# *F701 Weighing Controller*

*OPERATION MANUAL*

UNIPULSE

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**Rev. 2.12-04**

# *WELCOME!*

Thank you very much for your UNIPULSE purchase!

F701 Weighing Controller

The Unipulse Model F701 is suitable for Hopper scale, Packing scale, Checkweighing and Batching systems. Full digital front panel calibration. High speed A/D Conversion rate and powerful digital processing capabilities of (100 times/sec.) allow top speed and accuracy for your applications.

Self-Check function and Watch-Dog in CPU, ROM and internal circuit ensure excellent reliability. Typical Set Point processing includes three-gate feed and discharge gate controls. Automatic free fall compensation constantly updates the free fall value for greater filling accuracy.

Numeric keyboard for Tare and Set Point entry. Key entry protection. Two(2) Zero, Span adjustment ranges, two(2) types of gain and be selected according to the output of load-cell.

Unipulse standard 2-wire serial interface SI/F for connection Unipulse printer and remote displays. Printer could print daily, monthly report with each necessary items, Remote displays could display Gross, Net, Tare weight and Accumulated value. Optional BCD output, RS-232C communication interface, RS-485 communication interface, D/A Converter and Set-point interface.

# SAFETY PRECAUTION

◇ The integrated circuits used in this equipment are highly immune to noise and RFI when properly installed in the unit.
The F.G. terminal on the rear panel must be grounded directly, not with the AC ground.

◇ Therefore, when shipping please always use original packing (conductive material) for shipping. Remove equipment from the shipping container and examine the external surfaces of the equipment for physical damage.

◇ The F701 should be positioned in a safe area where there is no combustible gas, the operating temperature is +14°F to +104°F (-10℃ to +40℃), storage temperature -4 °F to +185 °F (-20 ℃ to +85 ℃).

◇ Confirm the AC voltage of all equipment before power-up. The F701 can operate within a -15% to +10% voltage variation.

# Table of Contents


1 Appearance Description ..... 1

1.1 Front Panel ..... 1
1.2 Keypad ..... 3
1.3 Rear Panel ..... 4

2 Connection ..... 6

2.1 Loadcell Connector ..... 6
2.2 Control Signal Input/Output Connector ..... 9

3 Function ..... 11

3.1 Setting Mode Chart ..... 11
3.2 Setting Procedure ..... 13
3.3 Setting Mode 0 ..... 14
3.4 Setting Mode 1 ..... 15
3.5 Setting Mode 2 ..... 16
3.6 Setting Mode 3 ..... 19
3.7 Setting Mode 4 ..... 21

4 Span Calibration ..... 24

4.1 What is Calibration ..... 24
4.2 Calibration Procedure ..... 25
CAL Lock Release, Shift Zero Point HI/LO Gain/ Filter/ Motion Detection/
Decimal Point,Unit/ Scale Capacity/ Minimum Scale Division/ Balance Weight/
Zero Calibration/ Span Calibration/ Calibration Lock/ Secondary Calibration

5 Function Settings ..... 39

5.1 Display Setting ..... 39
Display Frequency/ 1/4 Scale Division/ Zero Tracking/ One Touch Tare Subtraction/
Tare Reset/ Digital Preset Tare Subtraction/ Digital Zero & Digital Zero Reset/
Gravitational Acceleration

5.2 Auto Free Fall Compensation ..... 49

5.3 Control Input Signal ..... 51
5.4 Control Output Signal ..... 54
5.5 The Example of Feeding Weighing ..... 62
5.6 The Example of Discharging Weighing. ..... 64
5.7 Simple Comparison Control ..... 66
5.8 Sequence Control ..... 68
5.8.1 Sequence with Judgment ..... 68
5.8.2 Sequence with Adjust Feeding Effective ..... 70
5.8.3 Sequence without Judgment ..... 71
5.8.4 Stop Signal ..... 71
5.8.5 AZ Count, Judging Count and Average Count of Auto Free Fall Compensation ..... 72

6 Interface ..... 73

6.1 2-wire Serial Interface (SI/F) ..... 73
6.2 Interface for the Setpoint (Option 1) ..... 76
6.3 BCD Parallel Data Output Interface (Option 2) ..... 78
6.4 RS-232C Communication Interface (Option 3) ..... 82
6.5 D/A Converter (Option 4) ..... 91
6.6 RS-485 Communication Interface (Option 5) ..... 93

7 Trouble Shooting ..... 95

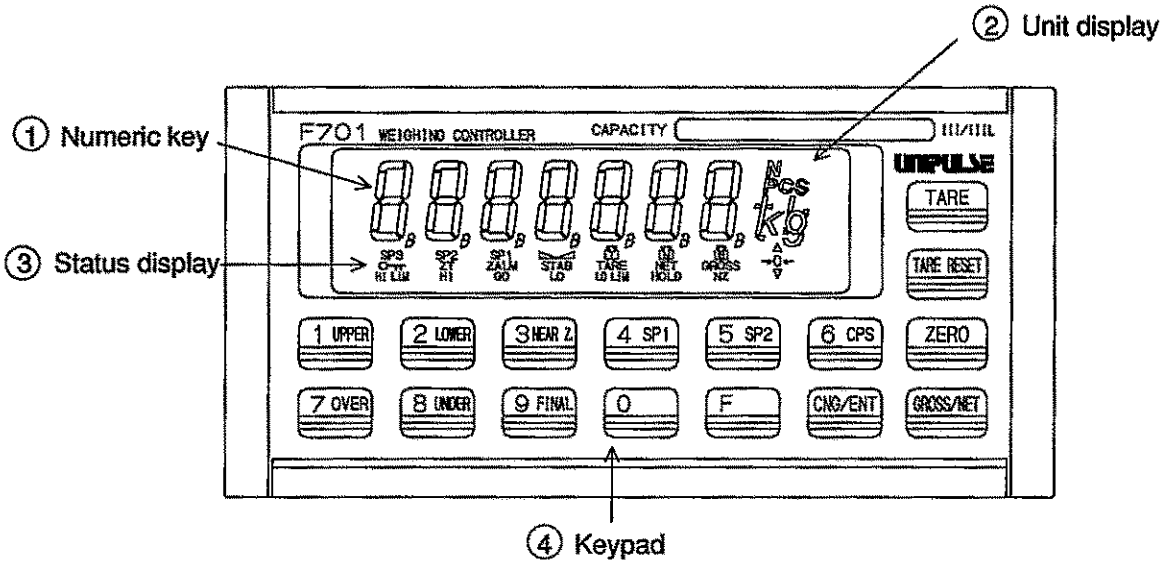
7.1 Self-Check & Memory Clear ..... 95
7.2 Replacing a Fuse ..... 97
7.3 Replacing the Back-Up Battery ..... 98
7.4 Changing the AC power voltage ..... 99
7.5 Over Scale Display & Error Display ..... 101
7.6 Settlement ..... 102
Over Scale Error/ Error Display/ Calibration Error/

8 Specifications ..... 107

8.1 The List of Initial Setting Value ..... 107
8.2 Block Diagram ..... 110
8.3 Dimensions ..... 112
8.4 Specifications ..... 113

# 1 Appearance Description

## 1.1 Front Panel




① Numeric Display

**Weight Display** : Display Gross, Net and Tare weight (5 digits, decimal point, minus sign)

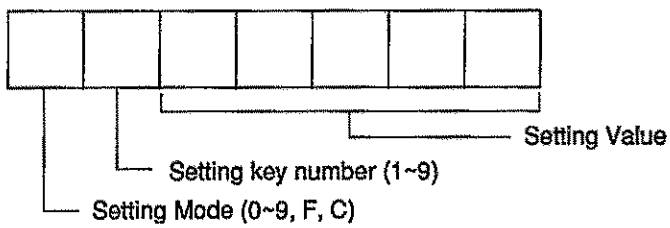
**Overflow Display** :

- When an input signal from the loadcell exceeds the Span adjustment range. **'LoAd'**
- When an input signal from the loadcell is lower than the Span adjustment range. **'–LoAd'**

( Input range = HI gain [0.0 mV/V ~ 1.5 mV/V] ; LOW gain [0.0 mV/V ~ 3.0 mV/V] )

- Net weight > Over Net set value **'oFL1'**
- Gross weight > Capacity + 9 scale division. **'oFL2'**
- Gross weight > Over Gross set value. **'oFL3'**

**Setting Value Display** : Display Calibration and other setting value



## ② Unit Display

Display selected system of weight measurement ( **t / kg / g / lb / N** / none )

## ③ Status Display

SP3 : Turns on when SP3 signal outputs from Control Connector on the rear panel.

SP2 : Turns on when SP2 signal outputs from Control Connector on the rear panel.

SP1 : Turns on when SP1 signal outputs from Control Connector on the rear panel.

 : Turns on when the Calibration Lock on the rear panel is enabled

ZT : Turns on when Zero Tracking is operating.

ZALM : Blinks when zero drift exceeds the set Digital Zero Regulation entered in Digital Zero or Zero Tracking.

: Turns on when weighing value display is stable.

: Turns on when Tare subtraction is on.
Blinks when the weighing display shows Tare weight.

: Turns on when the weighing display shows Net weight.

: Turns on when the weighing display shows Gross weight.

HI LIM : Turns on when Upper Limit signal outputs from Control Connector on the rear panel.

HI : Turns on when Over signal outputs from Control Connector on the rear panel.

GO : Turns on when Go signal outputs from Control Connector on the rear panel.

LO : Turns on when Under signal outputs from Control Connector on the rear panel.

LO LIM : Turns on when Lower Limit signal outputs from Control Connector on the rear panel.

HOLD : Turns on when weight display is held.

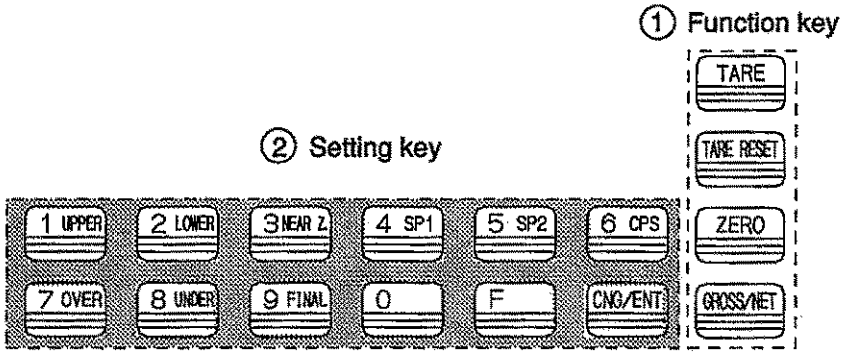
NZ : Turns on when weight value ≦ Near Zero value.

△ : Turns on when the weight value is at +1/4 scale division.

→0← : Turns on when the weight value is at Center Zero or each Center division.

▽ : Turns on when the weight value is at −1/4 scale division.

## 1.2 Keypad




### ① Function key

TARE : Press TARE key, the Tare weight is subtracted, the Net weight becomes zero, T TARE turns on.
The range of Tare Subtraction is selected in Setting Mode 4-9, full range or from 0 < Tare < Capacity

TARE RESET : Press TARE RESET key, restore the subtracted Tare and Net weight becomes equal to the Gross Weight

ZERO : Press ZERO → CNG/ENT keys zeros the weighing value, the Gross weight becomes zero.
If value exceeds the set Digital Zero Regulation, Zero alarm "ZALM" blinks.

GROSS/NET : Press GROSS/NET key, the weighing value display is switched between Gross and Net.

However, the display cannot be switched with this key if the switching Gross weight/Net weight display is set to "1:Control signal input " under External Function Selection 1 in setting mode 4.

### ② Setting Key

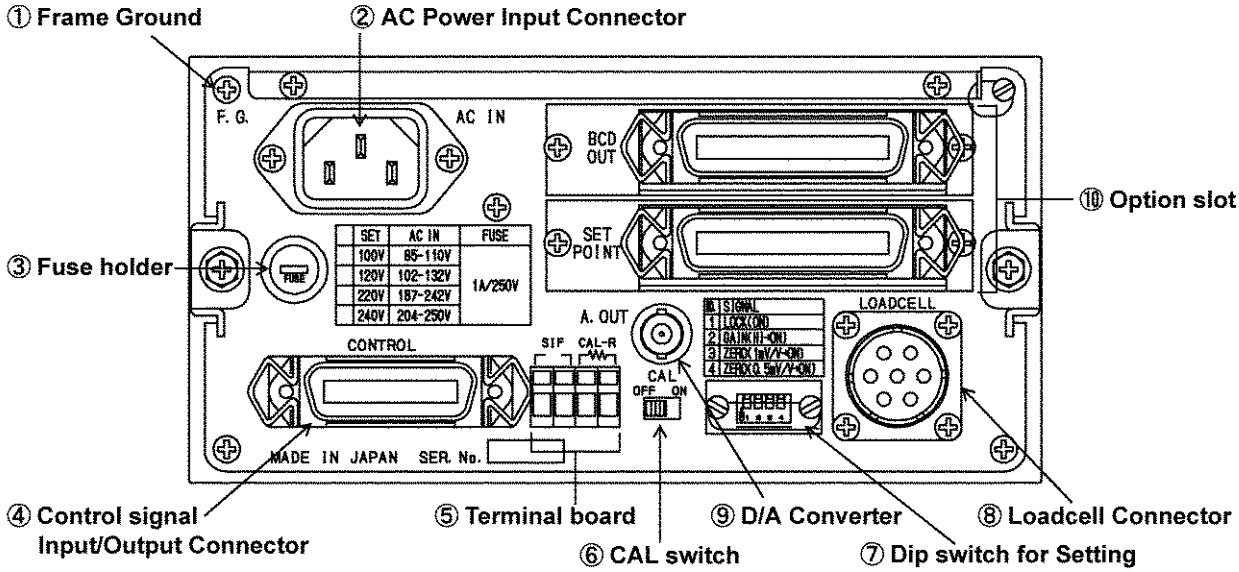
0 : Press 0 key, T TARE blinks.
Display subtracted Tare weight + Digital Preset Tare Subtraction weight.
Repress 0 key returns display to weighing mode. Contrary, press 0 key clears the present operation and returns display to weighing mode. If in Setting Mode, pressing 0 key twice returns unit to Setting Mode 0.

1 UPPER ~ 9 FINAL : Numeric keys for inputting data.

F : Press F key, changes Setting Mode

CNG/ENT : Press CNG/ENT key to enter the set or change value.

## 1.3 Rear Panel




### ① Frame Ground

The F.G. terminal must be grounded to avoid electric shocks and static charge interference.
The F.G. terminal on the rear panel must be grounded directly, not with the AC ground.

### ② AC Power Input Connector

AC input is labeled with the standard AC voltage of the country in which the unit was purchased.
Available voltages are : 100V, 120V, 200V or 220V.
Confirm the correct voltage on your F701. AC frequency is 50/60 Hz.

### ③ Fuse holder

1A **midget** fuse is inserted into the AC power circuit. The fuse can be removed by inscrewing the fuse holder counter-clockwise.

### ④ Control signal Input/Output Connector

Refer to page 9.

### ⑤ Terminal board

SI/F 2-wire serial interface is for connecting the F701 to peripheral equipment such as printer or remote displays.

CAL-R Connect a registor to these terminals to operate secondary calibration. Use a 50 to 300KΩ resistor with a temperature coefficient below 50ppm/℃.

### ⑥ CAL switch

This switch is for turning on and off the resistor connected to the CAL-R for secondary calibration. Use this only when operating the Span Calibration as secondary calibration.

CAL switch and CAL-R are used for Secondary Calibration. Due to the replacement of Weighing Controller F701 provides against an emergency, and no chance to do Actual Load Calibration immediately, but have to continually operate the weighing system.
The secondary calibration is an convenient, temporary measure. CAL switch must be turned off except is doing secondary calibration.

