

*Innovative Measurement Electronics*



**PT Ltd.**

**PT100DI**  
**Digital Indicator**  
**Setup Manual**

Rev. 6.4.6

Thank you for purchasing a PT Electronic Digital Indicator. In order to use the indicator properly, please read this Manual carefully before use. If you have a problem concerning the indicator, please contact your supplier.

PT regularly updates and issues new information regarding products, the most up to date information and additional detailed information is located on the PT web site.

[www.pt-global.com](http://www.pt-global.com)

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## 2. Preparation

### 2.1. Safety



1. Turn the power off before installing or disassembling.
2. Keep the product away from direct sunshine or heat sources. The temperature range for operation is -10C ~ +40C.
3. To connect the ground is a must for this equipment. The ground impedance is less than 100 ohms.
4. Never connect the ground with other equipments which are huge in power consumption.
5. No ground or incorrect ground connecting might cause the electric shocks or breakdowns.

### 2.2. Preparing the indicator for use

1. Unpack the indicator carefully and check the contents of the box are complete.
2. Assemble the support bracket to the indicator with the supplied adjusting knobs.
3. Install the indicator (display) in a convenient position by wall, pole or desk mounting with 2 screws (not included).
4. Avoid operating the indicator in direct sunlight to ensure the display is easy to read and the indicator does not become excessively hot.
5. Connect the load cells (either directly or through a PT summer box).

#### 4-Wire connection

Pin4&5, Short to connect with EXC+

Pin2&3, Short to connect with EXC-

Pin1 connects with SIG+

Pin9 connects with SIG-

Pin6, 7, 8 connect with Shield

#### 6-Wire connection

Pin5 connects with EXC+

Pin4 connects with SEN+

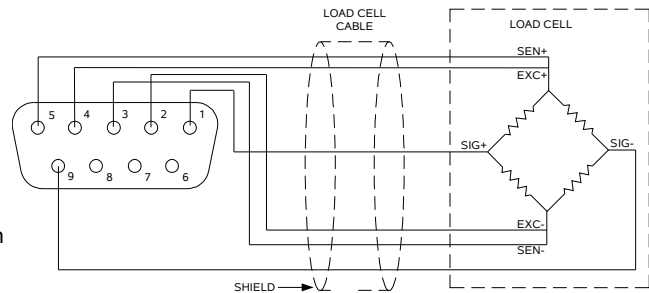
Pin3 connects with EXC-


Pin2 connects with SEN-

Pin1 connects with SIG+

Pin9 connects with SIG-

Pin6, 7, 8 connect with Shield



6. If an RS232 option is fitted connect the serial cable.
7. Connect the AC mains adapter.
8. For best accuracy switch the scale on for 15~20 minutes before use.
9. Please note when the  symbol appears on the screen, the batteries need to be recharged.
10. The power can now be turned on and the indicator can be configured and calibrated.
11. When configuring the indicator calculate the minimum division size possible based on the microvolts per division of 0.12. This may affect your choice of capacity and decimal point. The minimum division is calculated from

$$d_{min} = [\text{total effective load cell capacity}] * 0.12 / 1000 / [\text{load cell mV/V}] / 5$$

Remember that  $d_{min}$  must be rounded up to a multiple of 1, 2 or 5.

Total effective load cell capacity is the total capacity of the load cells as if a load cell were fitted under each leg or support point of the vessel. Some times only 2 legs of a 4 leg vessel will have load cells fitted.

12. The calibration access port in the indicator is located on the back below the rechargeable battery pack (if fitted). To access the LOCK/ADJ switch remove the rubber sealing plug.

## 3. FEATURES AND SPECIFICATIONS

### 3.1. Features

- Large clear LCD (height 25.4mm × 10mm)
- LED Back light, longer life and energy saving
- Auto zero tracking
- Weighing calibration in both kilogram and pound modes
- High resolution switch function to display 10 times the divisions
- Weighing unit change function
- Data accumulation function
- Multi-interval or multi-range mode
- Animal weighing mode
- Pre-tare entry function
- Adjustable digital filtering
- Can connect with up to four 350-ohm load cells
- Capable of connecting with 6-wire load cells
- Convenient to operate power switch in the front panel

### 3.2. Specifications

<p><b>Analog Specification</b></p> <ul style="list-style-type: none"> <li>• Load Cell Excitation: DC 5V +/-5% 60mA (Up to Four 350Ω Load Cells)</li> <li>• Max. Load Cell Input Voltage: -1~16 mV</li> <li>• Linearity error &lt; 0.002%FS</li> <li>• Input Sensitivity: 0.12uV/D or more</li> <li>• Temperature coefficient: zero &lt;14.49 ppm/C (-10C~40C)</li> <li>• Temperature coefficient: span &lt;1.65 ppm/C (-10C~40C)</li> <li>• Conversion Rate: Approximately 100 times/sec. (max.)</li> <li>• Input noise: 8nV/√Hz f = 10KHz</li> <li>• Resolution: 19 bits</li> </ul> <p><b>Digital Specification</b></p> <ul style="list-style-type: none"> <li>• Display: LCD, 6 digits, height 25.4x10mm, LED backlight</li> <li>• Display Frequency: 50 times/sec. (max.)</li> <li>• Display Range: - 999999 ~ 999999</li> <li>• Internal Resolution 520000</li> <li>• Min. Division: 1, 2, 5, 10, 20, 50</li> <li>• Decimal Point: 0, 0.0, 0.00, 0.000, 0.0000</li> <li>• Memory: Calibration parameters and function settings are all stored in EEPROM.</li> </ul>	<p><b>Optional Interface</b></p> <ul style="list-style-type: none"> <li>• RS-232 / RS-485 (Includes RTC Function). Up to 10 PT100DI can connect to the same host with RS485</li> </ul> <p><b>Power Requirement</b></p> <ul style="list-style-type: none"> <li>• Mains AC Adaptor Spec.: Input 120/230VAC 50~60Hz, output 9V/1000mA</li> <li>• Optional 6V Hi-MH rechargeable battery kit (1800mA/1hr)</li> <li>• Max. Power Consumption (with rechargeable battery):             <ul style="list-style-type: none"> <li>○ 120mA (with 4 Load Cells + backlight + RS-232 interface) →15 hours usage</li> <li>○ 50mA (with 1 Load Cell + no backlight + no RS-232 interface) →36 hours usage</li> </ul> </li> </ul> <p><b>Physical</b></p> <ul style="list-style-type: none"> <li>• Operation Temperature: -10C ~ 40C</li> <li>• Operation Humidity: &lt; 85% R.H.</li> <li>• Dimension: W 49.5 x L193 x H134 (mm)</li> <li>• Weight: 700 (g)</li> </ul>
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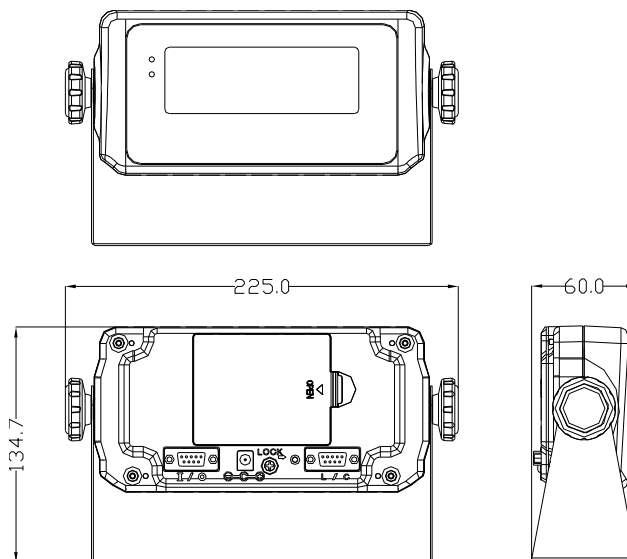
### 3.3. Product Package

- Scale 1 off
- User manual 1 off
- AC adapter 1 off
- Please contact to your supplier, if any of the items described above are missing.
- Rechargeable batteries and RS232 serial interface are options in the item code EP100DI232BAT only.

