# AC-11JB

# DIGITAL WEIGHING INDICATORS INSTALLATION MANUAL

(Digital Junction Box)

Version in June,2008

# CONTENTS

# 1.0 SPECIFICATIONS AND LED SYMBOLS

## 1.1 SPECIFICATIONS

Grade :      Class 3 at 3000 divisions
Input Signal :      Digital junction box
Supply voltage :      5v, 12 analog load cells of 350 ohm
Output:      Zero position relay output.
     RS232 serial output

Working temperature :      -10℃～40℃
Relative humidity :      ＜85%RH

Function:      Power failure protect,
     Non-stop clock.
     Automatic zero track range is selectable
Maximum data stored :      200 car numbers' tare,1500 car numbers' weighing

     records

Printing :      Daily report and static monthly report(sorted by
     car number and goods number)
Power supply :      AC220V,50Hz( ＜12w )
Overall dimension :

Weight :

Load imbalance warning is effective against tele-control cheating

## 1.2 LED SYMBOLS

[Zero]      When gross weight<0.0d,the indicative light is on.
[Net weight]      In net weight displaying state, the light is on.
[Auto]      In auto accumulation state, the light is on.
[Stable]      When weighing is stable, the light is on.
[Tare]      When tare is not equal to zero, the light is on.
[Truck No.]      When truck number is not equal to zero, the light is on.
[Sending ]      When the indicator sends data serially, the light is on.
[Receiving err]      When the indicator can't receive data ,the light is on.

## 2.0  CONNECTION

2.1   Interface

(1) The connection between AC-11JB Indicator (D-SUB-9 holes) and

8 load cells' digital junction box.

| | | |
|---|---|---|
| Pin 1-2 | +E | Digital junction box Vp |
| Pin 3 | GND | Digital junction box F.G shield |
| Pin 4-5 | -E | Digital junction box GND |
| Pin 7 | A | RS485A |
| Pin 8 | B | RS485B |
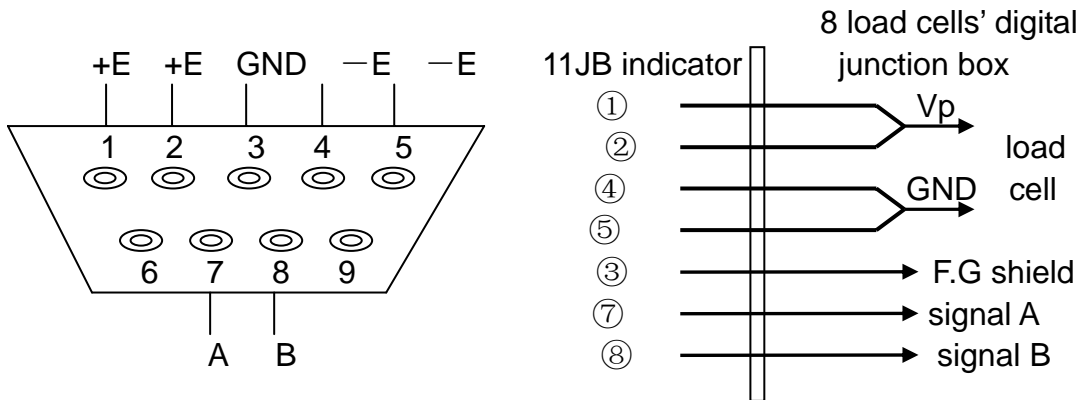


(2) The connection between 8 load cells' digital junction box and 4 load

cells' digital junction box
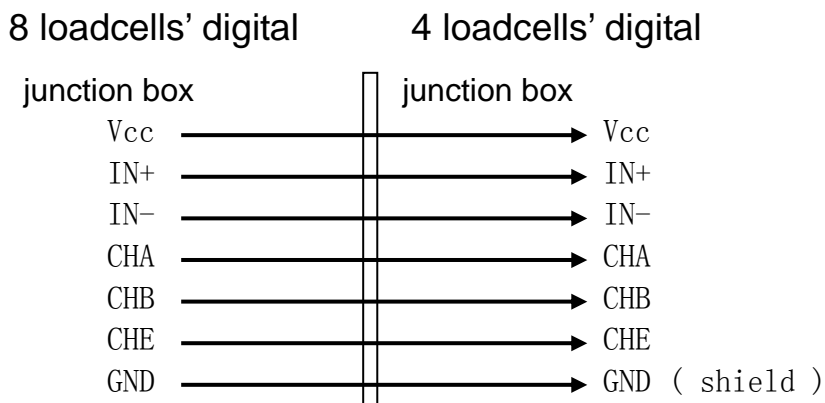
(3) The connection between junction boxes and load cells (You should connect smaller digits first if you don't connect all of them) 。 The first 8 Load cells(1-8) should be connected with junction box 8,the last 4 load cells(9-12) should be connected with junction box 4.