### ⑦ Dip Switches for Calibration

1 - Calibration ON/OFF

2 - HI GAIN (0.5 ~ 1.5 mV/V) LOW GAIN (1.0 ~ 3.0 mV/V)

3 - Zero shift (1 mV/V) ON/OFF

4 - Zero shift (0.5 mV/V) ON/OFF


In detail refer to Span Calibration page 26.

### ⑧ Loadcell Connector

Refer to page 6 for pin assignment and connection configuration.

### ⑨ D/A Converter (Option 4)

The D/A Converter Interface sends an analog signal for each weighing value (0~10V or 4~20 mA). BNC terminal is used.


### ⑩ Option slot

Interface for the set point (Option 1)

BCD parallel data output interface (Option 2)

RS-232C communication interface (Option 3)

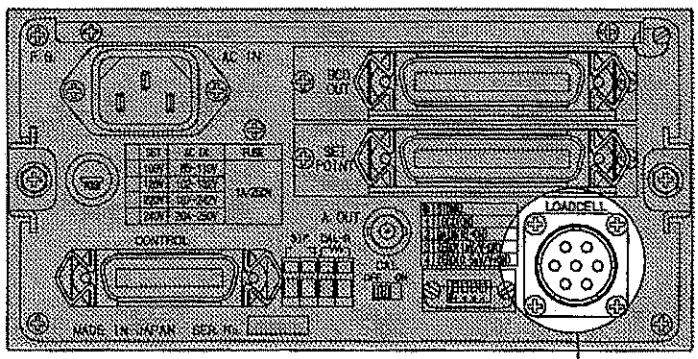
RS-485 communication interface (Option 5)

* 2 of options of 1, 2, 3, and 5 can be installed in option slot.
  Serial communication interface (RS-232C, RS-485) is 1 option only.

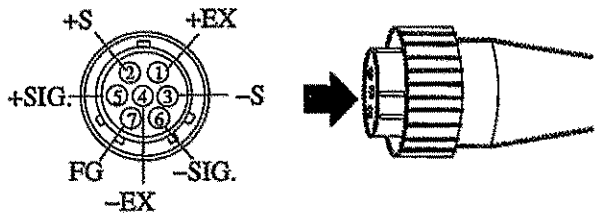
# 2 Connection

## 2.1 Loadcell Connector

The excitation voltage of F701 is 10VDC at a maximum current of 120mA. This can drive up to four (4) 350 ohm loadcells. 7-pin round connector for 6-wire connection with loadcells. Adaptable plug is Hirose JR16PK-7S (attached to the F701) or its equivalent. Refer the diagram below for loadcell pin assignment.



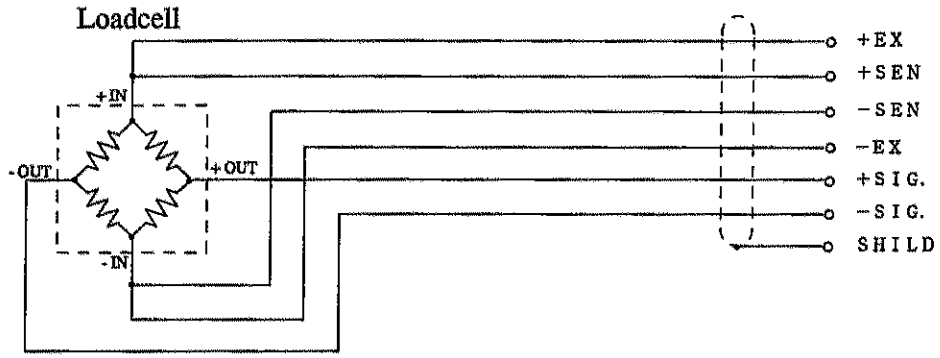

Loadcell Connector




| Pin No. | Signal (6-wire) | Signal (4-wire) |
|---|---|---|
| 1 | +EX | +EX (Connect 1 to 2) |
| 2 | +S | |
| 3 | −S | −EX (Connect 3 to 4) |
| 4 | −EX | |
| 5 | +SIG. | +SIG. |
| 6 | −SIG. | −SIG. |
| 7 | SHIELD | SHIELD |

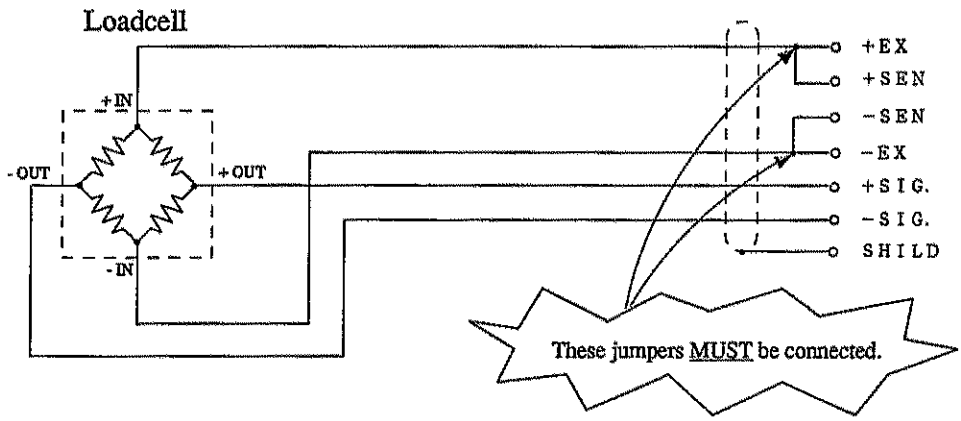
(1) 6-wire connection

The loadcell input of the F701 is for a 6-wire (remote sense) connection. 6-wire shielded loadcell cable should be used and kept separate from AC or other noise generating wire.




(2) 4-wire connection

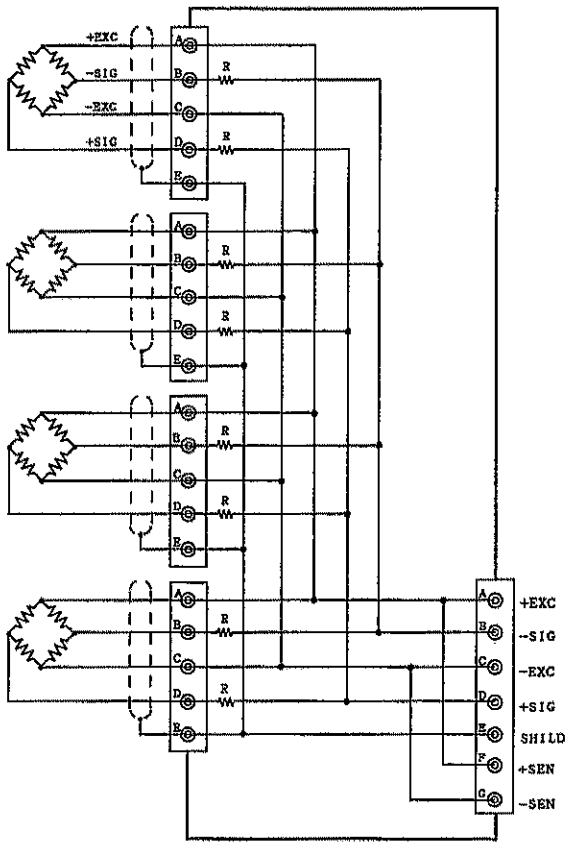
Jumper the Sense lines to the Excitation lines (+EX to +SEN; -EX to -SEN) in a 4 wire system (shown below). Failure to comply may result in system damage.




The F701 excitation voltage is 10VDC. Using a loadcell with a maximum excitation voltage less than 10V may generate heat or damage the unit.

(3) Connecting loadcells in parallel

The following diagram shows how to connect several loadcells in parallel for a truck scale or flow scale.




'n' (number) loadcells connected in parallel are considered one unit whose capacity is 'n' x rated capacity of loadcells (loadcells must have the same capacity, bridge resistance, and mV/V). The averaging resistor (R) must be in same relative ratis with a low temperature coefficient. Averaging resistors are not needed if loadcells were designed for parallel connection.

**NB**

When connecting loadcells in parallel, choose loadcells with a higher capacity than calculated. This will help with overload protection and shock loading.

## 2.2 Control Signal Input/Output Connector

This connector is for inputting signals to the F701 and outputting control signals to external devices. Connector DDK57-30240 is included.

◇ Control Connector pin assignment

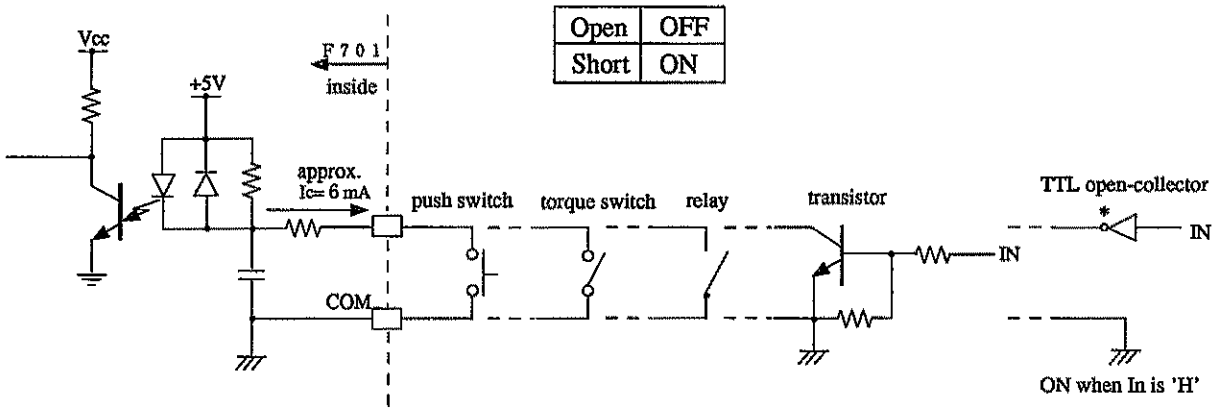
| | | | | | |
|---|---|---|---|---|---|
| 1 | * | COM | 13 | * | COM |
| 2 | in | G/N | 14 | in | Hold or Judgement |
| 3 | in | D/Z ON | 15 | in | Feed/Discharge |
| 4 | in | Tare Subtraction ON | 16 | in | Start *1 |
| 5 | in | Tare Subtraction OFF | 17 | in | Stop *1 |
| 6 | out | Near Zero | 18 | out | Lower Limit |
| 7 | out | SP1 | 19 | out | Upper Limit |
| 8 | out | SP2 | 20 | out | Stable |
| 9 | out | SP3 | 21 | out | Weight Error or Sequence Error *2 |
| 10 | out | Under | 22 | out | Go or Complete *2 |
| 11 | out | Over | 23 | out | RUN |
| 12 | * | COM | 24 | * | COM |

* The COM (Common) terminals are connected internally (COM : 1, 12, 13, 24 pin)
*1 are effective in the Sequence Mode
*2 outputs are selectable

- **Input signals** (8) : Gross/Net, Digital Zero ON, Tare Subtraction ON, Tare Subtraction OFF, Hold or judgment, Feed/Discharge, Start and Stop
  Signals are inputted by shorting or opening Input and COM terminals.
- **Output signals** (12) : Near zero, SP1, SP2, SP3, Under, Over, Lower Limit, Upper Limit, Stable, Weight Error/Sequence Error, Go/Complete, RUN
  The output signal circuit is an open-collector output of a transistor.

### Equivalent Circuit (Input)

Signals are inputted by shorting or opening input and COM terminals. A relay, switch or transistor may be used for this application.

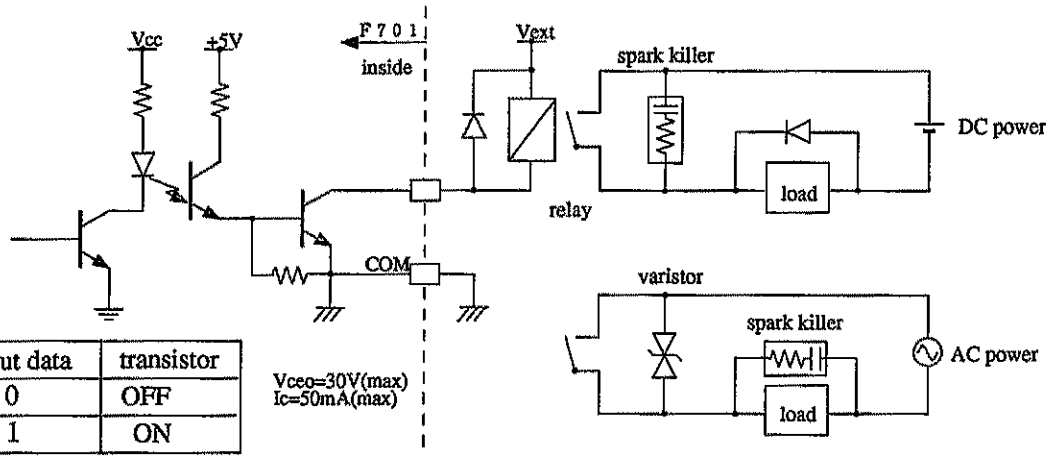



| | |
|---|---|
| Open | OFF |
| Short | ON |

- Do not apply external voltage to the signal input circuit.
- Use external elements which withstand Ic=10mA.
- Leakage from external elements must be 100 $\mu$ A or less.

### Equivalent Circuit (Output)

The output signal circuit is an open-collector output of a transistor.