### 3.4. Selectable Weight Units

Kilogram	(kg)	1 kg = 1000 g
Pound	(lb)	1 lb = 453.59239507 g
None		

### 3.5. Dimensions

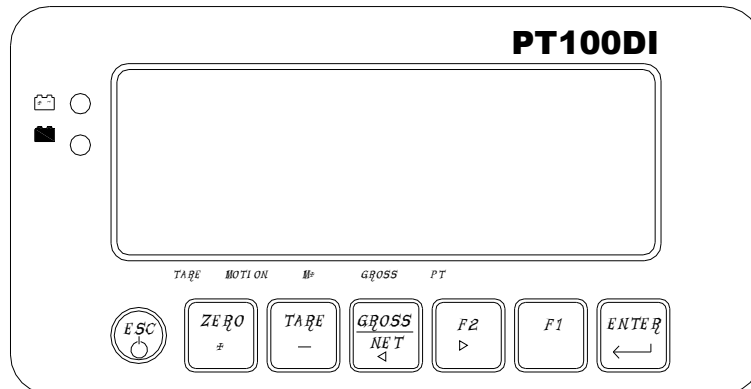


### 3.6. Error Messages



- Err0** ⇒ Load Cell or A/D circuit in extraordinary condition.
- Err2** ⇒ Real weighing value less than zero value.
- Err6** ⇒ Internal resolution  $< 0.12\mu\text{V}/\text{D}$  range.
- Err.** ⇒ Incorrect password
- E1** ⇒ Zero is lower than the zero range when switching the scale on.
- E2** ⇒ Zero is higher than the zero range when switching the scale on.

## 4. FRONT and REAR PANELS

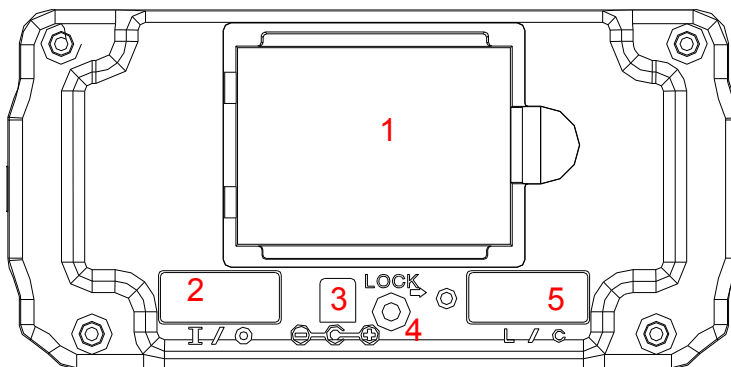
### 4.1. Front Panel



#### Indication:

-  : Battery charged status ("Low Battery" indication)
-  : Battery charging status
- TARE : Tare status ( The Net weight is displayed )
- MOTION : Unstable weighing indication
- M+ : Accumulation status indication
- GROSS : Gross weight ( The Gross weight is displayed )
- PT : Pre-tare

### 4.2. Rear Panel



#### Features:

- 1 : Battery Compartment
- 2 : RS232/485 Input/Output Connector
- 3 : DC 9V Power Input
- 4 : Calibration Switch access port
- 5 : Load Cell Connector

## 5. KEYBOARD DESCRIPTION



: The key to switch the indicator on or off.

- 1) Press to turn the indicator on, press and hold for 3 seconds to turn the indicator off.
- 2) To abort or escape when setting.



: ZERO key.

- 1) When the scale is switched on, with the weigh pan empty, if the display is not showing zero, press this key to zero (balance) the scale. Zero range:  $\pm 2\%$  of full scale.
- 2) To add a value when setting.



: TARE key.

- 1) Press the key to set a tare and deduct the weight of the container. The tare key is not functional when the weight value shown on the display is negative or over the full scale capacity. The scale is in gross mode when it is first turned on and the tare key is functional. Once the tare key has been pressed it will only be functional when the TARE annunciator is indicated. It will not function if the scale is displaying GROSS weight.
- 2) To reduce the value when setting.



: GROSS/NET.

- 1) Toggle display of gross or net weight. The gross weight = Tare weight + Net weight (The key is ONLY functional if a tare weight has been stored with the tare key and it will change between Net and Gross weight display with each press.)
- 2) To move the cursor left when setting.



: Function key.

- 1) Keypad Function (Settings FNC-02 and FNC-03).
- 2) To move the cursor right when setting.



: Function key.








- 1) Keypad Function (Settings FNC-02 and FNC-03).








: CONFIRMATION key.

- 1) To enter or confirm a parameter.



Function	Operation	Description
General Function Setting	Press and hold  , and then press 	Refer to <b>Function Parameter Setting</b> for details
Weighing Parameter Setting	Adjust calibration switch to ON	Setting for decimal point, capacity, division, zero tracking, and motion detection, etc. Refer to <b>Specification Setting</b> for details.
Calibration	Adjust calibration switch to ON	Refer to <b>Internal Weight Calibration</b> for operation.
Self-diagnosis Mode	While turning on and during countdown, press and hold  .	Refer to <b>Self-diagnosis Mode</b> for details.
Default Recovery for All Parameters	Adjust calibration switch to ON, and then press and hold.  	Refer to chapter 9 for details.
Default Recovery for General Function Parameters	While turning on with countdown, press and hold.  	Refer to chapter 9 for details.





During setup, use the following keys to complete selection and input.

- |   |                                |   |                                |
|---|--------------------------------|---|--------------------------------|
|  | ⇒ To add the value flashing    |  | ⇒ To move the cursor rightward |
|  | ⇒ To reduce the value flashing |  | ⇒ Storage setting              |
|  | ⇒ To move the cursor leftward  |  | ⇒ To abort setting/to escape   |

## 6. OPERATION

### 6.1. Basic Operation



#### 6.1.1. Switching the indicator on / Re-zeroing

1. When the indicator is off, press   key to turn the indicator on.
2. When the scale is on and without any object placed on the weigh pan, press the   key to obtain a zero reading. The ZERO annunciator is lit on the display.








#### 6.1.2. Switching the indicator off.

1. When the indicator is on, press   and hold to turn the indicator off.




#### 6.1.3. Selecting the desired units

1. Press the   key to select kilogram (kg) or pound (lb), the units indication will show in the right hand side of the display. The F2 key is user defined and can be changed from units selection. The factory default is UNITS select. If the function is changed from UNITS select for pretare, printing or accumulation, it will be necessary to change it back if the units switching function is required.
2. After power off, the indicator will remember the active units. When the scale is powered on again, it displays the previous active units.


















#### 6.1.4. Using TARE to deduct the weight of the container

1. Place the container on the weigh pan. After the reading is stable, press   key to deduct the weight value of the container. The tare annunciator will display. If the tare function has previously been used since the scale has been turned on it will be necessary to use the  key to select the tare mode (tare annunciator lit) before you can perform this step.
2. Place the object in the container, the scale will show the net weight value of the object.
3. Remove the container and weighing object, and the display shows the negative weight value of the container. Press   key to clear the weight value of the container, and tare annunciator goes off.
4. Tare continuously (Press   key, when weight is added or deducted on the weigh pan so the next amount added or removed can be weighed).
5. Tare value = The full capacity (The scale can be tarred continuously to the full capacity).





### 6.1.5. Net / Gross displayed weight switching





1. In the tare mode, the display shows a tare annunciator on the left hand side. Press the  key to show the gross weight value, and the tare annunciator goes off.
2. Press  key again, the display shows the net weight value and the tare annunciator shows again.
3. The  key is ONLY functional in the tare mode (when a tare action has been performed).

### 6.1.6. Using PRE-TARE to deduct the known weight of the container

1. To use the PRE-TARE function one of the function buttons  or  must be configured for PRE-TARE (see section 7.7) To set the F1 key enter external setting mode by pressing   together.  $01FnC$  displays. Press .  $FnC 00$  displays. Press  until  $FnC 02$  displays then press  again. Change the value shown to  $000006$  with the  and  keys. Press  then  twice until you are back at the weighing mode.
2. Set the PRE-TARE value. This is the known weight of the container. In some cases you may wish to fill a container that is already partially full, to top it up such as an LPG bottle that still has some gas in it. The tare weight is stamped on an LPG bottle, but for other containers there needs to be a record of the empty container weight. Press . The display value should be set to the weight of the container with the     keys and then press .
3. Place the container on the weigh pan. The indicator now only shows the weight of the contents of the container, the weight of the container has been deducted.
4. To remove the PRE-TARE value set the PRE-TARE value to 0 by the procedure in 2. above.