| Junction box terminal | | load cell |
|---|---|---|
| +E | → | Excitation Positive |
| +S | → | Input Positive |
| −S | → | Input Negative |
| −E | → | Excitation Negative |
| F.G | → | Shield |
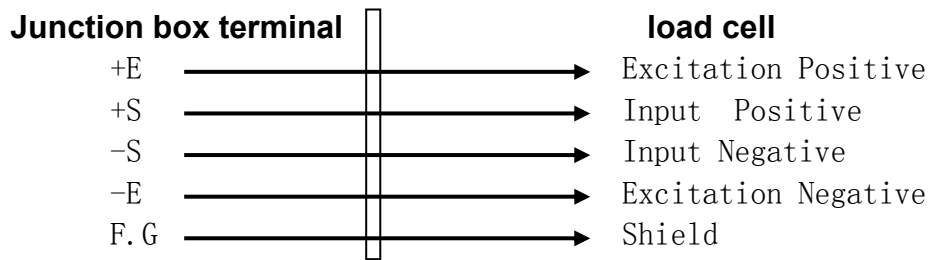
(4)  Serial Interface (D-SUB-9 pins)

Pin 3     TXD        RS-232   output

Pin 5     GND

## 2.2  RS232 Communication Data Format

Serial communication format : 1 start bit, 8 data bit, 1 stop bit, no check bit

DATA FORMAT( TOLEDO): STX A B C X6 X5 X4 X3 X2 X1 N6 N5 N4 N3 N2 N1 CR LF CKF.

X6 X5 X4 X3 X2 X1 is displaying data, X1 is low digit, X6   is high digit.

N6 N5 N4 N3 N2 N1 is tare data ,N1 is low digit,N6 is high digit   .

A B C is status byte.

# 3.0 MENU SELECTION

Only if the calibrated plug is in one side of [EN] and the version number [UE-3.10] is displayed, the following operation is available.

| Step | Operation | Display | Note |
|---|---|---|---|
| 1 | Press [Set] | [CAL SP] | Calibration:<br>Press the [Input ]key to start calibration.<br>Otherwise press the [Set] key. |
| 2 | Press [Set] | [-Set-] | User parameters setting<br>Press the [Input] to start user parameters setting<br>Otherwise press [Set] . |
| 3 | Press [Set] | [P-SEt-] | Press the [Input] key to start factory parameters setting<br>Otherwise press the [Set] key |
| 4 | Press [Set] | [J-Set-] | Press [Input] to start manual weight fact setting.<br>Otherwise press [Set]. |
| 5 | Press [Set] | [AUJ cn] | Press [Input] to start auto corner error adjustment |
| 6 | Press [Set] | [0.0] | Return to weighing state. |

# 4.0   PARAMETERS SETTING

| Step | Operation | Display | Note |
|---|---|---|---|
| 1 | Press **[Set]** | [CAL SP] | Calibration |
| 2 | Press **[Set]** | [-Set-] | Press**[Input]** to start user parameters setting. |
| 3 | Press **[Input]** | [CELL XX] | XX is the number of analog load cells (1-12 ). |
| 4 | Press **[No.]** | | Set the number of analog load cells. |
| 5 | Press **[Input]** | [d   10] | Display scale division. |
| 6 | Press[ ↑ ↓ ] | | Scroll through the other options (from 0.001 to 50) |
| 7 | Press **[Input]** | [30000] | Display the maximum weighing value. |
| 8 | Press **[No.]** | | Input new maximum weighing value. |
| 9 | Press **[Input]** | [g   YX] | X is zero track range(zero track range = 0.3d * X)<br><br>Y power on initial auto zero setting range(0 – 9 )<br><br>0-90%FS   ( 1-10%FS for keyboard zero setting ) |