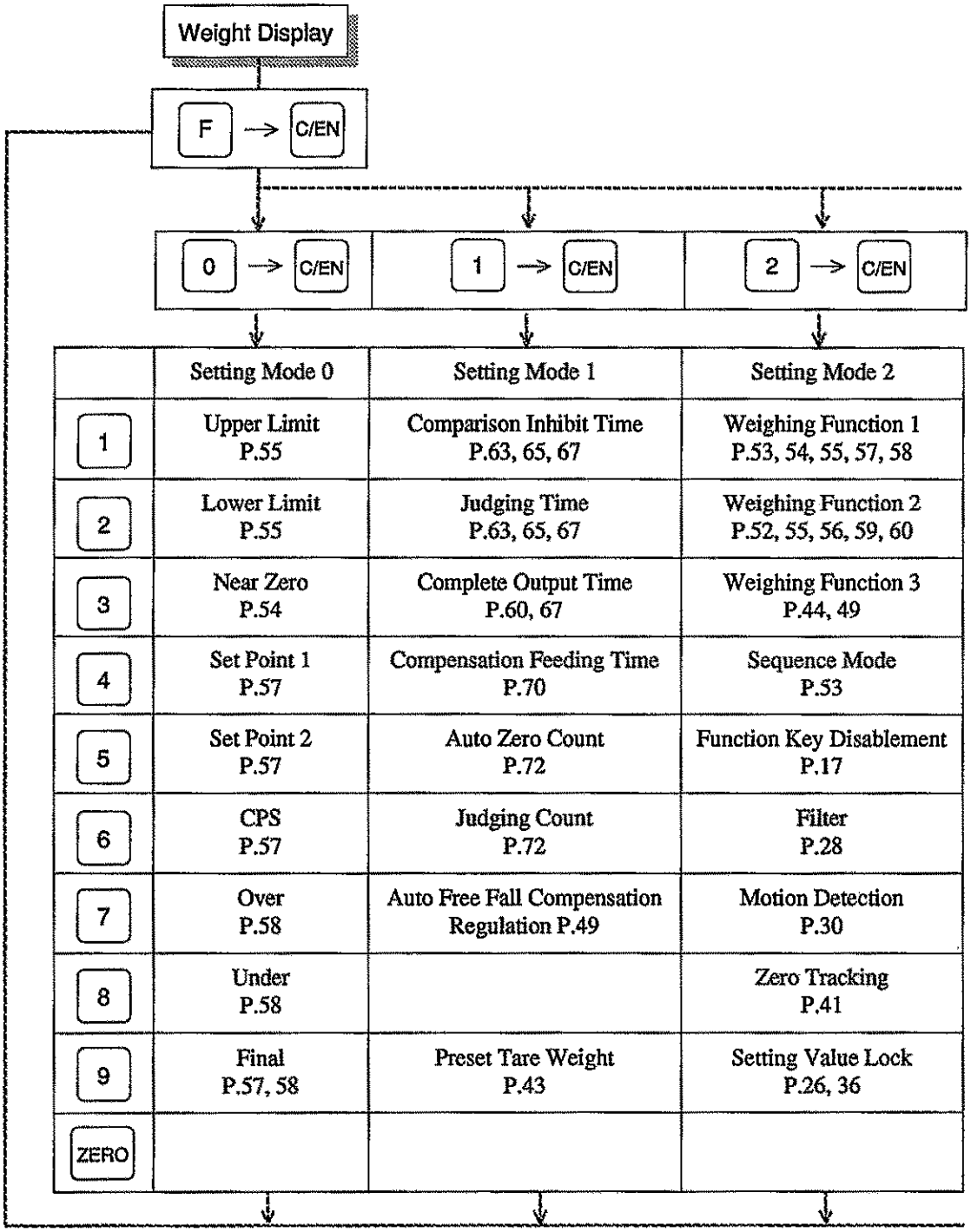



| Output data | transistor |
|---|---|
| 0 | OFF |
| 1 | ON |

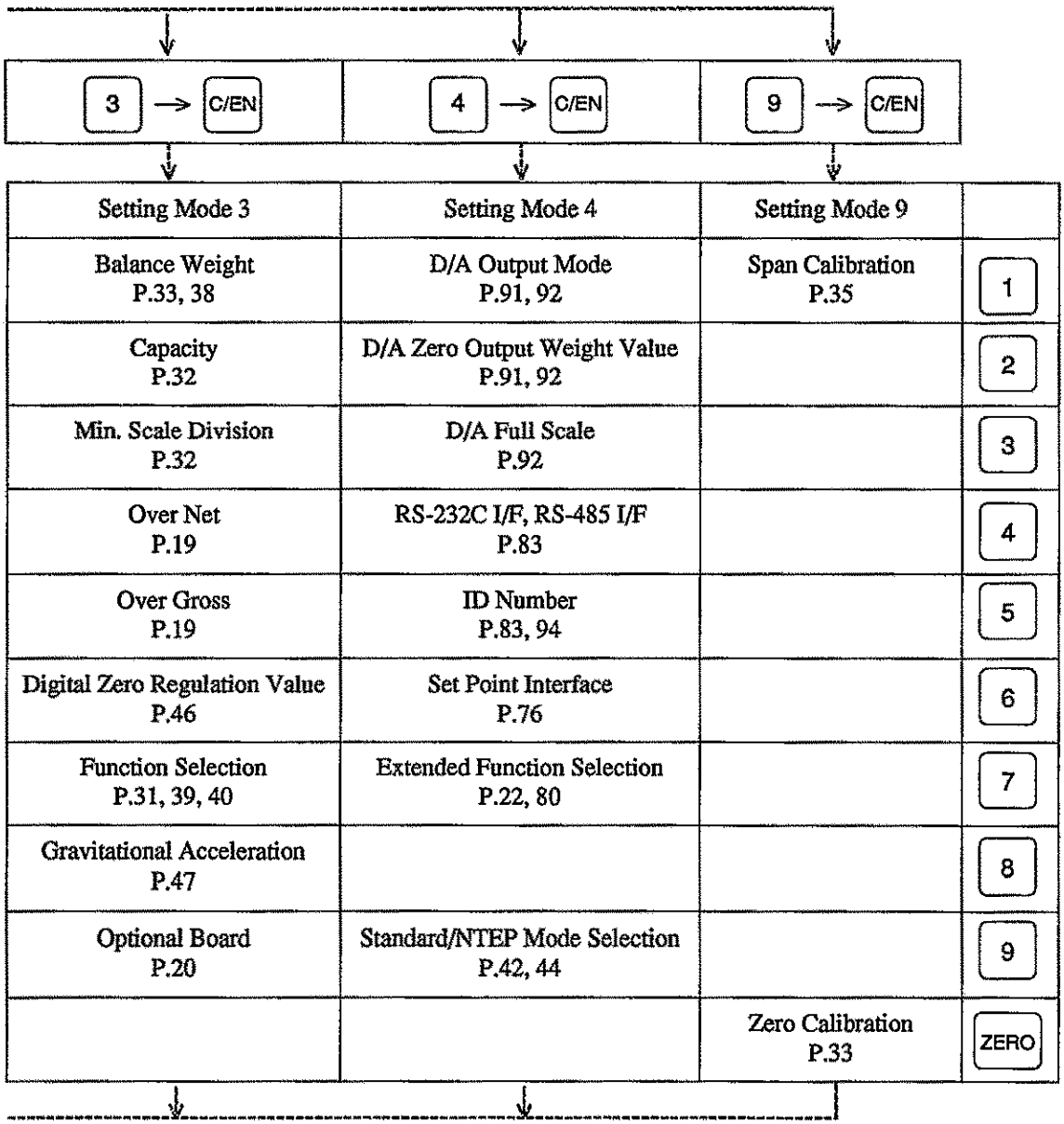
- Use an external power source (up to DC 30V) for driving the relay (Vext).
- Do not short-circuit any load such as a relay coil. This may damage the output transformer.
- Connect a surge suppresser or a spark killer to the relay circuit as shown in the figure to reduce the noise trouble and extend the life of the relay.

# 3 Function

## 3.1 Setting Mode Chart




| | Setting Mode 0 | Setting Mode 1 | Setting Mode 2 |
|---|---|---|---|
| 1 | Upper Limit P.55 | Comparison Inhibit Time P.63, 65, 67 | Weighing Function 1 P.53, 54, 55, 57, 58 |
| 2 | Lower Limit P.55 | Judging Time P.63, 65, 67 | Weighing Function 2 P.52, 55, 56, 59, 60 |
| 3 | Near Zero P.54 | Complete Output Time P.60, 67 | Weighing Function 3 P.44, 49 |
| 4 | Set Point 1 P.57 | Compensation Feeding Time P.70 | Sequence Mode P.53 |
| 5 | Set Point 2 P.57 | Auto Zero Count P.72 | Function Key Disablement P.17 |
| 6 | CPS P.57 | Judging Count P.72 | Filter P.28 |
| 7 | Over P.58 | Auto Free Fall Compensation Regulation P.49 | Motion Detection P.30 |
| 8 | Under P.58 | | Zero Tracking P.41 |
| 9 | Final P.57, 58 | Preset Tare Weight P.43 | Setting Value Lock P.26, 36 |
| ZERO | | | |

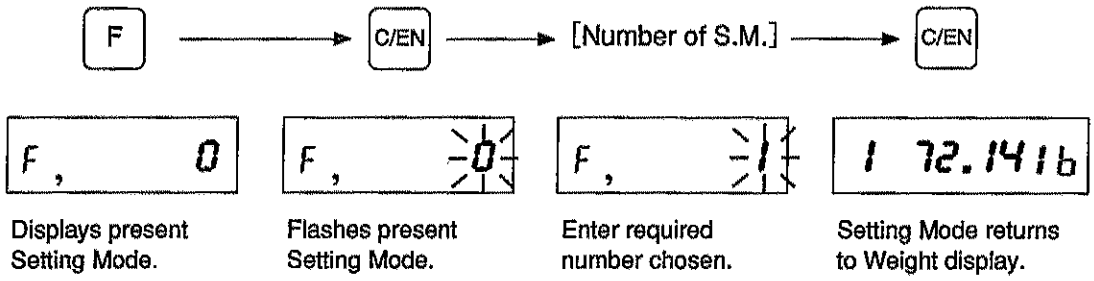



| Setting Mode 3 | Setting Mode 4 | Setting Mode 9 | |
|---|---|---|---|
| Balance Weight P.33, 38 | D/A Output Mode P.91, 92 | Span Calibration P.35 | 1 |
| Capacity P.32 | D/A Zero Output Weight Value P.91, 92 | | 2 |
| Min. Scale Division P.32 | D/A Full Scale P.92 | | 3 |
| Over Net P.19 | RS-232C I/F, RS-485 I/F P.83 | | 4 |
| Over Gross P.19 | ID Number P.83, 94 | | 5 |
| Digital Zero Regulation Value P.46 | Set Point Interface P.76 | | 6 |
| Function Selection P.31, 39, 40 | Extended Function Selection P.22, 80 | | 7 |
| Gravitational Acceleration P.47 | | | 8 |
| Optional Board P.20 | Standard/NTEP Mode Selection P.42, 44 | | 9 |
| | | Zero Calibration P.33 | ZERO |

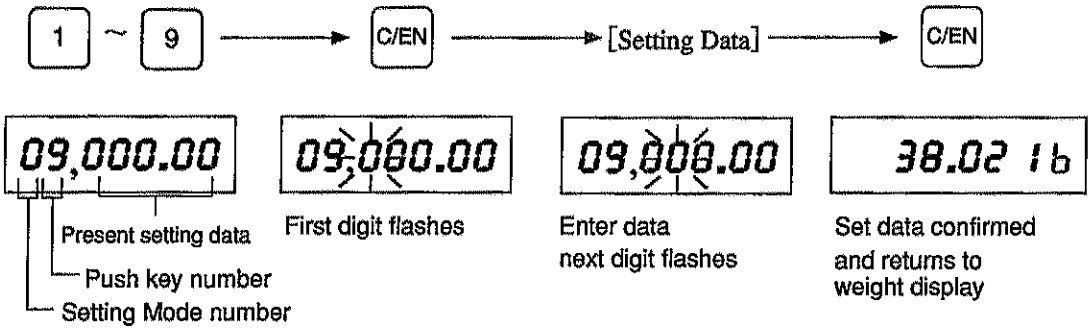
## 3.2 Setting Procedure

Please follow the procedure for entering data.

1. Enter Setting Mode




2. Choose Setting Item. Enter Setting Data




3. Data may be entered randomly or in set order within each Setting Mode. Repeat procedure 1 to change Setting Mode.

## 3.3 Setting Mode 0

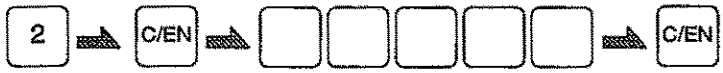

Setting Mode 0

- Upper Limit

Guidance Display



- Lower Limit





- Near Zero



- Set Point 1



- Set Point 2



- CPS



- Over



- Under



- Final


## 3.4 Setting Mode 1


Setting Mode 1

- Comparison Inhibited Time


Guidance Display


- Judging Time



- Complete Output Time



- Compensation Feeding Time (effective when selecting Sequence Mode)



- Auto Zero Count (effective when selecting Sequence Mode)



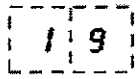
- Judging Count (effective when selecting Sequence Mode)