### 6.1.7. Using the accumulation function to total weigh operations

1. To use the ACCUMULATION function the function buttons  or  must be configured. Following the procedure above (detailed in chapter 7.7) set F2 to M+ and F1 to display accumulated weight.
2. Place the item to be weighed on the scale and press  to store the weight. The annunciator above M+ on the display is lit. Place each item to be accumulated on the scale and when stable press  to accumulate the weight.

3. Press   to display the quantity of items accumulated. Press   again to display the total accumulated weight.
4. To clear the accumulation it is necessary to configure F1 or F2 temporarily to MC and press this button. The annunciator above M+ becomes unlit.
5. Note that the accumulated values are retained during power off. This is useful if you wish to re-locate the indicator or scale for additional weighing. When the indicator is again powered on you can continue to accumulate further weights.

#### 6.1.8. Using the Animal weighing function

1. The animal weighing function is useful for veterinary or farm use. The function locks on to a reading once it has passed the pre-set stability criteria enabling easy reading and recording of the display. The reading is retained until the weight is removed and falls within 10 divisions of zero.
2. Configuration for animal weighing is performed at the Internal Function Setting stage of configuration (see chapters 7, 7.5, 7.6). The Lock switch accessed from the back must be set to "ON" for this function setting.
3. The reading is locked when the weight has been within the "Animal Scale Stable Range" (CFN-06) for a period of the number of weight samples of "Animal Scale Sampling Frequency" (CFN-07). "Animal Scale Stable Range" (CFN-06) is measured in divisions, so if your scale division is 5kg and CFN-06 = 30 and CFN-07 = 32 times then when the weight has been stable within a 150 kg band for 32 indicator internal samples the reading will lock.
4. The smaller the "Animal Scale Stable Range" and the larger the "Animal Scale Sampling Frequency" the more accurate the weight will be. If the animal moves around too much and the weight does not settle within the "Animal Scale Stable Range" then a weight will not be locked.
5. The digital filtering "Filter Strength" (CFN-03) can be increased to help stabilise the readings of moving animals.
6. When the reading is locked on the annunciator on the display to the right of GROSS is lit.

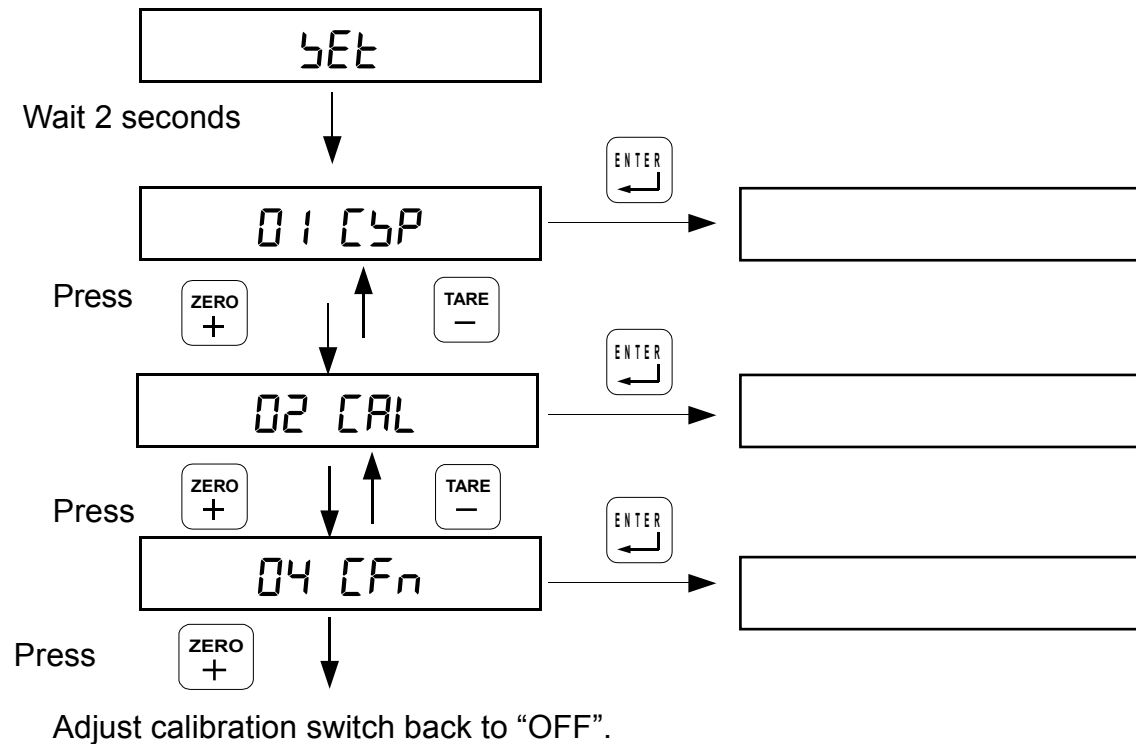
## 7. CONFIGURATION

### 7.1. Overview

Configuration consists of three areas.

- Specification settings (build)
- Calibration
- Internal Function settings
- External Function settings. The calibration switch does not need to be set ON.

Set calibration switch (located through the back) to “ON”, and the screen displays:

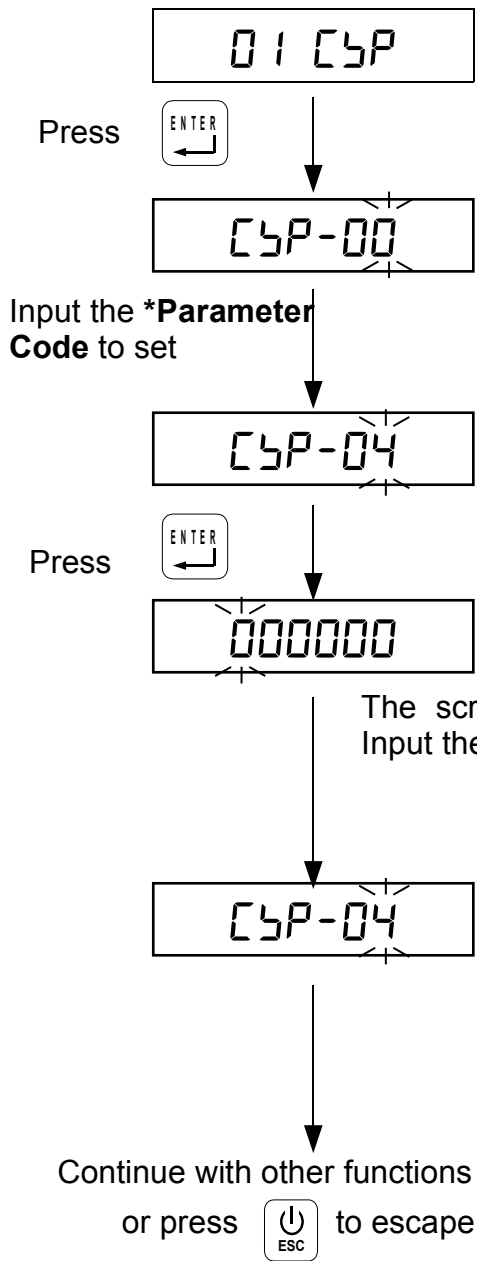


01 C5P ⇒ Specification Setting

02 CAL ⇒ Internal Weight Calibration

04 CFn ⇒ Internal Function Setting

7.2. Specification Setting



**\*Parameter Code**

- C5P-00 ⇒ Decimal Point
- C5P-01 ⇒ Capacity
- C5P-02 ⇒ Division 1
- C5P-03 ⇒ Division 2
- C5P-04 ⇒ Zero Tracking Setting
- C5P-05 ⇒ Unstable Detecting Setting

- ⇒ To increase the value flashing
- ⇒ To decrease the value flashing
- ⇒ To move the cursor leftward
- ⇒ To move the cursor rightward
- ⇒ Save setting
- ⇒ To abort setting / escape

## Specification Parameter Description

Parameter Code	Function	Setting		Default Setting
		Parameter	Description	
CSP-00	Decimal Point		Refer to the description on next page.	
CSP-01	Capacity	999999 ↓ 000000	Max. value for weight display	999999
CSP-02	Division 1	1	Min. value for weight display	1
		2		
		5		
		10		
		20		
		50		
CSP-03	Division 2	1	Min. value for Weight display	1
		2		
		5		
		10		
		20		
		50		
CSP-04	Zero Tracking Setting		Refer to the description on next page.	
CSP-05	Unstable Detecting Setting		Refer to the description on next page.	

