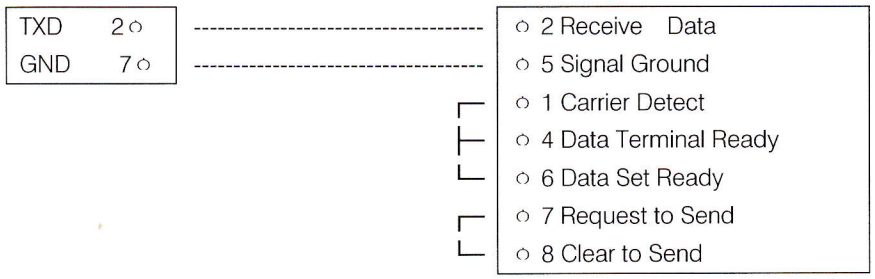
(4) RS-232C Pin Connection & Protocol

Computer connection



9 pin port(Male)
RS-232C port of CI-2001D

25 pin port(Female)
Serial port of computer



9 pin port(Male)
RS-232C port of CI-2001D

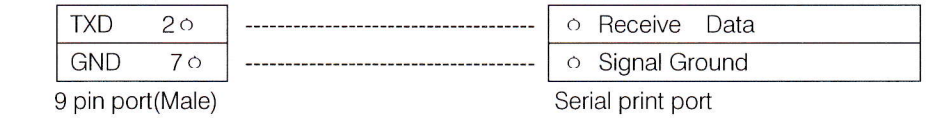
9 pin port(Female)
Serial port of computer

Sub-display connection

9 pin port(Male)
RS-232C port of CI-2001D

9 pin port(Male)
RS-232C port of sub-display

Serial print connection

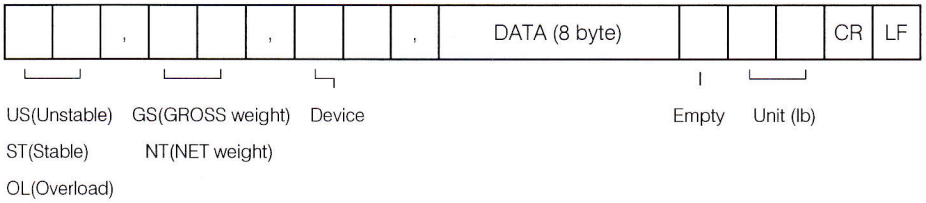


9 pin port(Male)

RS-232C port of CI-2001D

Serial print port

Transmit data protocol



▣ Weight Data(8 byte)

1. 13.5 kg : ' ', ' ', ' ', ' ', '1', '3', '.', '5'
2. 135 kg : ' ', ' ', ' ', ' ', '1', '3', '5', ' '
3. - 135 kg : '-', ' ', ' ', ' ', '1', '3', '5', ' '

Each ASCII code of Weight transmitted by 8 byte. (Ex,' ' : 0x20)

* Simple interface program (BASIC)

```
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
```

* Simple interface program (C)

```
#include <bios.h>
#include <conio.h>

#define COM1            0
#define DATA_READY 0x100
#define TRUE            1
#define FALSE           0

#define SETTINGS   0xE3

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) & 0x7F) != 0)
                putch(out);
            if (kbhit())
            {
                if ((in = getch()) == '\x1B')
                    DONE = TRUE;
                bioscom(1, in, COM1);
            }
    }
    return 0;
}
```

6. Load Cell Test Mode

(1) How to Enter

Turn on the power while pressing the "PRINT" key and TEST menu starts.

(2) Available

ENTER KEY : Move into next menu.

Test of the Digital Load Cells		
Key	LED Display	Description
ENTER : Exit mode	5500	Display digital value of current counts from Load Cells. This value is the total received counts from digital Load Cells.

REF 1. Check whether digital value is changing. If the digital value is fixed or zero is displayed, please check the connection of the load cell.

REF 2. Do this test after the connection between serial port of digital Load cells and indicator.

REF 3. If a Load Cell is not connecting the display will indicate LC * off. (x = L/C #)

7. Balance Multi Load Cells

(1) How to Enter

Turn on the power while pressing the "kg/lb" key and BALANCE mode starts.

(2) Available

ENTER KEY : Move into next menu.