| 10 | Press **[No.]** | | Input new value |
|---|---|---|---|
| 11 | Press **[Input]** | [    100] | Display the minimum weighing value |
| 12 | Press **[No.]** | | Input new value |
| 13 | Press **[Input]** | [Unt    X] | Display weight unit:    0 = kg, 1 = ton ( 1000 kg ) |
| 14 | Press **[No.]** | | Input new value |
| 15 | Press **[Input]** | [FLT    X] | Display filter parameter |
| 16 | Press **[No.]** | | Input new filter parameter value<br>X=0 is static weighing mode<br>X=1 is hanging scale weighing mode, |
| 17 | Press **[Input]** | [b 9600] | Display RS232 communication baud rate |
| 18 | Press **[↑]** | | Select one option among 1200, 2400, 4800, 9600 |
| 19 | Press **[Input]** | [Fn**AZYX**] | X=1 , permit tare operation.<br><br>X=0   tare operation is   prohibited.<br><br>Y=1, Use the numerical keys to input the tare value<br><br>Y=0, You can't use the numeral keys to tare.<br><br>Z=1, It is In permission supplement printing condition<br><br>Z=0, It is prohibited to print.<br><br>A=1, warning is permitted; A=0,It is prohibited. |

Note 1:    If zero track range is zero, there is no zero track.    If zeroing range is zero ,there is no automatic zeroing when the power is on.

Note 2:   When the weight is less than the minimum weighing value,the relay is closed and the truck number and tare will be cleared automatically.

Note 3:   In the digital junction box, the number of the analog loadcells is fewer than 12, You should connect smaller digits first.

# 5.0    Loadcell weight fact setting

| Step | Operation | Display | Note |
|---|---|---|---|
| 1 | Press[Set] | **[CAL SP]** | Calibration |
| 2 | Press[Set] | **[-SEt-]** | User parameters setting |
| 3 | Press[Set] | **[P-SEt-]** | Factory parameters setting |
| 4 | Press[Set] | **[J-SEt-]** | Press the **[Input]** key to enter loadcell weight fact setting. |
| 5 | | **[X1.0000]** | The weight fact of loadcell X is displayed. Normally do not change this value |
| 6 | Press [No.] | **[X0.9990]** | Input the weight fact of loadcell X |
| 7 | Pres[Input] | **[Y1.0000]** | The weight fact of loadcell Y is diaplayed. Normally do not change this value |
| 8 | | | Set repeatedly from 1 to 12 until ending the operation,then return to weighing .display |

# 6.0   CALIBRATION

| Step | Operation | Display | Note |
|---|---|---|---|
| 1 | Press**[Set]** | [CAL SP ] | Calibration: Press the **[Input]** key to enter |
| 2 | Press**[Input]** | [CAL 00] | Ensure there is no load on the scale and it is stable |
| 3 | Press**[Input]** | [------] | Zero point calibration is proceeding |
| 4 | | [30000] | Zero point calibration has been done. Display the maximum weighing value for 1.5 seconds |
| 5 | | [-LOAd-] | Start to load weight |
| 6 | Press**[No.]** | [XXXXX] | Input actual load value, wait for weighing stable |
| 7 | Press**[Input]** | [------] | Span calibration is proceeding |
| 8 | | Weighing Value | End calibration and return to normal weighing display |

**Note 1:**    If zero point is correct and just need span calibration, then after

it displays **"CAL 00",** press the **[Tare]** key to skip zero point

calibration and enter span calibration directly.

**Note 2:** If only zero point needs calibration, then after it displays

**"-LOAd-",** press the **[Input]** key to end span calibration and

return to normal weighing display.

**Besides,** If only zero point needs calibration in normal weightting mode,

Press **[SET]** and **[ZERO]** to enter zero point calibration.