## Parameter Display Description

### CSP-00 Decimal Point

Display	Decimal Point Digit
<i>d</i> 0	None
<i>d</i> 00	1 Digit
<i>d</i> 000	2 Digits
<i>d</i> 0000	3 Digits
<i>d</i> 00000	4 Digits

### CSP-04 Zero Tracking Setting

Display	Division/Period
0.25 <i>d</i>	0.25 D/1 sec
0.5 <i>d</i>	0.5 D/1 sec
0.75 <i>d</i>	0.75 D/1 sec
1 <i>d</i>	1D/1 sec
1.25 <i>d</i>	1.25 D/2 sec
1.5 <i>d</i>	1.5 D/2 sec
1.75 <i>d</i>	1.75 D/2 sec
2 <i>d</i>	2 D/2 sec
<i>no</i>	No Zero Tracking



### CSP-05 Motion Detection Setting

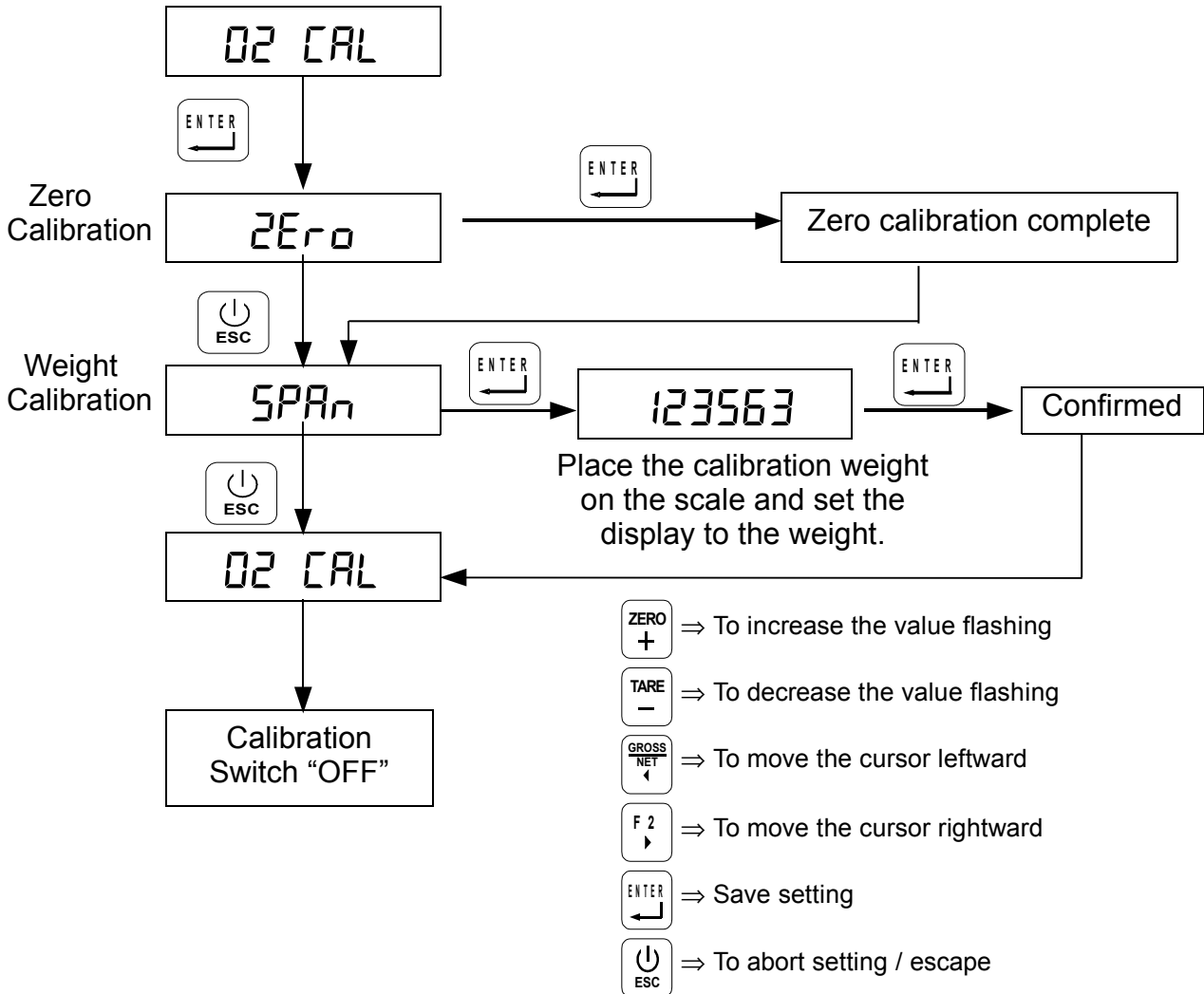
Display	Division / Period
0.25 <i>d</i>	0.25 D/1 sec
0.5 <i>d</i>	0.5 D/1 sec
0.75 <i>d</i>	0.75 D/1 sec
1 <i>d</i>	1D/1 sec
1.25 <i>d</i>	1.25 D/2 sec
1.5 <i>d</i>	1.5 D/2 sec
1.75 <i>d</i>	1.75 D/2 sec
2 <i>d</i>	2 D/2 sec
<i>no</i>	No Unstable Detecting




### 7.3. Calibration


Turn on and warm up the machine for 15 to 30 minutes before calibration.  
**Set the calibration switch to “ON”, and the screen will display 02 CAL.**

Press  or  to select **02 CAL**.





#### Zero Calibration

a ) Ensure nothing on the platter, when stable, press , and the screen will display “.....”. The zero calibration will be complete 5 seconds later.

b ) To abort zero calibration, just press .

#### Weight Calibration

a ) Place an object, whose weight is known, on the platter, and input the weight value from front panel. When stable, press  and the screen will display “.....”. The weight calibration will be complete 5 seconds later.

b ) To abort weight calibration, just press .

### 7.4. Password Setting

Set the calibration switch to "ON"

5Et

After 2 seconds

01 C5P

ZERO  
+

02 CAL

F 1

n 0000

Input new password  
"0000" means no password.

r 0000

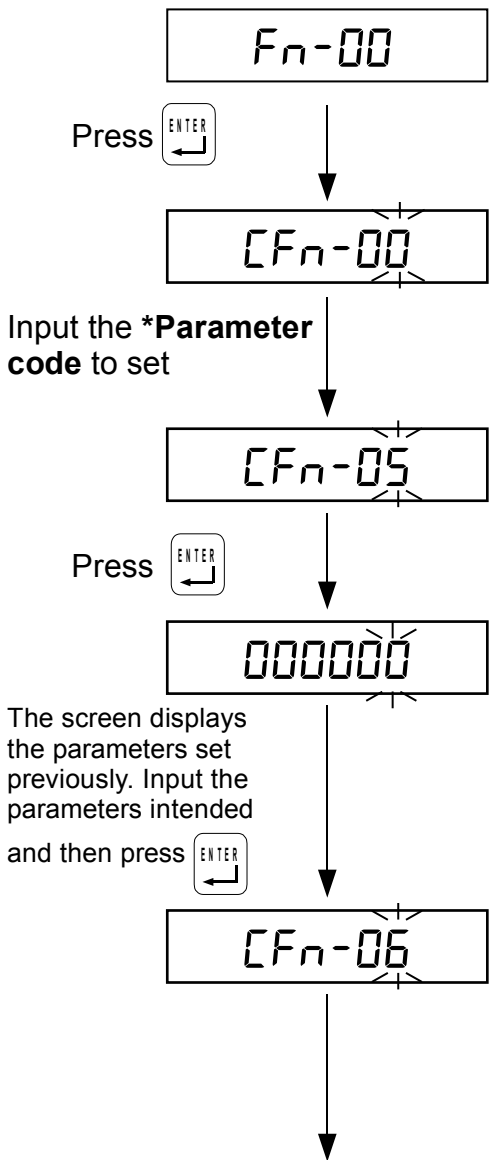
Confirm new password (re-input again)

02 CAL

After completing password setting, when entering calibration mode or function setting mode, the screen displays *Pu* for 1 second, and then *0000*. It's necessary to input the correct password to continue each setting.