- Auto Free Fall Compensation Regulation



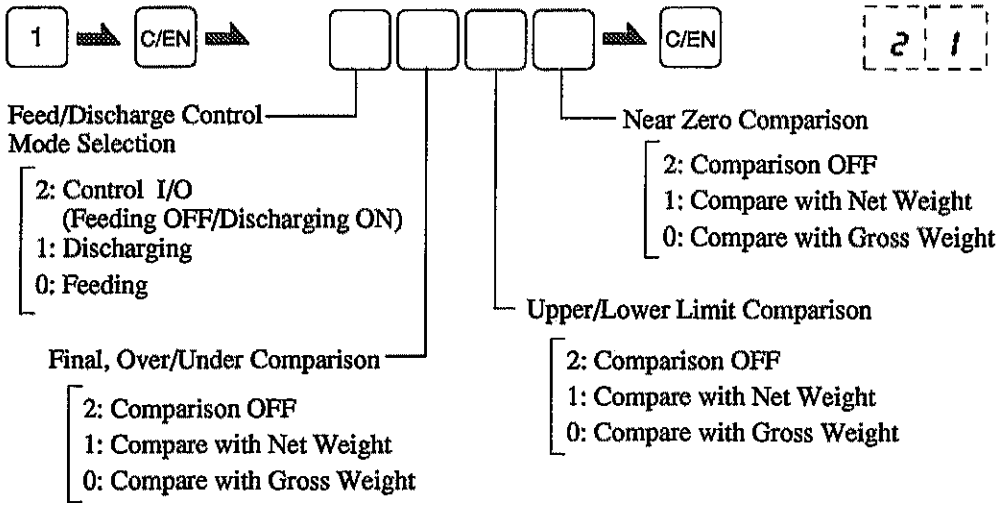
- Preset Tare Weight

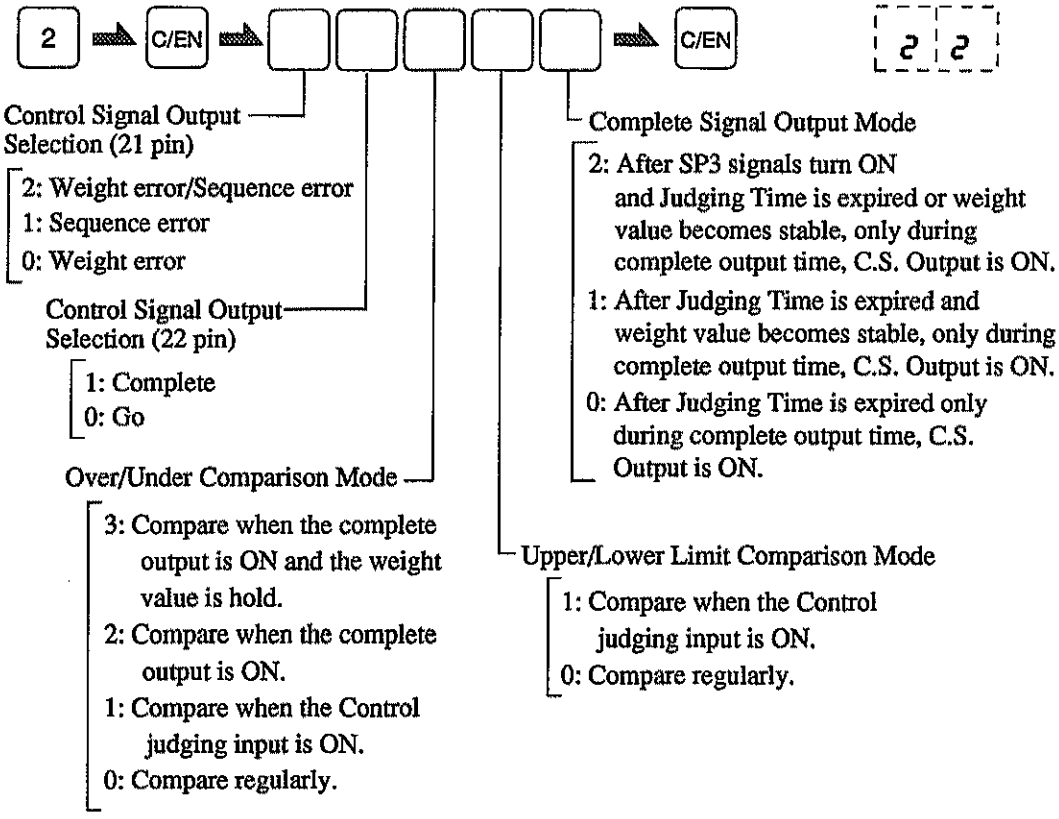
## 3.5 Setting Mode 2


- Weighing Function 1

**Guidance Display**

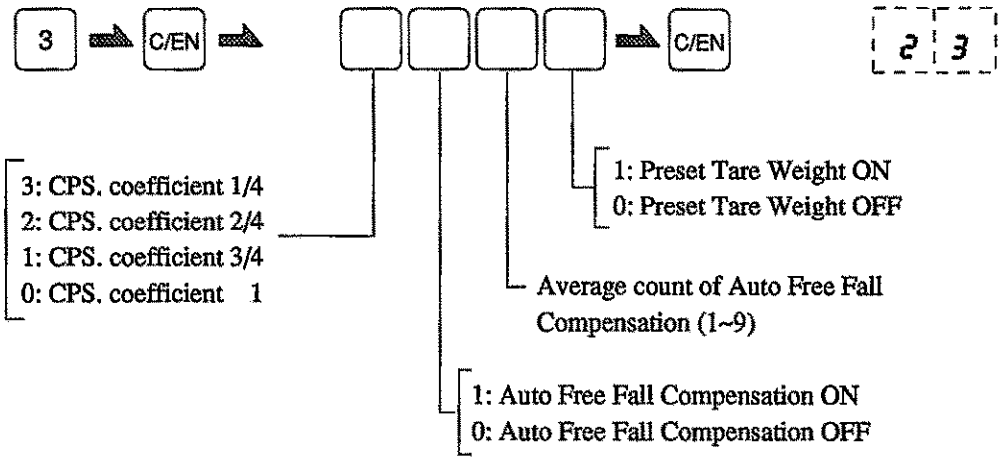



- Weighing Function 2

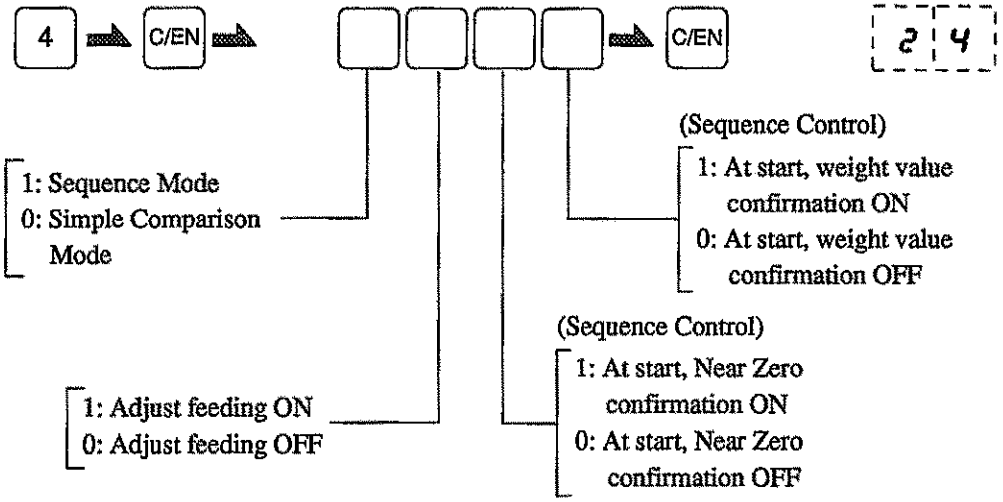


· Weighing Function 3

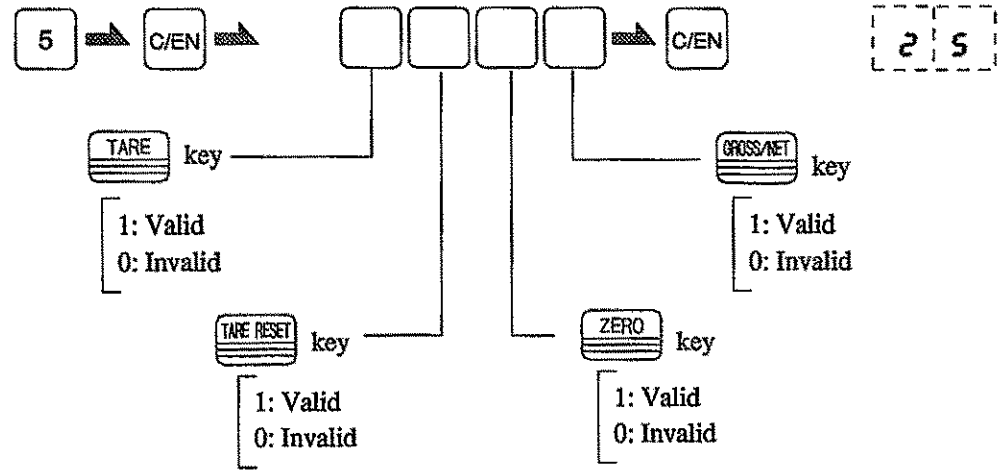
**Guidance Display**




· Sequence Mode

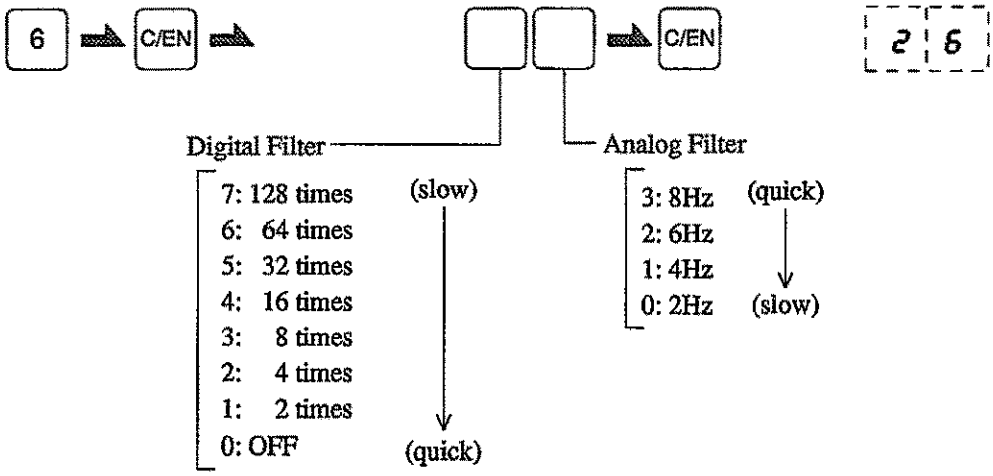



· Function Key Disablement

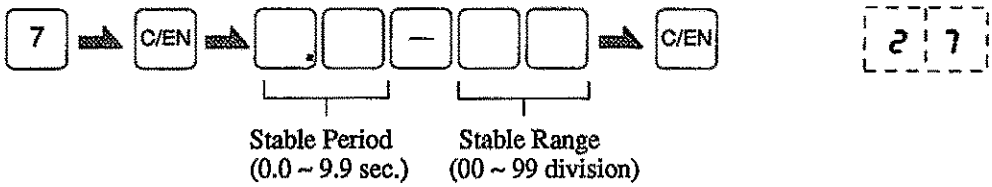


· Filter

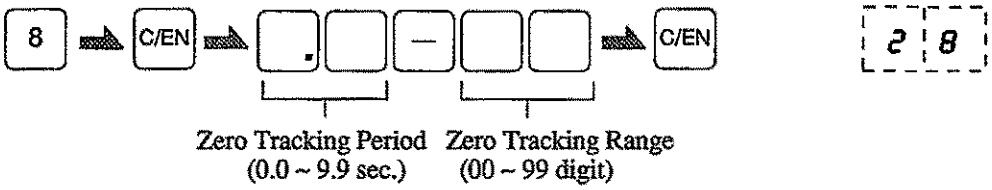
Guidance Display



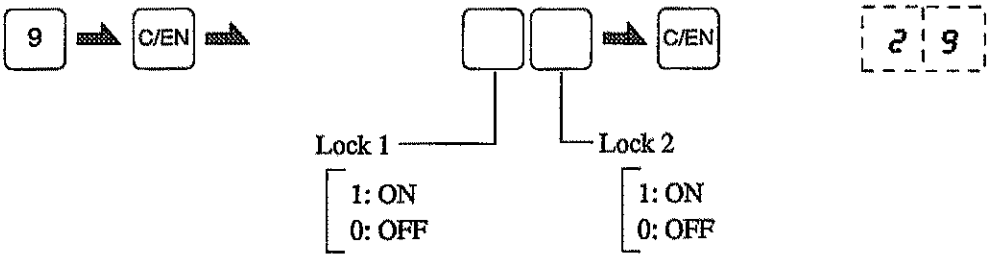

· Motion Detection




· Zero Tracking




· Setting Value Lock

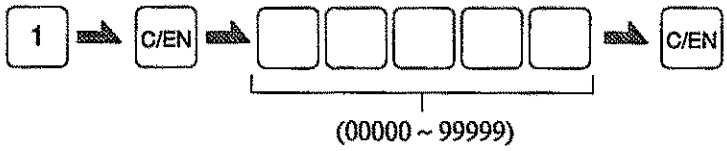


## 3.6 Setting Mode 3


Setting Mode 3

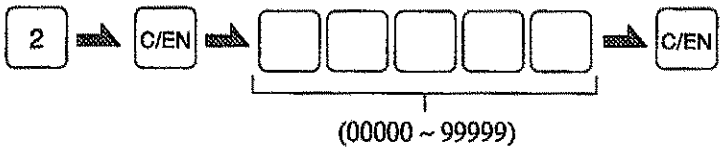
- Balance Weight

Guidance Display



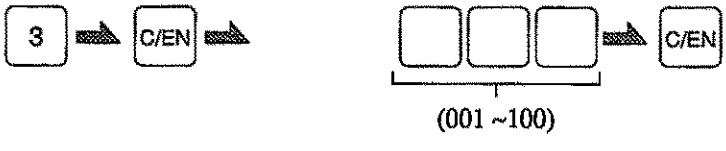


- Capacity



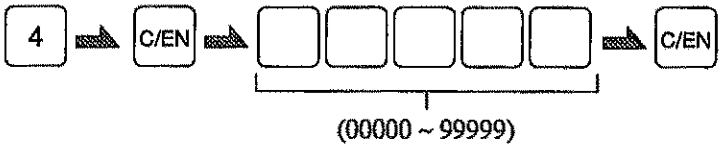


- Min. Scale Division



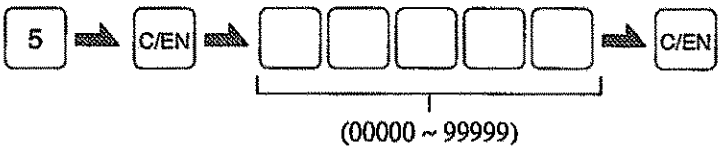


- Over Net



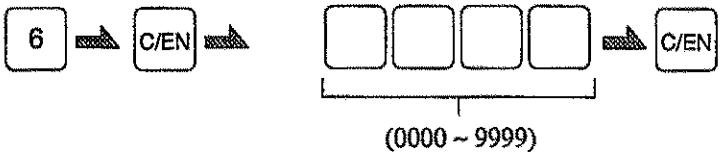


- Over Gross



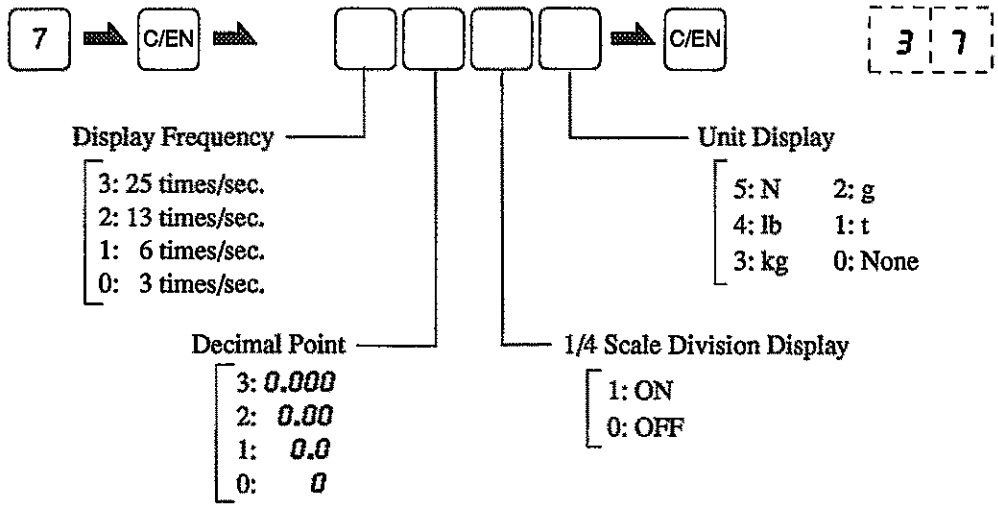


- Digital Zero Regulation Value



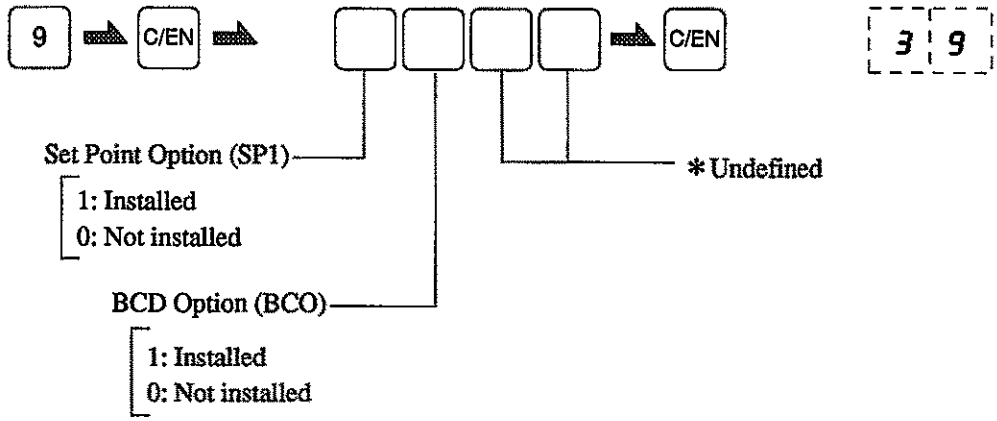

· Function Selection

Guidance Display




· Gravitational Acceleration


· Optional Board

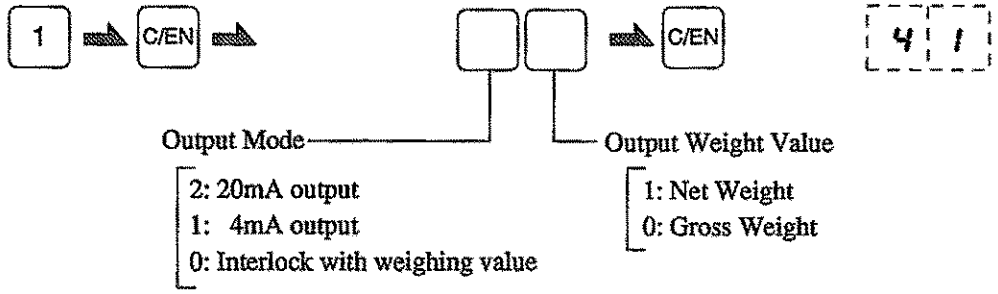


## 3.7 Setting Mode 4

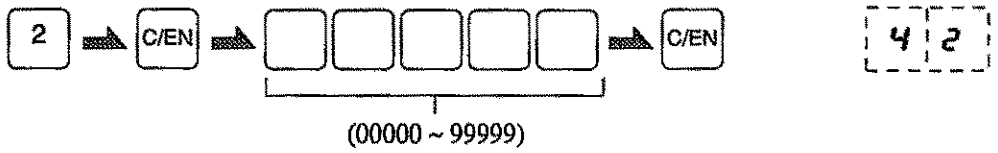

Setting Mode 4

- D/A Output Mode

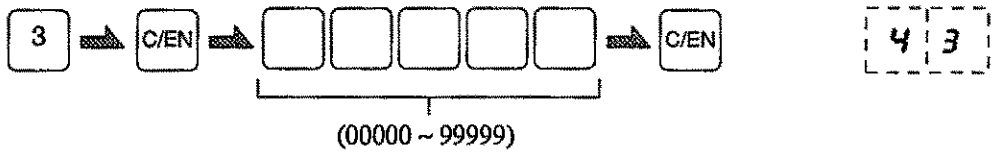
Guidance Display



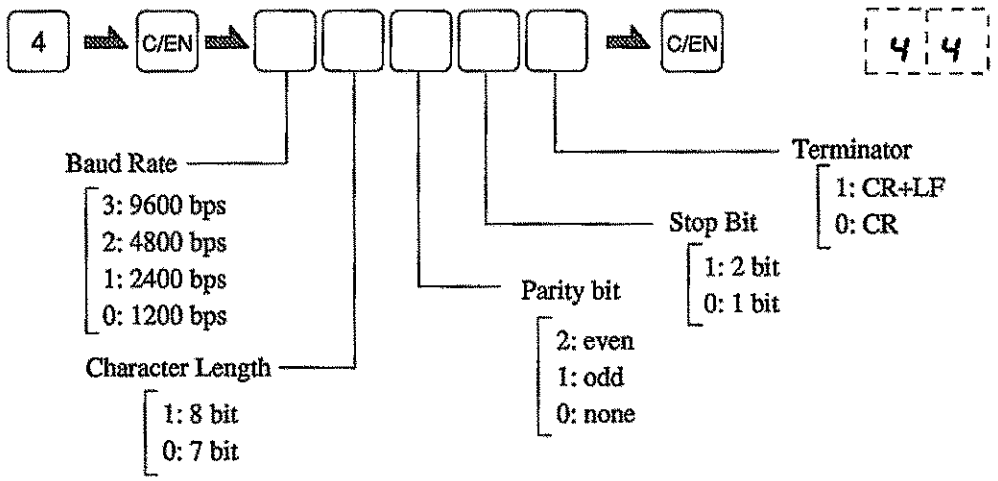

- D/A Zero Output Weight Value



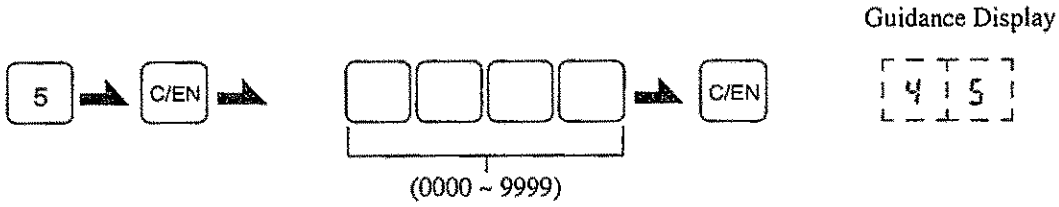

- D/A Full Scale Value



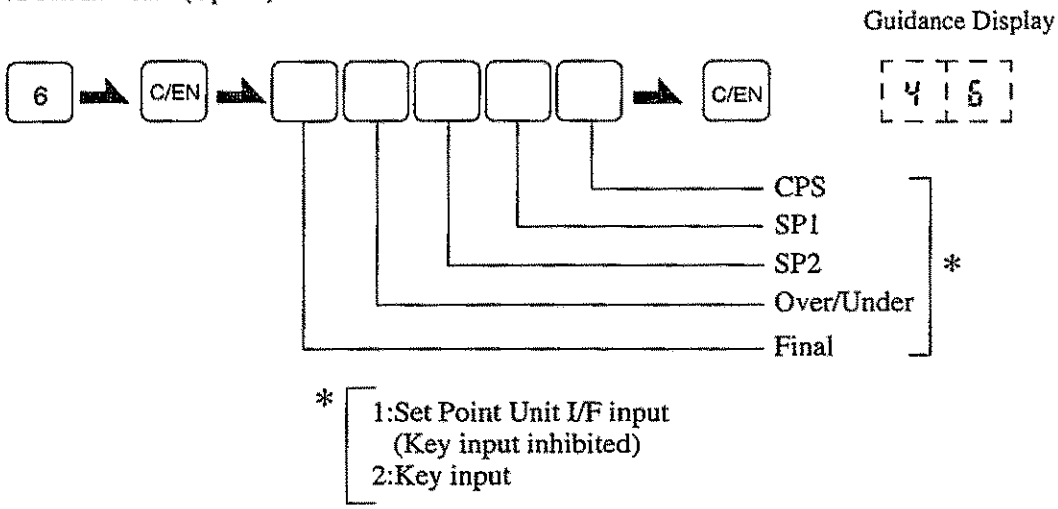

- RS-232C I/F, RS-485 I/F



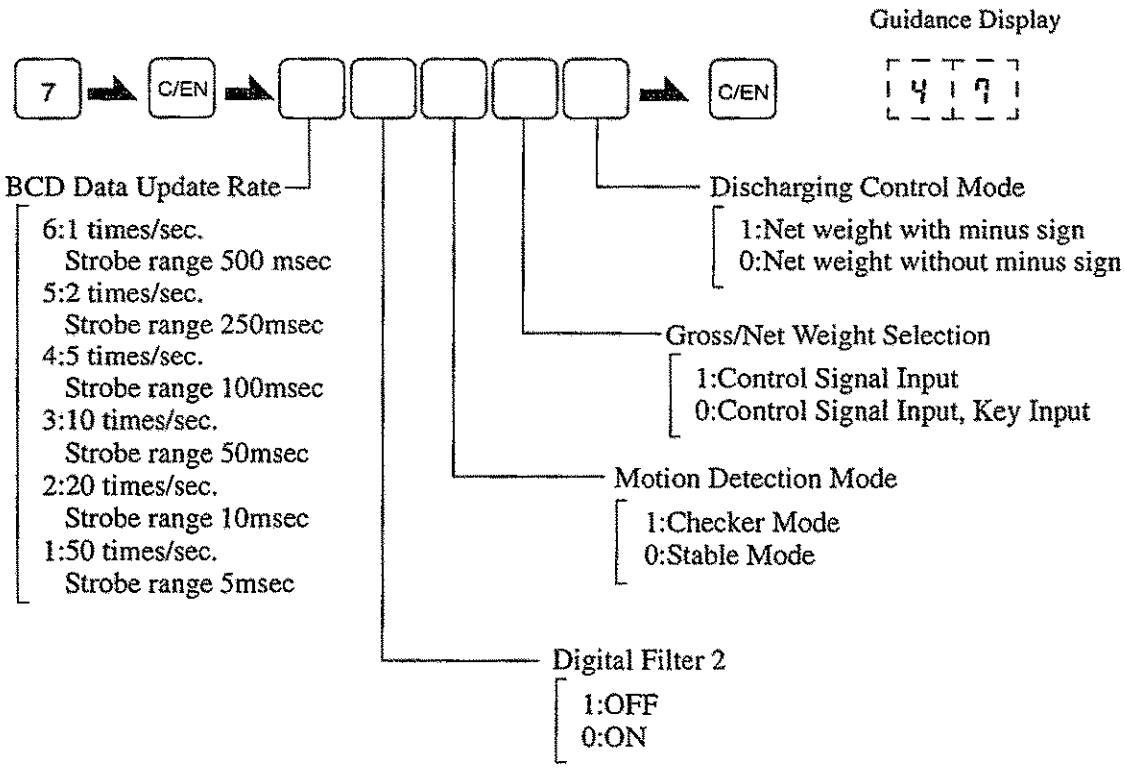
• ID Number




• Set Point Interface (Option)

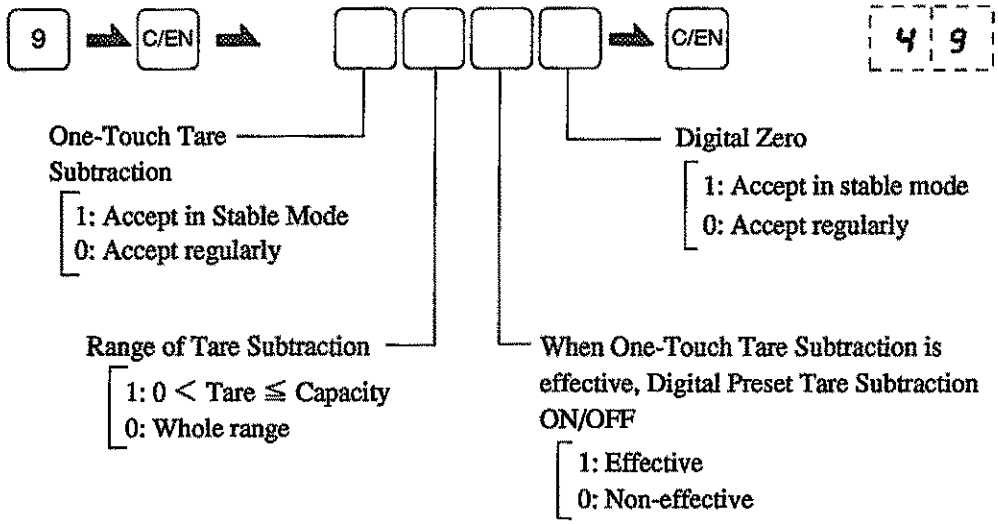



• External Function Selection



• Standard/NTEP Mode Selection

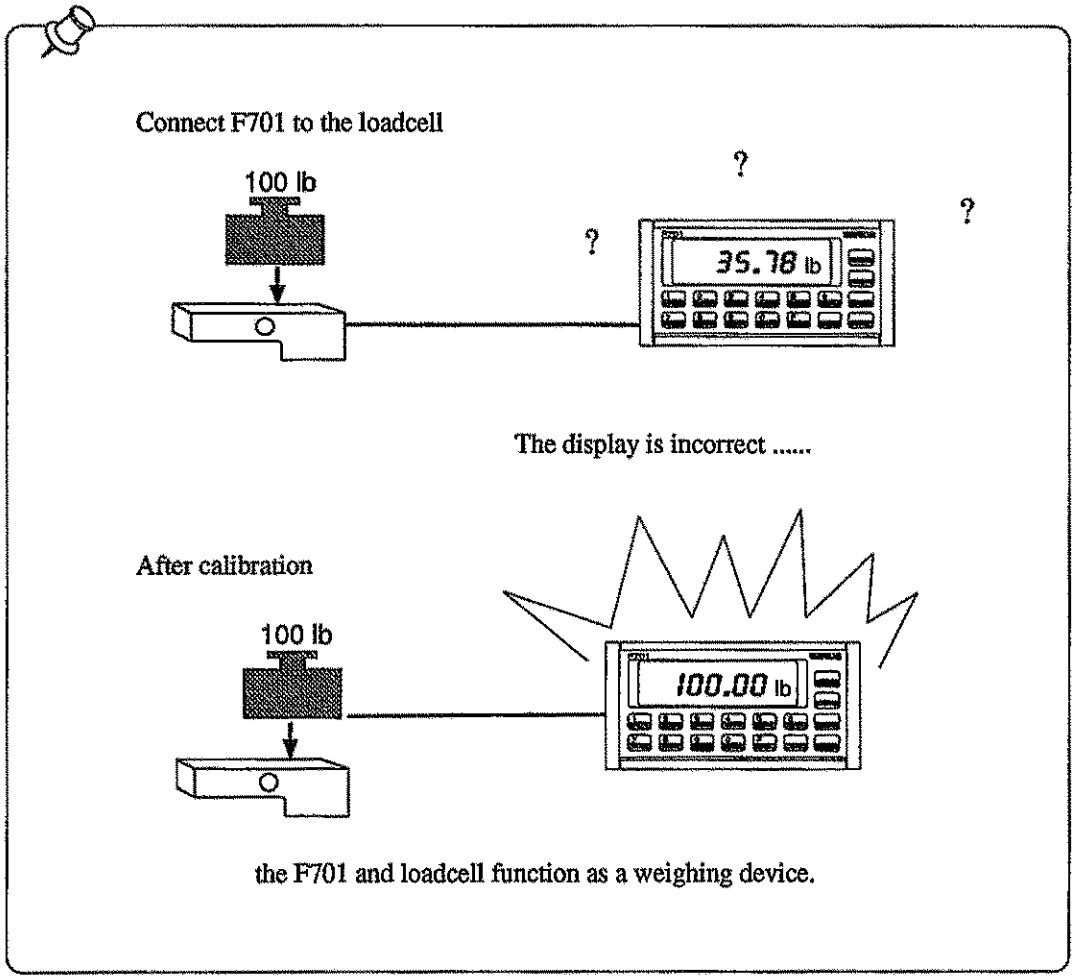
Guidance Display