## 7.0   FACTORY PARAMETERS SETTING

| Step | Operation | Display | Note |
|------|-----------|---------|------|
| 1 | Press **[Set]** | [CAL SP] | Calibration |
| 2 | Press **[Set]** | [-SEt-] | User parameters setting |
| 3 | Press **[Set]** | [P-SEt-] | Factory parameters setting |
| 4 | Press **[Input]** | [XXXXXX] | Start factory parameters setting, display span calibration parameter |
| 5 | Press **[No.]** | [XXXXXX] | Modify span calibration parameter. Normally do not change this parameter |
| 6 | Press **[Input]** | [E    -XX] | Display the maximum value of the non-linearity error |
| 7 | Press **[No.]** | [E    -XX] | Input new maximum value |
| 8 | Press [↑] | [E    XX] | Select positive/negative sign of the error |
| 9 | Press **[Input]** | [ XXXXX] | Display the weighing value corresponding to the maximum non-linearity error |
| 10 | Press **[No.]** | [ XXXXX] | the weighing value corresponding to the maximum non-linearity error |
| 11 | Press **[Input]** | Weighing value | End factory parameters setting return to normal weighing display |

**Note:** Non-linearity error revision adopts Newtonian quadratic equation

method to amend the curve.

*After calibration, turn off the power. Push the setting permit*

*socket to the "OFF" side, and then turn on the power to use.*

# 8.0   A/D VALUE DISPLAY

A/D value display can be used to check whether the scale or the load

cell is working correctly.

| Step | Operation | Display | Note |
|---|---|---|---|
| 1 | Press **[Set]** | [PS    0] | |
| 2 | Press **[Gross/Net]** | [**XX**XXXX] | Display the A/D value XXXXXX of all load cells . |
| 3 | | [**Y** XXXX]  [XXXXXX] | Input 1-12,display the A/D value of 1-12. The number Y of the Load cell is flashing. Or Press**[↑↓]**, to select the cell number Press**[0],**display the A/D value of all load cells. The display value is one tenth of the actual value. |
| 4 | Press **[Input]** | | Return to weighing display |

# 9.0   ERROR MESSAGES AND TROUBLE-SHOOTING

| Error Messages | Possible Causes |
|---|---|
| [Err    E] | The memory chip X5045 has failed **.** |
| [Err   F ] | The memory chip 24C256 has failed. |
| [ Err t   ] | The clock chip has failed. |
| [E ABCD] | Digital load cell ABCD has failed. |
| [Err    3] | Zero point is abnormal when power is on. |
| [Err    5] | span calibration has failed. |
| [Err    6] | Weighing value can't be stabilized in calibration period. |
| [   OUEr] | Weighing value is bigger than the maximum weighing. |
| ！  Power can't be turned on  check the junction box, the load cell or fuse to see if any is short circuit ,  or the indicator is failure . | |

！  Weighing display doesn't show stable value,

It is possible that the junction box or load cell has gone wrong

or that   the junction box is affected with damp.

# 10.0 AUTO CORNER ERROR ADJUSTMENT

| Step | Operation | Display | Note |
|---|---|---|---|
| 1 | Press[Set] | [CAL SP] | Calibration |
| 2 | Press[Set] | [-SEt-] | User parameters setting |
| 3 | Press[Set] | [P-SEt-] | Factory parameters setting |
| 4 | Press[Set] | [J-SEt-] | Load cell weight fact setting |
| 5 | Press[Set] | [AUJ cn] | Auto corner error adjustment. |
| 6 | Press[Input] | [[AUJ 00] | Start auto corner error adjustment, confirm zero point first. |
| 7 | Press[Input] | | Press the[Input] key to confirm. It take several seconds |
| 8 | | [AUJ 1n] | Add the same load on one corner, Press the[Input] key to confirm when weight is stable. |
| 9 | Press[Input] | [AUJ  X] | Display X(X is the number of current loaded Load cell),1.5 seconds later, |
| 10 | | [AUJ 2n] | Add the same load on next corner, Press the[Input] key to confirm when weight is stable. |
| 11 | Press[Input] | [AUJ  Y] | Display Y(Y is the number of current loaded Load cell),1.5 seconds later, |
| 12 | | | Repeat step 10 and step 11 until every corner is loaded on. |
| 13 | | [YAH00] | End auto corner error adjustment and return to normal weighing display. |