If the password inputted is not correct, the screen displays *Err*.

7.5. Internal Function Setting









**\*Parameter Code**

- CFn-00 ⇒ Tare or Zero Function with Motion detected
- CFn-01 ⇒ Re-zero at Power ON
- CFn-02 ⇒ Re-zero Range
- CFn-03 ⇒ Filter Strength
- CFn-04 ⇒ AD Sampling Rate
- CFn-05 ⇒ Animal Scale Mode
- CFn-06 ⇒ Animal Scale Stable Range
- CFn-07 ⇒ Animal Scale Sampling Frequency
- CFn-08 ⇒ Dual Range Resolution Setting
- CFn-09 ⇒ Dual Range Resolution Middle Point Setting

The screen displays the parameters set previously. Input the parameters intended and then press

Continue with other functions setting

or press  to escape.

-  ⇒ To increase the value flashing
-  ⇒ To decrease the value flashing
-  ⇒ To move the cursor leftward
-  ⇒ To move the cursor rightward
-  ⇒ Save setting
-  ⇒ To abort setting / escape

## Internal Function Parameter Description

Parameter Code	Function	Setting		Default Setting
		Parameter	Description	
CFN-00	Tare or Zero Function under Unstable Status	0	ON	0
		1	OFF	
CFN-01	Re-zeroing after Turning on	0	OFF	0
		1	ON	
CFN-02	Re-zero Range	0% ~ 30%	0%: Full range re-zero 1% ~ 30%: Capacity × ± setting value%	0
CFN-03	Filter Strength	0 ~ 5	Strength increases by number	2
CFN-04	AD Sampling Rate	0	No limit	2
		1	20 times/sec.	
		2	10 times/sec.	
		3	5 times/sec.	
CFN-05	Animal Scale Mode	0	OFF	0
		1	Mode 1: No weight display under unstable status	
		2	Mode 2: Weight display whether under stable or unstable status	
CFN-06	Animal Scale Stable Range	0 ~ 100	Mode 2: Stable Range Setting	30
CFN-07	Animal Scale Sampling Frequency	0	8 times	2
		1	16 times	
		2	32 times	
		3	64 times	
		4	128 times	
CFN-08	Dual Range Resolution Setting	0	Multi-interval	0
		1	Multi-range	
CFN-09	Dual Range Resolution Middle Point Setting	0 ~ 65535		5000

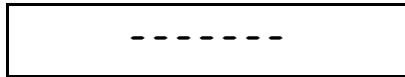
7.6. Special Function Setting

7.6.1. Animal Scale Function Setting

**CFN-05 = 1**

**(Animal Scale Mode1: No weight display in motion condition)**

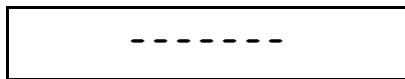
When no object is on the platter or any object is placed on the platter, the screen will display:



When the object is on the platter, after weight has been measured, the screen will display:



If the display weight value returns lower than zero plus 10d, the screen will display:

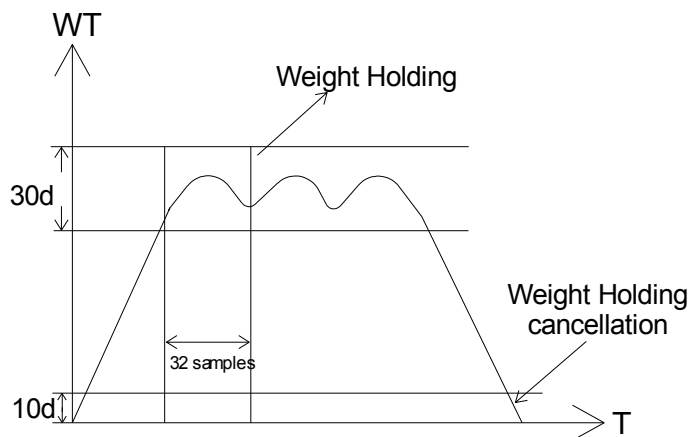


**CFN-05 = 2**

**(Animal Scale Mode 2: Weight display in motion condition)**

When the weight value reaches the range of CFN-06 and CFN-07 setting, the screen will hold and keep displaying the weight value. The Annunciator to the right of the GROSS annunciator is lit.

Example: CFN-06=30 CFN-07=2

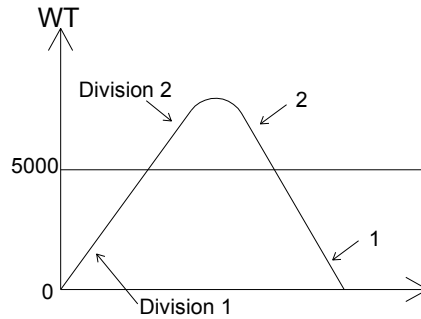


**7.6.2. Dual Range Resolution Switch Function**

If the setting of CSP-02 is not the same as CSP-03, the dual range resolution will be activated.

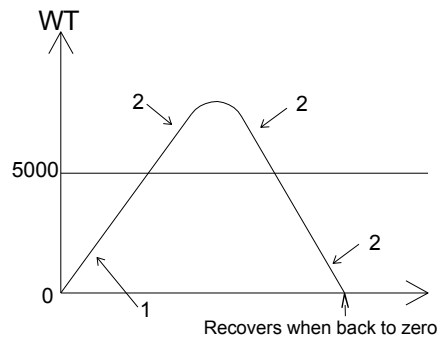
**CFN-08 = 0 ⇒ Multi-interval Weighing**

If CFN-09 = 5000





**CFN-08 = 1 ⇒ Multi-range Weighing**

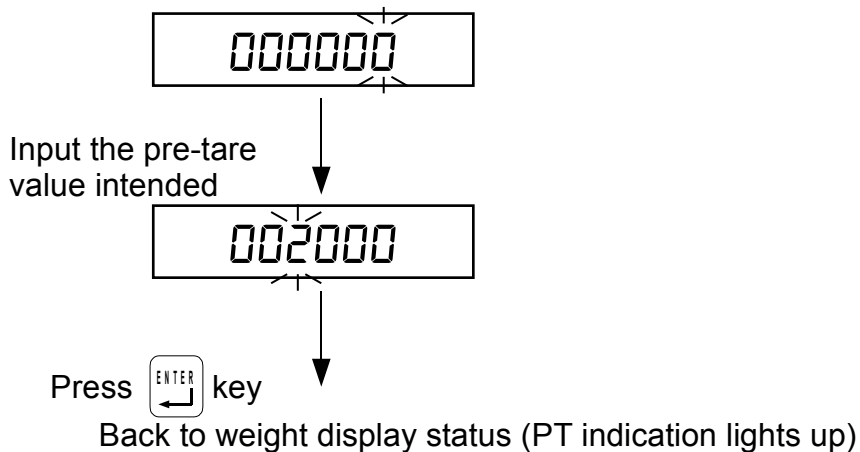
If CFN-09 = 5000



### 7.6.3.Pre-tare Function

#### FNC-02 or FNC-03 setting is set to parameter 6. (Pre-tare Function)

Under weight display status, press the  or  key (according to the FNC setting), the screen will display:





#### Pre-tare Cancellation

When the gross weight is displayed as “0”, press the  key to cancel the pre-tare value.