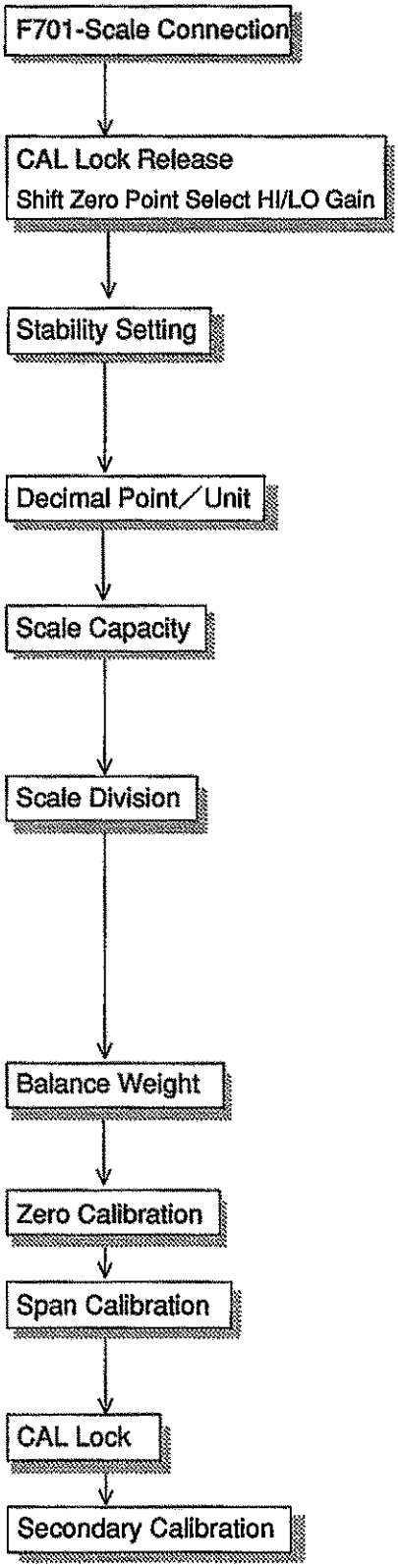
# 4 Span Calibration

## 4.1 What is Calibration

Span Calibration means putting a load (test weight) on the loadcell (or scale) and calibrating so the F701 indicates the correct weight (100.00 lb test wt. = 100.00 lb display).



## 4.2 Calibration Procedure




Connect the F701 to the Scale and turn on power. Check that a weight or an over scale message is displayed.

Release the calibration and setting value Lock with the dip switch on the rear panel, shift zero point and select HI/LO Gain by dip switch.

Adjust the Filters and Motion Detection settings so the STAB display is lit when weight display becomes stable. (Setting Mode 2-6, 7)

Register the position of the decimal point and the unit of the scale. (Setting Mode 3-7)

Register the maximum capacity of the scale. (Setting Mode 3-2). If the registered value is exceeded by 9 scale divisions, display shows over scale, "**oFL2**".

Register the minimum unit (scale division) of the scale. (Setting Mode 3-3). The number of scale divisions can be from 001 to 100. The value of the maximum scale capacity divided by the minimum scale division becomes the display resolution. The display resolution can be up to 40,000 divisions. [10,000 Legal for Trade]

Register the value of the load (balance weight) for calibration. (Setting Mode 3-1).

Register the initial zero point. (Setting Mode 9).

Place the load (balance weight) on the loadcell and register the span value. (Setting Mode 9-1).

Disable calibration. (Dip switch 1 on the rear panel)

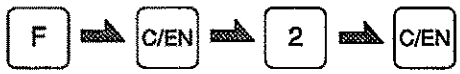
Used as back-up to primary Calibration (see special instructions).

## CAL Lock Release, Shift Zero Point Select HI/LOW Gain

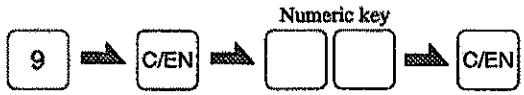
The F701 features a Lock function for disabling changes in calibration and setting values. The F701 calibration lock function must be disable before calibration. The Hardware Lock is located on the rear panel; the Software Lock is in Setting Mode 2-9.