Note 1：To ensure the precision of auto corner error adjustment, the weight of the load should be bigger than 10% of the maximum weighing. Press**[Tare]**and end auto corner error adjustment.
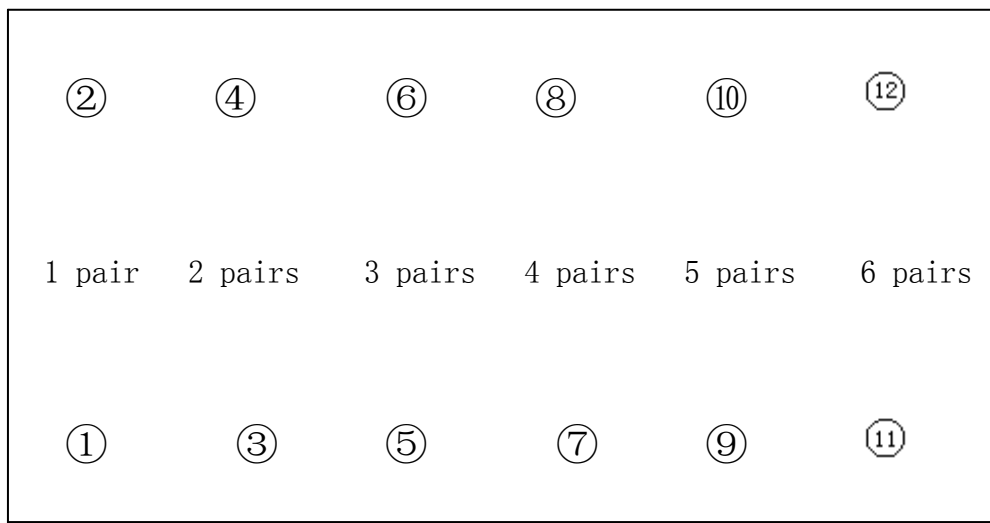
Note 2**:** After one auto corner error adjustment, if you can't get required precision, you can repeat it .Normally, you can get it 3 times at most. If not, please use manual corner error adjustment.( load cell weight fact setting)

# 11.0  LOAD IMBALANCE WARNING

Load imbalance warning is effective against tele-control cheating. In order to release load imbalance warning, load cells should be connected symmetrically. If the deviation of a pair of load cells is more than 25%,load imbalance warning works. The buzzer sounds discontinuous.

v.g. The track scale platform has 12 load cells, which should be connected as follows:

②        ④        ⑥        ⑧        ⑩        ⑫

1 pair    2 pairs    3 pairs    4 pairs    5 pairs    6 pairs

①        ③        ⑤        ⑦        ⑨        ⑪

# 12.0   TEMPORARY LOADCELL FAILURE PROCESSING

If one loadcell is failure, but weighing is a must,the following processing is avilable for temporary weighing.the measuring accuracy drops.

Remove the failure loadcell,connect the signal terminal of it with the signal of the opposite loadcell.   Namely , replace the failure loadcell with the opposite one.

Because the signal of a pair of loadcells has the symmetry characteristic(Although it is't symmetrical completely)，if load imbalance is not serious,the error is not so big.

v.g. Loadcell 5 is failure,remove it, connect the signal terminal of it with the signal of loadcell 6 (only two wires : positive signal and negative signal）

Digital junction box communication data format:

RS485 Serial output ( Baudrate:9600)

STX  n  D  X1  X2  X3  X4  X5  X6  E1  E2  BCC  CR

    n  is  the number of the digital junction box (80H- 83H)

X6 X5 X4 X3 X2 X1 is encoding data.X6 is high digit,X1 is low digit.

Xi = 3XH, it is an HEX data.( i = 1- 6 )

The data is stable when the bit3 of X6 is 1.

The data is negative when the bit2 of X6 is 1.

E1 is a status symbol byte, 1GFE,DCBA ( Binary Data)

    GFEDCBA=1111111;   It indicates loadcell 7,6,5,4,3,2,1 is failure.

E2 is a status symbol byte 100L,KJIH ( Binary Data )

    L,KJIH=1,1111; It indicates loadcell 12,11,10,9,8 is failure.

BCC is checksum，is the sum of data between STX and BCC（get the lower byte）.But when the sum equal to 02H or 0DH , automaticly increase one, to avoid same as [stx] or [cr] .