### 7.6.4.Resolution Switch Function

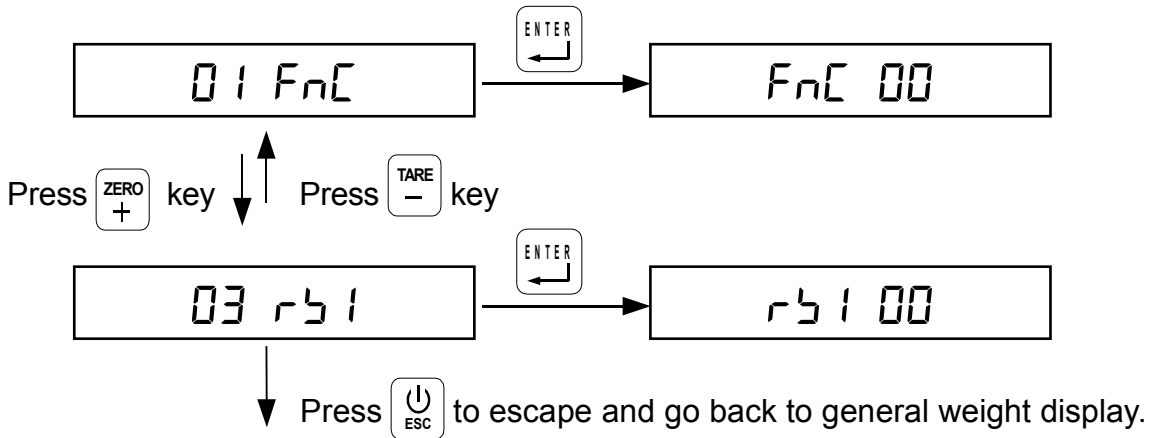
#### FNC-02 or FNC-03 setting is at parameter 5. (HR)

Under weight display status, press the  or  key (according to FNC setting), the screen will display 10 times resolution, and then, return back to normal after 5 seconds.

### 7.7. External Function settings

Note that these can be accessed from the front panel without setting the calibration switch to ON. Functions relating to serial communications are located in the SERIAL COMMUNICATIONS section of the manual.

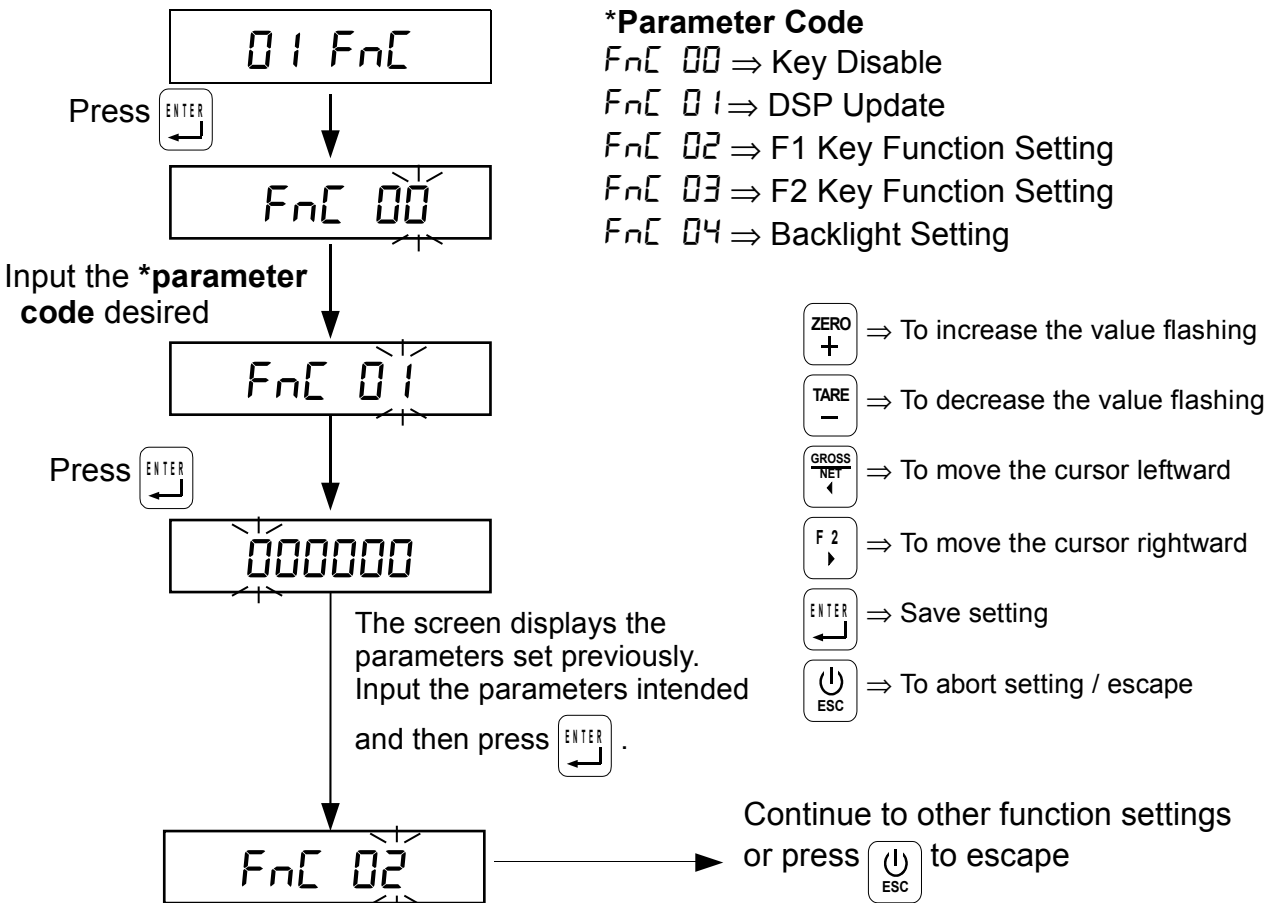
Under general weight display status, press **F 1** **ENTER** together and the screen will display:



01 FnC ⇒ External function setting

03 r51 ⇒ RS232/RS485 interface function (see serial communications section)

#### 7.7.1. External Function Setting Menu





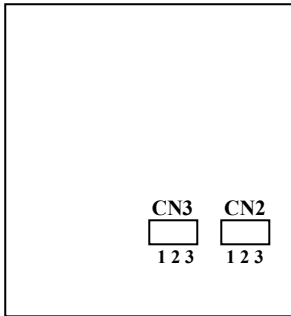
## External Function Parameter Settings

Parameter Code	Function	Setting				Default Setting
		Parameter	Description			
FNC-00	Key Disable	0000	0	ON	0000 corresponds to: (from left to right)	0000
		↓ 1111	1	OFF		
FNC-01	DSP Update	0	No Limit			1
		1	20 times/sec.			
		2	10 times/sec.			
		3	5 times/sec.			
		4	1 times/sec.			
FNC-02	F1 Key Function Setting	0	Print (printing)			0
		1	Units (units switch)			
		2	M+ (accumulation and printing)			
		3	MC (memory clearing)			
		4	Weight/Weight Accumulation/Times Accumulation Display Switch			
		5	HR (high resolution switch)			
		6	Pre-tare (pre-tare function)			
FNC-03	F2 Key Function Setting	0	Print (printing)			1
		1	Units (units switch)			
		2	M+ (accumulation and printing)			
		3	MC (memory clearing)			
		4	Weight/Weight Accumulation/Times Accumulation Display Switch			
		5	HR (high resolution switch)			
		6	Pre-tare (pre-tare function)			
FNC-04	Backlight Setting	0	Auto Backlight On (backlight on in operation only)			0
		1	Backlight On (backlight always on)			
		2	Backlight Off			

# 8. SERIAL COMMUNICATIONS

## RS232/RS485 Serial Output (with RTC)

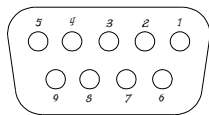
### 8.1. General Layout



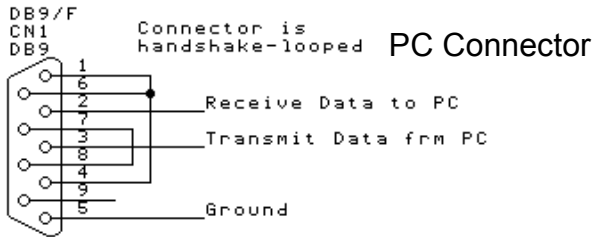
**Short 1 and 2 pins for RS485 output.  
Short 2 and 3 pins for RS232 output.**

#### 8.1.1. Pin Numbering of Rear Panel Connector

Note: The communications connection is a 3-wire connection without software or hardware handshaking. It may be necessary to use a null modem cable for your host device or printer requires handshaking.