### Release Software Lock

1) Choose Setting Mode 2.



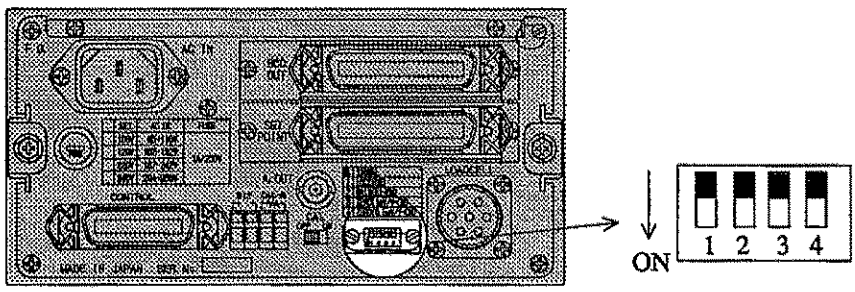

2) Select 9, Setting Value Lock, enter "00" to Lock 1 and lock 2.




### Release Hardware Lock

1) Remove two(2) screws on the Dip Switch Cover, take off the cover.

2) Slide the dip switch number 1 to OFF to perform calibration.
Calibration cannot be performed if switch is in the ON position.

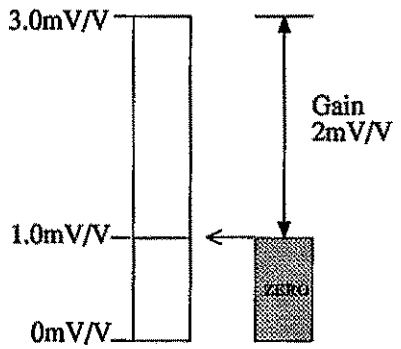


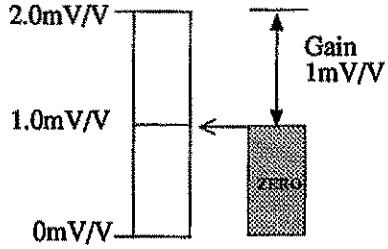

| No | Switch ON | Switch OFF |
|---|---|---|
| 1 | Calibration Lock ON | Calibration Lock OFF |
| 2 | HI GAIN (0.5-1.5mV/V) | LO GAIN (1.0-3.0mV/V) |
| 3 | Zero shift (1mV/V) ON | OFF |
| 4 | Zero shift (0.5mV/V)ON | OFF |

## Shift Zero Point, Select HI/LO Gain

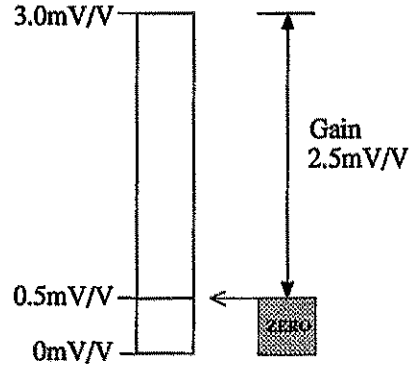
In big dead load (the initial Tare weight is heavy) application, adjust the input of 0.5mV/V, 1mV/V or 1.5mV/V to zero by dip switch on the rear panel.

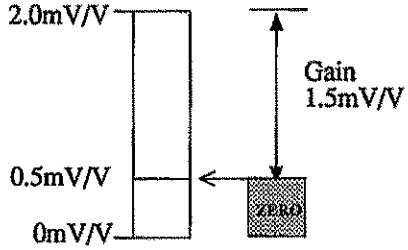
- Slide the dip switch number 3 to ON.



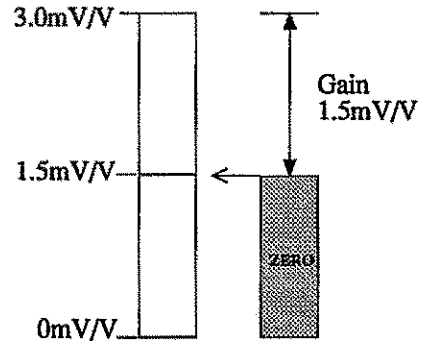



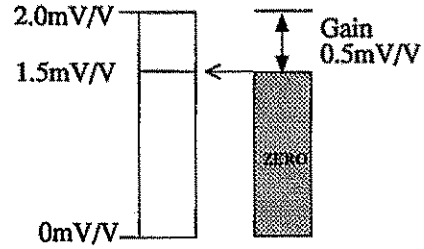

- Slide the dip switch number 4 to ON.




- Slide the dip switch number 3 and 4 to ON.




Then, regarding the specification of loadcell and the range of Gain slide the dip switch number 2 to ON or OFF.

## Filter

### Digital Filter

This function minimizes instability of the weight value by calculating the average frequency of the data converted from analog to digital. The frequency of the moving average can be from 2 to 128 times. A higher frequency will make a more stable display with slower response. A lower frequency will have quicker response but a more unstable display.

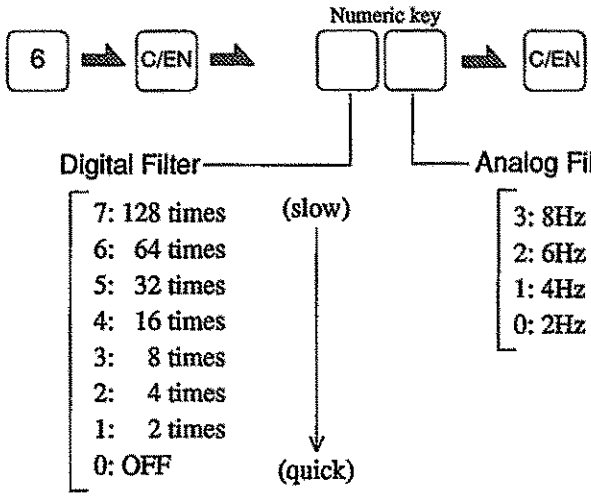
### Analog Filter

This function stabilizes the display by removing low frequency noise from the loadcell signal as well as averaging analog signals. Selectable frequencies are: 2, 4, 6 and 8 Hz.

### Setting Filter

1) Choose Setting Mode 2

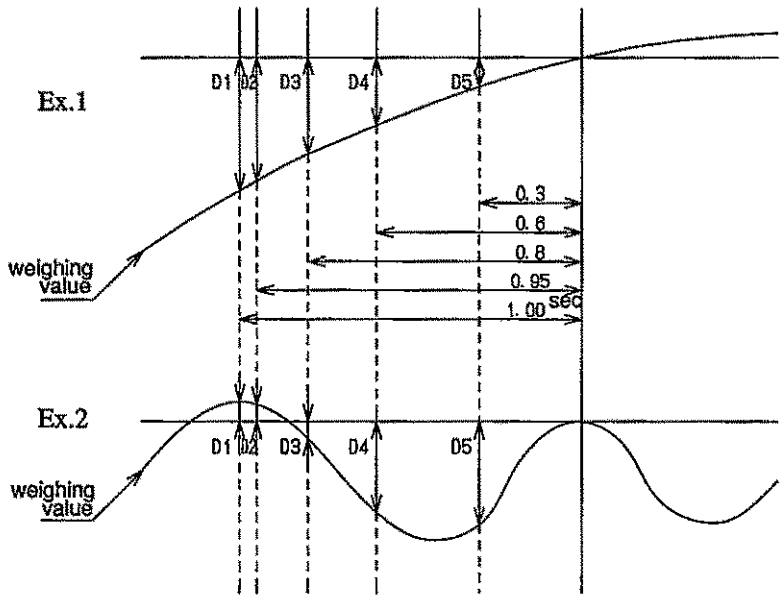

2) Select 6, Filter



## Motion Detection

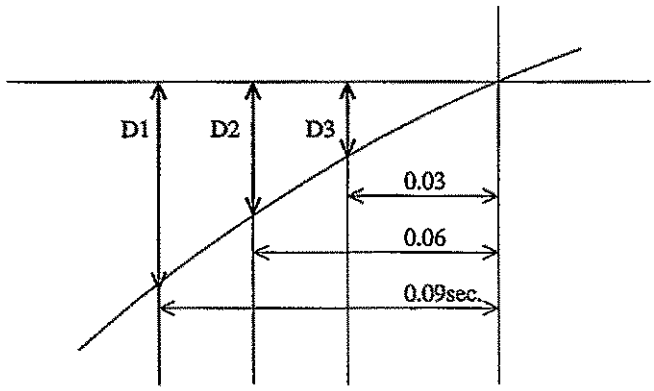
When signal fluctuation is less than the result (range × min. scale div.) and is within the set period, weighing value is stable and STAB display lights. The two modes of Motion Detection in the F701 are: Stable Mode and Check Mode. (It switching by External Function Selection 1 in setting mode 4.)

**Stable Mode**: Per each A/D conversion, the current weight is compared to (1) second previous. If the any of the set parameters are exceeded, STAB display goes out. (Refer to the following chart)

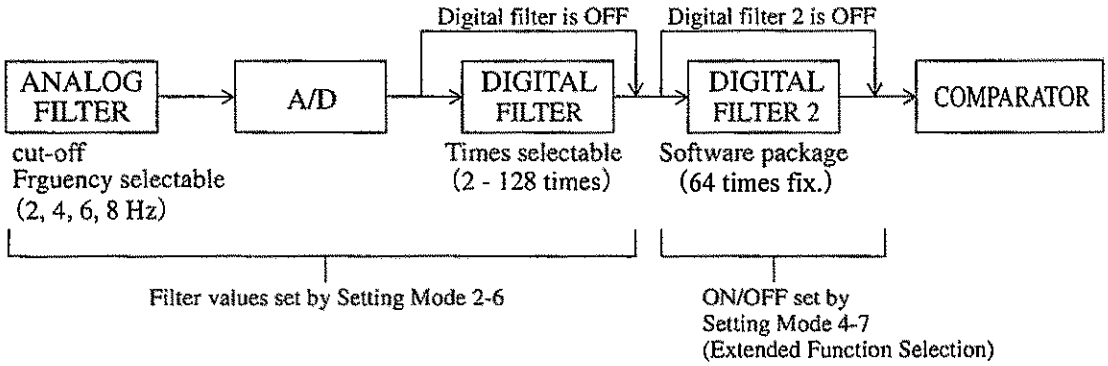



D1 is the difference between the present weight value and that of 1 sec. before.

**Check Mode**: Per each A/D conversion, the current weight is compared to 0.09 second previous. If the any of the set parameters are exceeded, STAB display goes out. (Refer to the following chart)



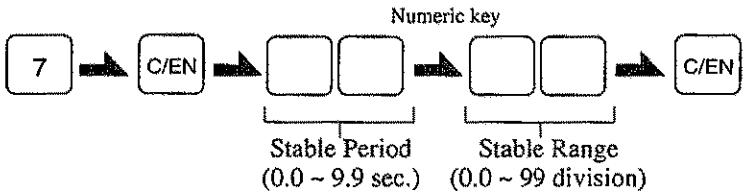
Digital filter 2, is a software package use to quickly eliminate the effects of plant vibration on weighing systems, while yielding a stable weight reading.




**Setting Motion Detection**

1) Choose Setting Mode 2


2) Select 7 Motion Detection



## Decimal Point, Unit

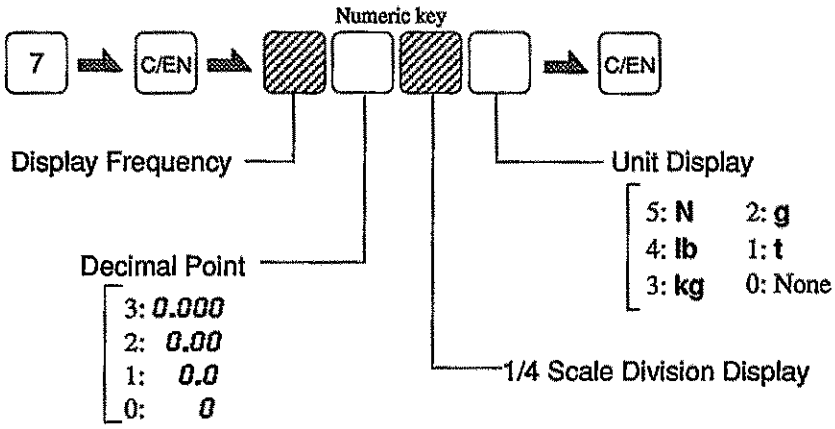
This operation sets the position of the Decimal point and unit. The decimal point position options are **：00.0.0.0.**

The Unit can select from **t, kg, g, lb, N** or None Unit.

### Setting Decimal Point

1) Choose Setting Mode 3


2) Select 7, Function Selection.




The display resolution ignores the Decimal point.

For example：When Minimum Scale Division is 001 then
10.000 display resolution is 1/10000;
100.00 display resolution is 1/10000;
8.000 display resolution is 1/8000

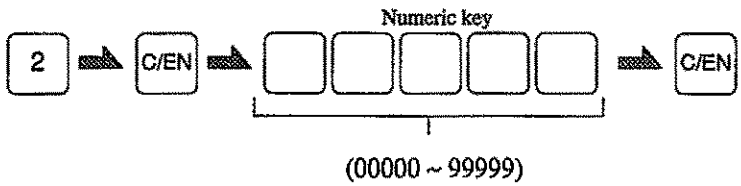
## Scale Capacity

Input the Scale Capacity and Min. Scale Division desired. The Capacity must be within the rated load of all loadcells combined.
The display resolution of F701 is 1/10,000 Legal for Trade or 1/40,000.

### Setting Capacity

1) Choose Setting Mode 3


2) Select 2, Capacity



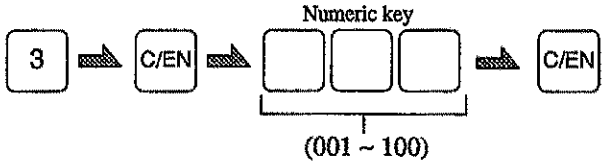

## Minimum Scale Division

The Minimum Scale Division can be from 001 to 100. The display resolution obtains from dividing Minimum Scale Division by Scale Capacity.

### Setting Minimum Scale Division

1) Choose Setting Mode 3


2) Select 3, Min. Scale Division



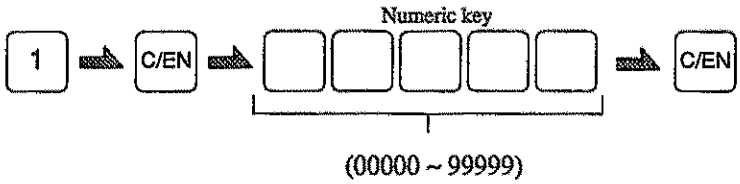
## Balance Weight

The load value (balance weight) that is applied to the loadcell for calibration.

### Setting Balance Weight

1) Choose Setting Mode 3


2) Select 1 Balance Weight




## Zero Calibration

Enter the initial zero.

1) Verify there are no excess loads applied to loadcell or scale.

2) Verify that the STAB display is on. Correct Calibration cannot be completed if signal is unstable.

### Zero Calibration

1) Choose Setting Mode 9


2) Press



Zero Calibration is complete after the display at the left is replaced by zero (0).

If a Calibration Error is displayed, redo Zero Calibration using the following Error Codes.

**cErr2:** Initial Dead Load is above Zero adjustment range.
Remove any excess load from loadcell or scale. If **cErr2** is still displayed, connect a resistor between +EX and -SIG. loadcell connections. This should shift the Zero point. Do Zero Calibration again.

**cErr3:** Initial Dead Load is negative.
Check that loadcell is mounted in the correct direction; check that load is being applied to the loadcell in the correct direction; check that the +SIG. and -SIG. lines are properly connected. If **cErr3** is still displayed, connect a resistor between -EX and -SIG. loadcell connections. This should shift the Zero point. Do Zero Calibration again.