Balance Multi Load Cells (Ex : In case of 8 load cells)		
Key	LED Display	Description
ENTER : Next menu	LC bAL	Balance Load cells, Press ENTER Key.
	Zero	Scale unloaded, Press ENTER Key.
	Cell 1	Apply load to cell 1 only. When display is stable. Press ENTER Key. Remove load to cell 1.
	Cell 2	Apply load to cell 2 only. When display is stable. Press ENTER Key. Remove load to cell 2.
	Cell 3	Apply load to cell 3 only. When display is stable. Press ENTER Key. Remove load to cell 3.
	Cell 4	Apply load to cell 4 only. When display is stable. Press ENTER Key. Remove load to cell 4.
	Cell 5 ~ Cell 8	Apply load to cell (5 ~ 8) only. When display is stable. Press ENTER Key. Remove load to cell (5 ~ 8).
	End	Press ENTER Key.

REF 1. Do this test every time a load cell is replaced or disconnected and reconnected to insure proper calibration.

REF 2. The indicator will read the zero output of each load cell.
The Cell is identified by the a light on the left edge (ZERO, TARE, GROSS, NET) and right edge (lb, kg, -, stable)

8. Calibration Mode

(1) How to Enter

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

(2) Available Keys & Converting Method

▲ KEY : Increase the first place set value to 1.

▼ KEY : Decrease the first place set value to 1.

PRINT KEY : Initial("0") of the set value.

ENTER KEY : Move into next menu.

(3) CALIBRATION MENU (CAL 1 - CAL 5) - Primary Base unit is lb.

CAL 1 : Maximum Capacity

CAL 2 : Minimum Division

CAL 3 : Setting Weight

CAL 4 : Zero Calibration

CAL 5 : Span Calibration

CAL 1 (CAL 1 Start automatically)

FUNCTION : Maximum Capacity SET (Range : 1~99,999)		
Key	LED Display	Description
▲ : Increase or of no. ◀ : Shift of digit ENTER : Store and move into next menu.	CAL 1	CAL 1 Condition
	100	100 lb
	10000	10000 lb

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

CAL 2

FUNCTION : Minimum Division SET (RANGE : 0.0002~200)		
Key	LED Display	Description
▲,▼ : Increase or de- crease of no. move into next menu.	CAL 2	CAL 1 Condition
	1	1 lb
	0.001	0.001 lb

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

REF 2. External resolution is obtained by dividing the max. Capacity by the min. division.

CAL 3

FUNCTION : Setting Weight In Span CALIBRATION		
Key	LED Display	Description
▲ : Increase or of no. ◀ : Shift of digit ENTER : Store and move into next menu.	CAL 3	CAL 3 Condition
	100	100 lb
	10000	10000 lb

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

REF 2. If the Setting Weight is under the 10% of the Maximum Capacity,
Error message "Err 7" will occur.

CAL 4

FUNCTION : Zero Calibration		
Key	LED Display	Description
ENTER : Zero calibration and Move into next menu.	CAL 4	CAL 4 Condition
	UnLoAd	Unload the tray and press ENTER.
	- - -	Performing zero calibration.
	Good	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 press, only Zero Calibration is completed and program moves into CAL 1.

CAL 5

FUNCTION : Span Calibration		
Key	LED Display	Description
ENTER : Span calibration and Exit calibration mode	CAL 5	CAL 5 Condition
	LoAd	Load the weight which was set in. CAL 3 and press ENTER.
	- - -	Performing span calibration.
	Good	Span calibration is completed. Press Enter key.
	Err 8	Error occurrence. Move into initial menu automatically.

REF 1. If Span calibration is done without any error, "Good" message is displayed.

REF 2. If the span is low, Error message "Err 8" is displayed. Calibrate with lower resolution.

9. Description Error Message

(1) Errors in weighing mode

Over

▣ Reason

The weight on platform is 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.

LC#OFF(# : 1,2,3,4,5,6,7,8)

▣ Reason

Each(#1,2,3,4,5,6,7,8) digital Load cell connection failure or broken.

☞ Trouble shooting

Check the digital load cell.

(2) Errors in calibration mode

Err 6

▣ Reason

The resolution exceeds 900,000 division.

☞ Trouble shooting

Lower the resolution. The resolution = Max. weight / one division.

Err 7

▣ Reason

The Calibration weight is greater than the capacity of the scale.

☞ Trouble shooting

Reduce the amount of weight used to calibrate the scale.

Err 8

▣ Reason

The load cell output is too small to do a SPAN calibration.

☞ Trouble shooting

Increase the reference weight or decrease the resolution.

2003. 5. 30