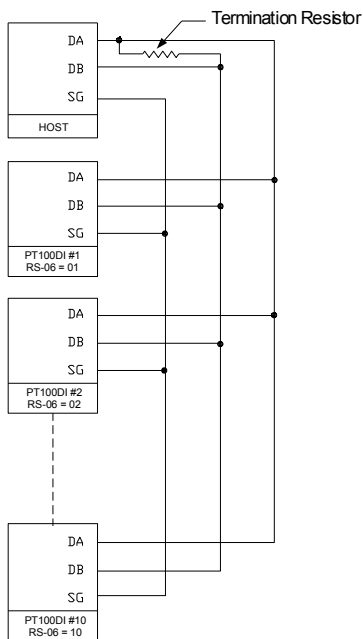
PT100DI Connector



PT100DI		PC DB9		PC DB25	
Pin	Name	Pin	Name	Pin	Name
2	RxD	3	TxD	2	TxD
3	TxD	2	RxD	3	RxD
5	GND	5	GND	7	GND
6	DA		RS485		RS485
6	DB		RS485		RS485

#### 8.1.2. Connection Description (RS485)

The RS485 interface is capable of enabling connection of up to 10 PT100DI indicators.

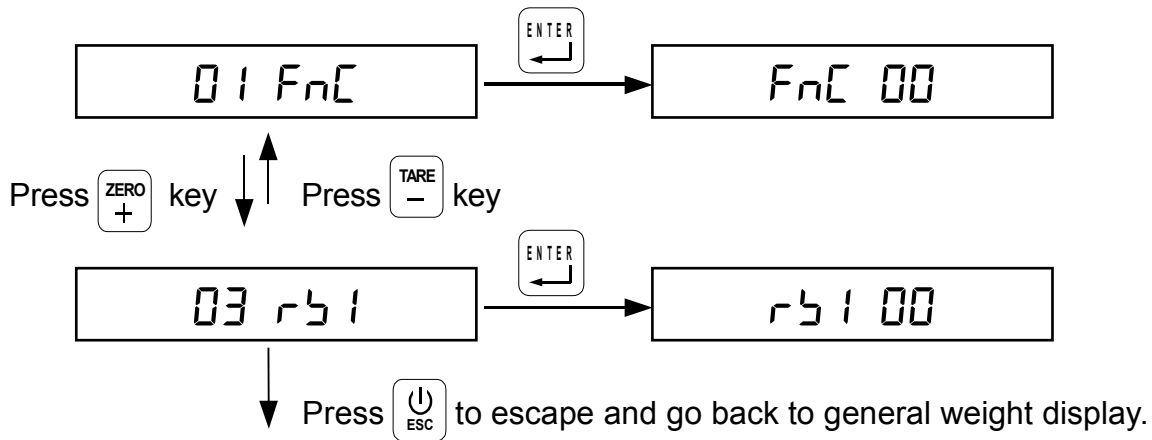


#### Note

1. If the termination resistor is built into the host interface, it's not necessary to connect an additional resistor outside.
2. If the host computer has no signal ground (SG), it's not necessary to use this connection.

## 8.2. Communications Functions

Under general weight display status, press **F 1** **ENTER** together and the screen will display:

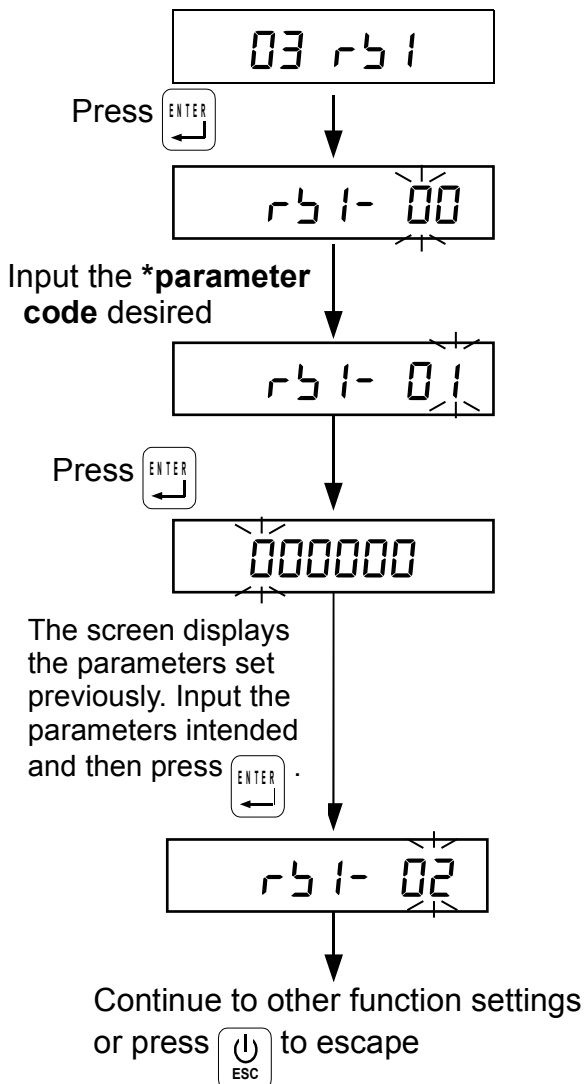


01 FnC ⇒ External function setting (see chapter 7)

03 r51 ⇒ RS232/RS485 interface function

### \*Parameter Code

- r51-00 ⇒ Information Pattern
- r51-01 ⇒ Transmission Method
- r51-02 ⇒ Transmission Rate
- r51-03 ⇒ Parity, Bit Length, Stop Bit
- r51-04 ⇒ Unstable or Over Load
- r51-05 ⇒ Auto Transmission Condition
- r51-06 ⇒ Command Address
- r51-07 ⇒ Output Format
- r51-08 ⇒ Transmission Times
- r51-09 ⇒ Date Setting
- r51-10 ⇒ Time Setting



- ZERO +** ⇒ To increase the value flashing
- TARE -** ⇒ To decrease the value flashing
- GROSS NET** ⇒ To move the cursor leftward
- F 2** ⇒ To move the cursor rightward
- ENTER** ⇒ Save setting
- ESC** ⇒ To abort setting / escape

## 8.2.1.RS232 / RS485 Interface Functions

Parameter Code	Function	Setting		Default Setting
		Parameter	Description	
RS1-00	Information Pattern	0	Display Correspondingly	0
		1	Gross Weight	
		2	Net Weight	
		3	Tare	
		4	Weight Accumulation	
		5	Times Accumulation	
		6	Output with Date & Time	
RS1-01	Transmission Method	0	Continuous Transmission	0
		1	Auto Transmission	
		2	Press <input type="button" value="F1"/> or <input type="button" value="F2"/> to transmit	
		3	Command Mode (no address)	
		4	Command Mode (with address)	
RS1-02	Transmission Rate	0	1200	1
		1	2400	
		2	4800	
		3	9600	
		4	19200	
RS1-03	Parity Bit Length Stop Bit	0	N, 8, 1 No Parity 8 Bits Length 1 Stop Bit	2
		1	O, 7, 1 Odd Parity, 7 Bits Length, 1 Stop Bit	
		2	E, 7, 1 Even Parity, 7 Bits Length, 1 Stop Bit	
RS1-04	Unstable or Over Load	0	Continuous Output	0
		1	Stop Output	
RS1-05	Auto Transmission Condition	0	Positive (over + 10D)	0
		1	Positive/negative (over + 10D, under - 10D)	
RS1-06	Command Address	00 ↓ 99	Available only if RS1-01 setting is "4"	0
RS1-07	Output Format	0	Standard Format	0
		1	UMC 600	
RS1-08	Transmission Times	0	No Limit	4
		1	1 times/sec.	
		2	2 times/sec	
		3	5 times/sec	
		4	10 times/sec	
		5	20 times/sec	
RS1-09	Date Setting			
RS1-10	Time Setting			

8.2.2. Transmission Format

RS1-00 ⇒ 0 ~ 3

S	T	,	G	S	,	+	1	2	3	4	.	5	6		g	CR	LF
---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	---	----	----

Header 1    Header 2    Weight Data ( 8 digits )    Unit Terminators

**Header 1**

ST : Stable Weight / US : Unstable Weight / OL : Weight Over Load

**Header 2**

GS : Gross Weight / NT : Net Weight / TR : Tare

**Weight Data ( 8 digits )**

The first digit of the weight data represents “+/-” indication for weight value. The other 7 digits, including decimal point, represent the weight value. If the weight is over load (Header 1 : OL), the screen turns into “blank” except “+/-” indication and decimal point.