**cErr9:** The Load is not stable enough for correct Calibration.
Adjust the Filters Stable Period and Stable Range of Motion Detection so STAB display lights during Calibration. Do Calibration again.

★ This table is for a 350 ohm loadcell.

★ The temperature coefficient of the connected resistor directly influences the accuracy of the indicator. Use a resistor with a temperature coefficient below 50 ppm/℃.

| resistance | | strain | |
|---|---|---|---|
| calculated value | approx. value | μ-STRAIN | mV / V |
| 875 KΩ | 866 KΩ | 200 | 0.1 |
| 437 KΩ | 442 KΩ | 400 | 0.2 |
| 291 KΩ | 294 KΩ | 600 | 0.3 |
| 219 KΩ | 221 KΩ | 800 | 0.4 |
| 175 KΩ | 174 KΩ | 1000 | 0.5 |
| 146 KΩ | 147 KΩ | 1200 | 0.6 |
| 125 KΩ | 124 KΩ | 1400 | 0.7 |
| 109 KΩ | 110 KΩ | 1600 | 0.8 |
| 97 KΩ | 97.6KΩ | 1800 | 0.9 |
| 87.3KΩ | 86.6KΩ | 2000 | 1.0 |
| 79.4KΩ | 78.7KΩ | 2200 | 1.1 |
| 72.7KΩ | 73.2KΩ | 2400 | 1.2 |
| 67.1KΩ | 66.5KΩ | 2600 | 1.3 |
| 62.3KΩ | 61.9KΩ | 2800 | 1.4 |
| 58.2KΩ | 57.6KΩ | 3000 | 1.5 |
| 54.5KΩ | 54.9KΩ | 3200 | 1.6 |
| 51.3KΩ | 51.1KΩ | 3400 | 1.7 |
| 48.4KΩ | 48.7KΩ | 3600 | 1.8 |
| 45.9KΩ | 46.4KΩ | 3800 | 1.9 |
| 43.6KΩ | 43.2KΩ | 4000 | 2.0 |
| 41.5KΩ | 41.2KΩ | 4200 | 2.1 |
| 39.6KΩ | 39.2KΩ | 4400 | 2.2 |
| 37.9KΩ | 38.3KΩ | 4600 | 2.3 |
| 36.3KΩ | 36.5KΩ | 4800 | 2.4 |
| 34.8KΩ | 34.8KΩ | 5000 | 2.5 |

## Span Calibration

Apply the load (balance weight) to the loadcell or scale.

- The Balance weight should be full capacity to get the best linearity. The Balance weight must be at least 50% of scale capacity.
- Verify there is no excess load (except balance weight) applied to the loadcell or scale.
- Verify the STAB (stable) indicator is lit for correct Calibration.

### Span Calibration

1) Choose Setting Mode 9

F → C/EN → 9 → C/EN

2) Select 1 Span Calibration

1 → C/EN → [Numeric key] → C/EN

When used Balance Weight is not equal to the Capacity,
Input the real weight here C/EN

SP

Span Calibration is complete after the display at left is replaced by Balance Weight.

If a Calibration Error is displayed, redo Span Calibration using the following Error Codes.

**cErr4:** The entered balance weight value is greater than the maximum capacity. Re-enter a balance weight value lower than the maximum capacity.

**cErr5:** The entered balance weight value is 00000. Re-enter the correct value.

**cErr6:** The loadcell output does not reach the span adjustment range. Check how load is applied to loadcell; check loadcell has sufficient output (mV/V) to reach Span range. Do Span Calibration again.

**cErr7:** The loadcell output is negative. Verify that the +SIG. and -SIG. loadcell lines are connected properly.

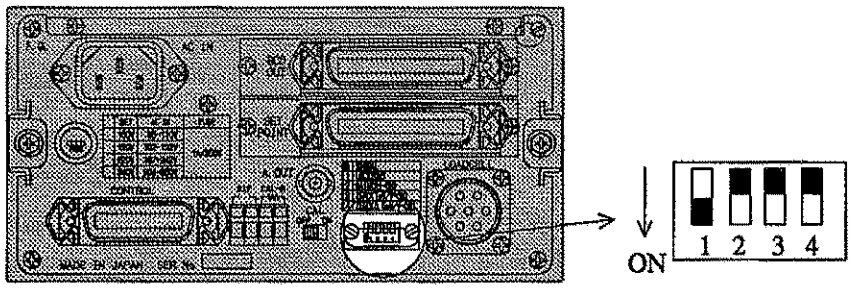
**cErr8:** The loadcell output is beyond the span adjustment range. Verify that the loadcell output is within the span adjustment range of the F701.

## Calibration Lock

After Zero and Span Calibration, slide the Calibration Lock dip switch number 1 to ON on the rear panel.

### Hardware Lock

1) Remove the dip switch cover screws and remove cover.

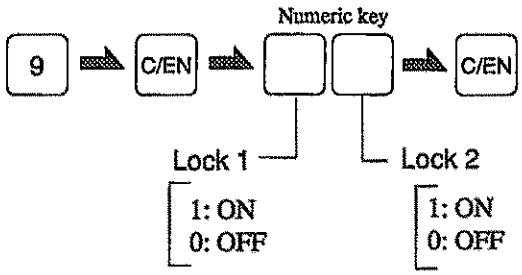



2) Slide the dip switch number 1 to ON, lock calibration and restore the cover.

### Software Lock

1) Choose Setting Mode 2.


2) Select 9, Setting Value Lock

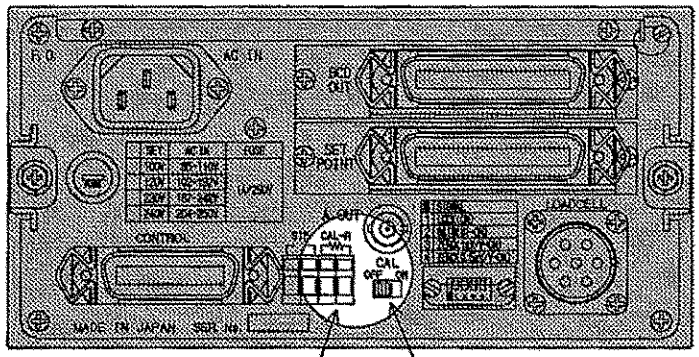



Refer to page 101 The List of Initial Setting Value for detail of Lock 1 and Lock 2. These Locks are useful tools for your application.

## Secondary Calibration

The Secondary Calibration Function is provided for provisional calibration when the F701 develops trouble or the calibration value is mistakenly changed. The secondary calibration value must be recorded for this secondary calibration.

1) Connect a resistor with a low temperature coefficient to the CAL-R terminals on the rear panel. Refer to the table below for the correct resistor value. Choose a value near to (but not more than) the output voltage of the loadcell at maximum capacity.




The resistance values are for one loadcell of 350 ohm. Each resistance value is 1/4 when four load-cells are connected in parallel.

・One (1) 350Ω loadcell

| spurious input sensitivity | resistance |
|---|---|
| 0.29 mV/ V | 300 kohm |
| 0.44 mV/ V | 200 kohm |
| 0.87 mV/ V | 100 kohm |
| 1.74 mV/ V | 50 kohm |

・Four (4) 350Ω loadcell

| spurious input sensitivity | resistance |
|---|---|
| 0.29 mV/ V | 75 kohm |
| 0.44 mV/ V | 50 kohm |
| 0.73 mV/ V | 30 kohm |
| 1.82 mV/ V | 12 kohm |

2) Remove any load from the loadcell so that the Gross weight becomes zero.

3) Turn on the CAL ON/ OFF switch and record the Gross weight value as the secondary calibration value.

**NB**

The temperature coefficient of the resistor to be connected to the CAL-R terminals directly influences the accuracy of the secondary calibration. 5 ppm/℃ or less is recommended for practical use while 50 ppm/℃ is for provisional use.

Turn off the CAL ON/ OFF switch before weighing.

## ● Secondary Calibration

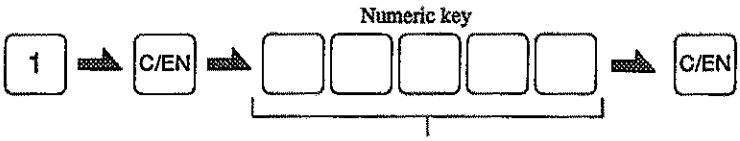
Secondary Calibration is for provisional calibration. When the F701 develops trouble or the calibration value is changed or lost, Secondary Calibration will recalibrate the unit.

1) Make sure that the resistor used for recording the secondary calibration value is connected to the CAL-R terminals of the F701.
2) Perform Zero Calibration referring to the Span Calibration procedure.
3) Turn on the CAL ON/ OFF switch.
4) Enter the recorded secondary calibration value as the balance weight value.

**Setting the Secondary Calibration**

1) Choose Setting Mode 3


2) Select 1, Balance Weight




5) Do Span Calibration.
6) The secondary calibration is completed when the weight display is equal to the recorded secondary calibration value. Turn off the CAL ON/ OFF switch.

**NB**

The secondary calibration is only a provisional method. Calibration with an actual load must be done as soon as possible. Turn off the CAL ON/ OFF switch before weighing.

# 5 Function Settings

## 5.1 Display Setting

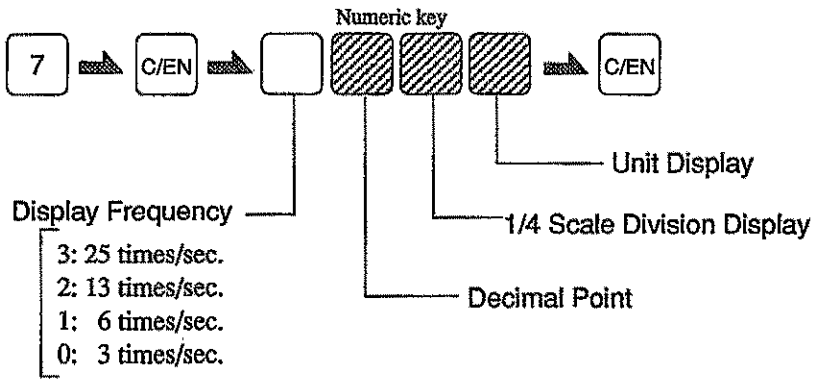
### Display Frequency

Select the F701 Display Frequency. The internal conversion speed is fixed at 100 updates per second. The available display frequencies are : 25 times per second, 13 times per second, 6 times per second and 3 times per second.
25 times per second is recommended for normal operation. If the display flickers, select a lower frequency.

**Setting Display Frequency**

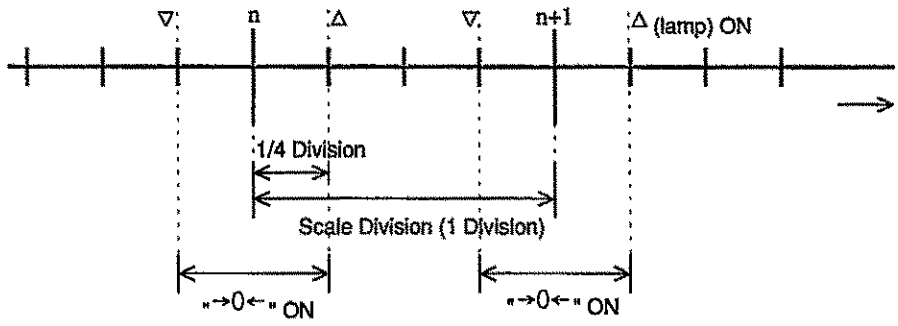
1) Choose Setting Mode 3


2) Select 7, Function Selection.



## 1/4 Scale Division

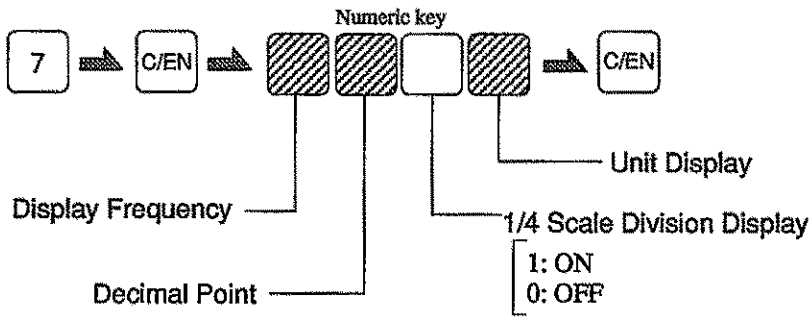
It divides the Minimum Scale Division into four (4) parts. The " →0← " (Center Zero) lamp turns on when the weight value is between +1/4 and -1/4 division.



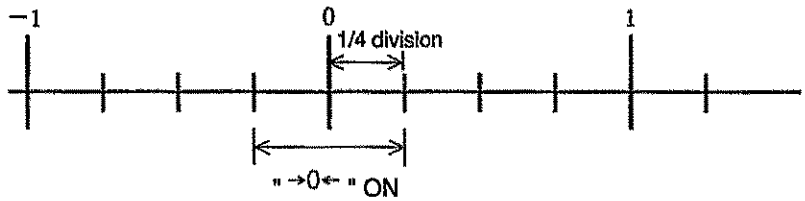

### Setting Scale Division

1) Choose Setting Mode 3


2) Select 7, Function Selection.




When the 1/4 scale division display setting is OFF, the " →0← " lamp only works at the Zero Point.



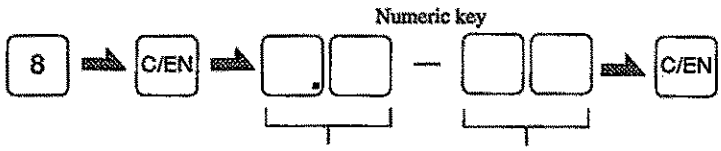
## Zero Tracking

This function automatically adjusts slow drifts and slight shifting of the zero point due to small amounts of accumulation on a scale.

### Setting Zero Tracking

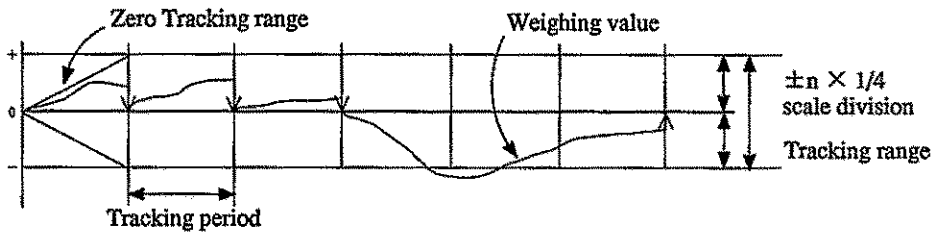
1) Choose Setting Mode 2


2) Select 8 Zero Tracking




Zero Tracking adjusts the zero point every set period when the shifting of the zero point is within the set range.

The Tracking period must be set between 0.1 and 9.9 seconds. The Tracking range must be set using a 1/4 scale division as a unit. (02 = 0.5 divisions, 12 = 3 divisions) Zero Tracking does not work when the period is set 0.0 or the range is set to 00.




**NB**

- Zero Tracking is operated at the Zero Point of Gross weight and does not work when the weight value is beyond the tracking range. Adjust the Zero point by Digital Zero or Zero Calibration.
- The ZALM (Zero Alarm) turns on when the drift (from the calibrated zero point) to be adjusted by Zero Tracking or Digital Zero exceeds the Digital Zero Regulation Value. There is no adjustment of the Zero point when this occurs.

## One Touch Tare Subtraction / Tare Reset / Digital Preset Tare Subtraction

### One Touch Tare Subtraction

Tare is subtracted and the Net weight is zeroed by pressing [TARE] key, display T TARE . The Gross weight will not be changed by this function. Note that depending on setting in Tare mode and range of Tare Subtraction may be selected from the whole range or from 0 < Tare ≦ Capacity.

#### The Operation of One Touch Tare Subtraction

1) Press [TARE] key, the Tare weight is subtracted.