**Unit**

Kg, g, t, lb or “blank”

**Terminators**

CL and LF are data termination code.

RS1-00 = 4

T	N	,	1	2	3	CR	LF
---	---	---	---	---	---	----	----

RS1-00 = 5

T	W	,	+	1	2	3	4	.	5	6	k	g	CR	LF
---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

RS1-00 = 6

D	A	T	E		:	2	0	X	X	/	X	X	/	X	X	CR	LF
T	I	M	E		:	X	X	:	X	X	:	X	X	CR	LF		
G	R	O	S	S	:	+	1	2	3	4	.	5	6	k	g	CR	LF
N	E	T			:	+	1	2	3	4	.	5	6	k	g	CR	LF
T	A	R	E		:	+	1	2	3	4	.	5	6	k	g	CR	LF
T	N				:	X	X	X	CR	LF							
T	W				:	+	1	2	3	4	.	5	6	k	g	CR	LF

### 8.2.3.Command Mode

In command mode a command is sent to the PT100DI, a response from the PT100DI contains the required information or an error indication.

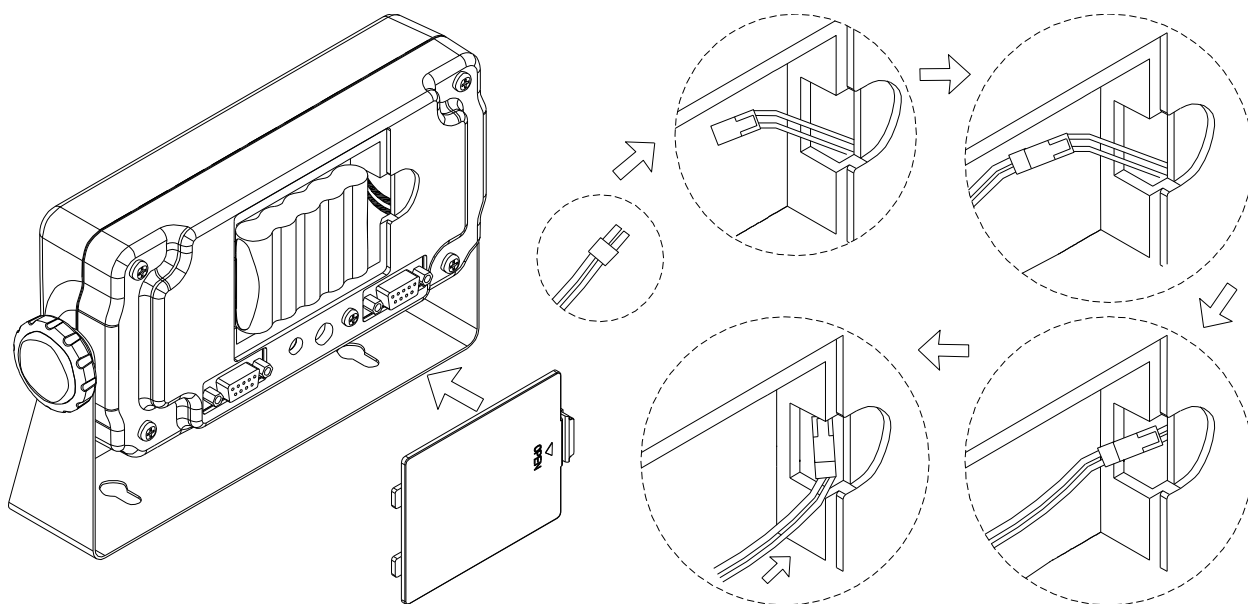
Command	Function	Command	Function
READ, RW	Weight Reading	CT	Tare Clearing
ZERO, MZ	Weight Re-zeroing	RI	Weight Accumulation
TARE, MT	Gross Weight Reducing	Rm	Times Accumulation
NTGS	Gross / Net Switch	Rn	Date
MG	Gross Weight Indicating	Ro	Time
MN	Net Weight Indicating	AT	Weight and Times Accumulation
		DT	Weight and Times Accumulation Clearing

- ❶ When transmitting the commands mentioned above, it's necessary to add the termination code "CR(0DH) and LF(0AH)".
- ❷ If the command is not correct, it will reply "E" + "Command Unidentified".
- ❸ If using command mode with address set (RS1-06 = 4), add "@ address" in front of each command.  
 Example: When RS1-08 = 1, to read the weight value, the complete command should be "@01RW(CR)(LF)".




## 9. MAINTENANCE

### 9.1. Installing/replacing the battery.




Follow the diagram below to install or replace the rechargeable battery. Note that it is necessary to open the case to fit the connector through the battery compartment hole. The case is opened by removing the mounting bracket and the 4 retaining screws. The back is carefully pulled from the case keeping it parallel with the case. The pins connecting the back to the case can be damaged if the back is twisted. When the back is free the battery can be fitted and the back carefully re-assembled with the battery connector located flat under the battery compartment.








### 9.2. Default Recovery for All Parameters

1. Set the calibration switch to "ON", when re-zeroing after turning on, press and hold   simultaneously.
2. The screen will display *INITALL*.
3. To continue and reset all parameters, press  and hold until *End* is displayed, and then set the calibration switch to "OFF".

### 9.3. Default Recovery for General Function Parameters

1. When re-zeroing after turning on, press   and hold simultaneously.
2. The screen will display *INITFn*.
3. To continue and reset general function parameters, press  and hold until until the PT100DI restarts the turning on countdown.

### 9.4. Self-diagnosis Mode

1. When re-zeroing after turning on, press  and hold.
2. The screen will display *UEr*, which means entered self-diagnosis mode.
3. Use  or  keys to select the item it is intended to test.
4. Press the  key to enter self-diagnosis, and press  key to escape.

#### Self Diagnosis Tests

Item	Display	Testing Item
1	<i>UEr</i>	Program Version Number Displaying
2	<i>dSP</i>	7-segment Display Testing
3	<i>KEY</i>	Keypad and Calibration Switch Testing
4	<i>AdC</i>	AD Conversion Value Displaying
5	<i>EEP</i>	EEPROM Testing
6	<i>rTc</i>	RTC Date & Time Testing
7	<i>232</i>	OP-1 RS232 Serial Output Interface Testing

#### 1. Program Version Number

7-segment display reveals program version number.

#### 2. 7-segment Display Testing

7-segment display reveals “0 ~ 9” and “.”.

#### 3. Keypad & Calibration Switch Testing

Adjust calibration switch to “ON”, and press any key, the corresponding bit will be changed from  $i \rightarrow \bar{i}$ .


#### 4. AD Conversion Value


7-segment display reveals the internal value of the present weight.

#### 5. EEPROM Testing

Displaying *PASS* represents normal condition. Displaying *FA iL* represents an extraordinary condition.

#### 6. Time & Date Testing

Press the  key to enter the testing mode, and the screen will display the date in ISO format XX.XX.XX. Example: “05.11.03” represents 3rd of November, 2005.

Press the  key again to display time XX.XX.XX. Example: “09.45.50” represents 9 o'clock, 45 minute and 50 seconds.

#### 7. RS-232 Serial Output Interface Testing

Short the 2<sup>nd</sup> pin and 3<sup>rd</sup> pin of the SER. OUT. D-SUB 9pin socket. Displaying *PASS* represents normal condition. Displaying *FA iL* represents a fault condition. If connected with a computer (protocols must be corresponding), the screen will display *0~9*, which means the RS-232 output is in normal condition.