#### Setting Tare Subtraction

1) Choose Setting Mode 4


2) Select 9, Standard/NTEP Mode Selection


One-Touch Tare Subtraction
- 1: Accept in Stable Mode (NTEP)
- 0: Accept regularly

Digital Zero
- 1: Accept in stable mode
- 0: Accept regularly

Range of Tare Subtraction
- 1: 0 < Tare ≦ Capacity
- 0: Whole range

When One-Touch Tare Subtraction is effective, Digital Preset Tare Subtraction ON/OFF.
- 1: Effective
- 0: Non-effective

### Tare Reset

The subtracted Tare can be restored and Net weight becomes equal to the Gross weight.

**The Operation of Tare Subtraction Reset**

1) Press [TARE RESET] key, the Tare subtraction value is restored.

To operate Tare Subtraction, Tare Reset via the Control Connector on the rear panel by shorten input pin 4, pin 5 to COM.

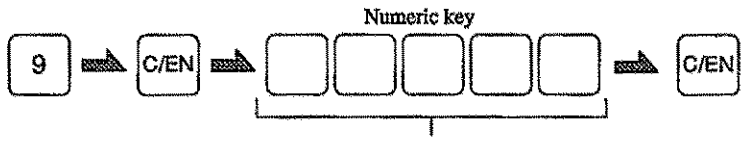
### Digital Preset Tare Subtraction

In addition to the One-touch Tare Subtraction, there is a Preset Tare Weight function. Following is the procedure for setting Preset Tare Weight.

**Setting Preset Tare Weight**

1) Choose Setting Mode 1


2) Select 9, Preset Tare Weight



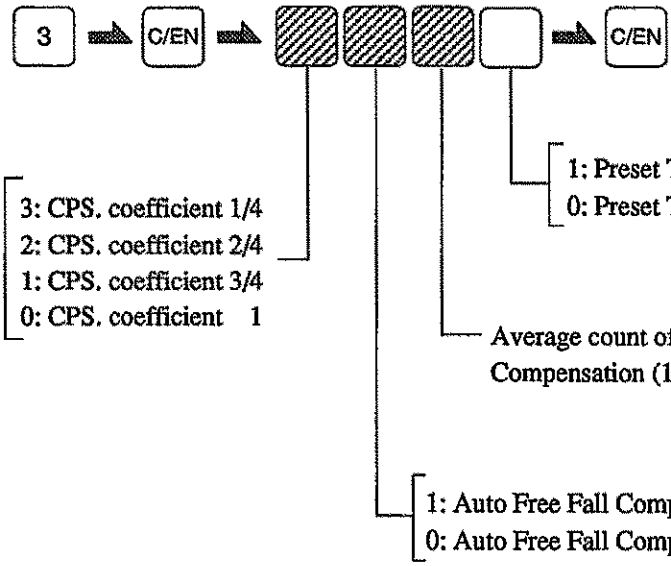

Preset Tare Weight (Max. 5 digit)

To subtract the above tare setting from the Net weight, the Digital Preset Tare Subtraction must be set to ON using the following procedure.

## Setting Digital Preset Tare Subtraction ON/OFF

1) Choose Setting Mode 2


2) Select 3, Weighing Function 3

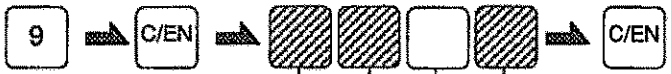



If you active One-Touch Tare Subtraction while the Preset Tare is also active, you cannot reset or change the Preset Tare Weight. Select '1: Effective' here, Tare Subtraction is canceled, then could reset Preset Tare Weight ON/OFF and Change Preset Tare Weight.

### Setting Digital Preset Tare Subtraction

1) Choose Setting Mode 4


2) Select 9, Standard/NTEP Mode Selection




One-Touch Tare Subtraction

Range of Tare Subtraction

Digital Zero

When One-Touch Tare Subtraction is effective, Digital Preset Tare Subtraction ON/OFF.

1: Effective
0: Non-effective

## Digital Zero & Digital Zero Reset

### Digital Zero

The Digital Zero function zeroes the Gross Weight to adjust for slight shifts at the zero point due to loadcell drift or dregs remaining on a scale.

The Gross weight is instantly zeroed by pressing ZERO key.
If Digital Zero is operated when the displayed weight is beyond the set Digital Zero Regulation Value, then the **ZALM** (Zero Alarm) is activated, "**ZALM**" is blinking. To cancel alarm, use Digital Zero Reset or reset Digital Zero Regulation Value.

### The Operation of Digital Zero Reset

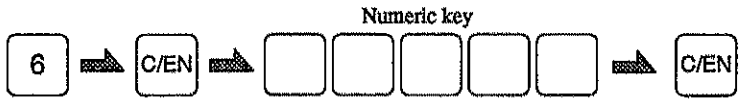
Press 


Digital Zero be canceled and the "**ZALM**" will turn off.

**Setting Digital Zero Regulation Value**

1) Choose Setting Mode 3


2) Select 6, Digital Zero Regulation Value




To operate Digital Zero via the Control Connector on the rear panel, input ON edge (OFF →ON) signal to the pin 3 (D/Z ON) and the COM (Common).

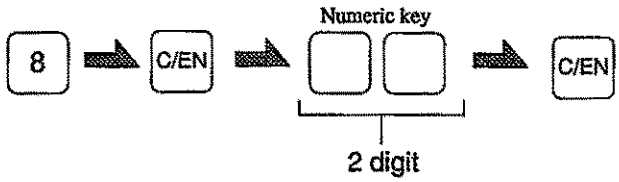
## Gravitational Acceleration

Slight errors may occur if the scale moved from the location of calibration due to gravitational changes.
If the scale is used in the location of calibration, this function is not necessary. But after calibration the scale will ship to different location, before Span Calibration do operation 1, and 2 then 4 using the following procedure.

### Setting Gravitational Acceleration

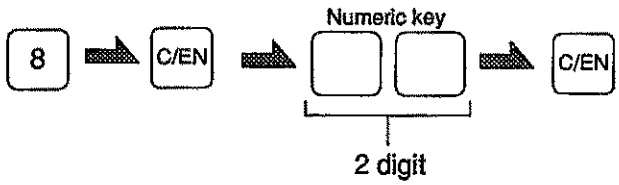
1) Choose Setting Mode 3


2) Select 8, Gravitational Acceleration, input the relatively number to located Gravitational Acceleration.




3) Do Span Calibration

4) Input the 2 digit number following new place Gravitational Acceleration



**Gravitational Acceleration**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 01 | 9.806 | 02 | 9.805 | 03 | 9.804 | 04 | 9.803 |
| 05 | 9.802 | 06 | 9.801 | 07 | 9.800 | 08 | 9.799 |
| 09 | 9.798 | 10 | 9.797 | 11 | 9.796 | 12 | 9.795 |
| 13 | 9.794 | 14 | 9.793 | 15 | 9.792 | 16 | 9.791 |

| | | | |
|---|---|---|---|
| Amsterdam | 9.813 $m/s^2$ | Ottawa | 9.806 $m/s^2$ |
| Athens | 9.800 $m/s^2$ | Paris | 9.809 $m/s^2$ |
| Auckland NZ | 9.799 $m/s^2$ | Rio de Janeiro | 9.788 $m/s^2$ |
| Bangkok | 9.783 $m/s^2$ | Rome | 9.803 $m/s^2$ |
| Birmingham | 9.813 $m/s^2$ | San Francisco | 9.800 $m/s^2$ |
| Brusseles | 9.811 $m/s^2$ | Singapore | 9.781 $m/s^2$ |
| Buenos Aires | 9.797 $m/s^2$ | Stockholm | 9.818 $m/s^2$ |
| Calcutta | 9.788 $m/s^2$ | Sydney | 9.797 $m/s^2$ |
| Capetown | 9.796 $m/s^2$ | Taichung | 9.789 $m/s^2$ |
| Chicago | 9.803 $m/s^2$ | Taiwan | 9.788 $m/s^2$ |
| Copenhagen | 9.815 $m/s^2$ | Taipei | 9.790 $m/s^2$ |
| Cyprus | 9.797 $m/s^2$ | Tokyo | 9.798 $m/s^2$ |
| Djakarta | 9.781 $m/s^2$ | Vancouver, BC | 9.809 $m/s^2$ |
| Frankfurt | 9.810 $m/s^2$ | Washington DC | 9.801 $m/s^2$ |
| Glasgow | 9.816 $m/s^2$ | Wellington NZ | 9.803 $m/s^2$ |
| Havana | 9.788 $m/s^2$ | Zurich | 9.807 $m/s^2$ |
| Helsinki | 9.819 $m/s^2$ | | |
| Kuwait | 9.793 $m/s^2$ | | |
| Lisbon | 9.801 $m/s^2$ | | |
| London (Greenwich) | 9.812 $m/s^2$ | | |
| Los Angeles | 9.796 $m/s^2$ | | |
| Madrid | 9.800 $m/s^2$ | | |
| Manila | 9.784 $m/s^2$ | | |
| Melbourne | 9.800 $m/s^2$ | | |
| Mexico City | 9.779 $m/s^2$ | | |
| Milan | 9.806 $m/s^2$ | | |
| New York | 9.802 $m/s^2$ | | |
| Oslo | 9.819 $m/s^2$ | | |

## 5.2 Auto Free Fall Compensation

Auto Free Fall Compensation adjust the amount of suspended ingredient automatically to reduce weighing errors.

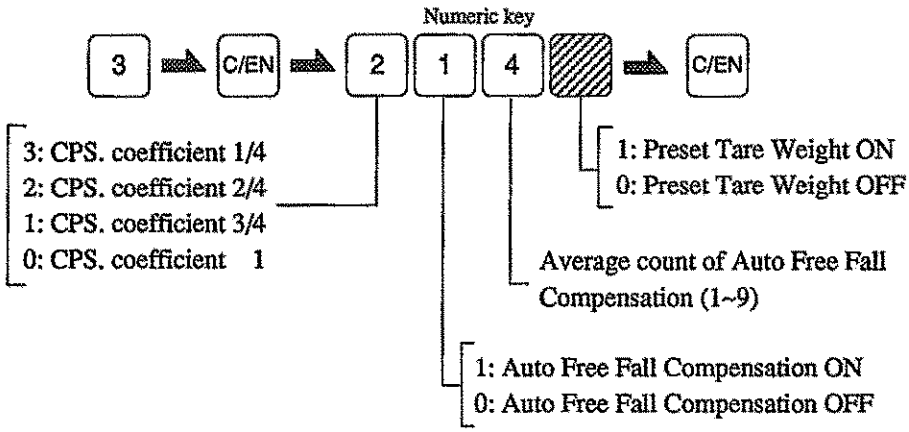
Record "n" times the difference between set Final value and actual weighing value (error), average the difference and multiplied by CPS coefficient, then add the result to CPS value.

Select Auto Free Fall Compensation ON, input the average count of Auto Free Fall Compensation and CPS coefficient.

**The Operation of Selections**

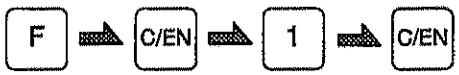
1) Choose Setting Mode 2


2) Select 3, Weighing Function 3

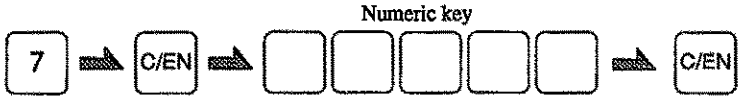



**Setting Auto Free Fall Compensation Regulation**

1) Choose Setting Mode 1




2) Select 7, Auto Free Fall Compensation Regulation (AFFC.R)




When (Final + AFFC. Regulation) ≧ actual weighing value ≧ (Final – AFFC. Regulation) then the F701 will regard the difference as valuable data. Otherwise it is ignored.

《Ex》

| | |
|---|---|
| Final | 20.000 |
| Auto Free Fall Compensation Regulation | 0.100 |
| Average count of AFFC. | 4 |
| CPS coefficient | 2/4 |

| Times | Actual Weighing Value | Error | Average count of AFFC. | CPS |
|---|---|---|---|---|
| 0 | | | 0 | ← Power ON |
| 1 | 20.050 | +0.050 | 1 | 0.500 |
| 2 | 20.040 | +0.040 | 2 | 0.500 |
| 3 | 20.070 | +0.070 | 3 | 0.500 |
| 4 | 20.080 | +0.080 | 4 → 0 | 0.500 |
| | | +0.240/4 | = 0.060 | |
| | | | 0.060×2/4=0.030 | → CPS value |
| 5 | 20.020 | +0.020 | 1 | 0.530 |
| 6 | 20.000 | 0.000 | 2 | 0.530 |
| 7 | 20.010 | +0.010 | 3 | 0.530 |
| 8 | 20.110 | (+0.110) | ←× 3 | 0.530 |
| 9 | 20.010 | +0.010 | 4 → 0 | 0.530 |
| | | +0.040/4 | = 0.010 | |
| | | | 0.010×2/4=0.005 | → CPS value |
| 10 | 19.880 | (-0.120) | ←× 1 | 0.535 |
| 11 | 19.990 | -0.010 | 1 | 0.535 |
| 12 | 20.010 | +0.010 | 2 | 0.535 |
| 13 | 20.000 | 0.000 | 3 | 0.535 |
| 14 | 19.980 | 0.020 | 4 → 0 | 0.535 |
| | | -0.020/4 | = −0.005 | |
| | | | −0.005×2/4=−0.0025 | |
| | | | round off the fractions to three decimal place | |
| | | | −0.003 | → CPS value |
| | | | | 0.532 |

## 5.3 Control Input Signal

(1) Gross/Net switching (G/N)

The display value is switched between Gross and Net by pressing the GROSS/NET key or through the Input Signal.

< edge input >

When the setting of External Function Selection 1 in setting mode 4 is "0 : Control Signal Input, key Input"

When Control Input pin 2 is shorted to COM (OFF → ON) the Net weight is displayed.

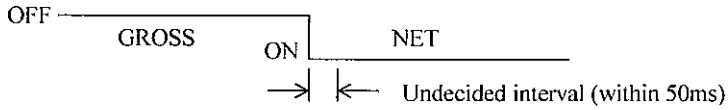
When Control Input pin 2 is open to COM (ON → OFF) the Gross weight is displayed.


Also set GROSS/NET key input effective and do toggle motion (NET → GROSS → NET).

< Level input >

When the setting of External Function Selection 1 in setting mode 4 is "1 : Control Signal Input"

Net weight display results at ON, and Gross weight display results at OFF.

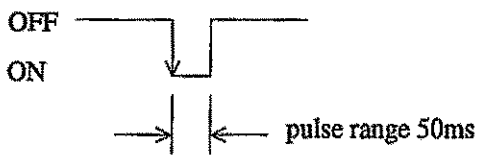



GROSS/NET key becomes invalid.

(2) Digital Zero (D/Z ON) 〈edge input〉 [pin 3]

Press ZERO → CNG/ENT , brings Gross weight to zero.

When Control Input pin 3 is shorted to COM (OFF→ON) it brings the Gross weight to zero.

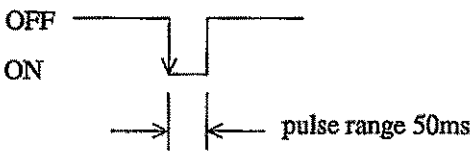



Digital Zero Regulation Value is set through Setting Mode 3-6. If the values are exceeded, the "**ZALM**" (Zero Alarm) blinks.

(3) Tare Subtraction (Tare ON) 〈edge input〉 [pin 4]

Pressing TARE brings the Net weight to zero.

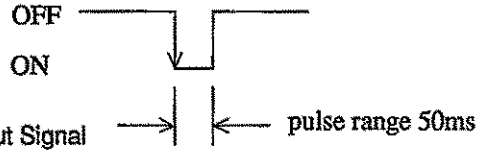
When Control Input pin 4 is shorted to COM (OFF→ON) it brings the Net weight to zero.




(4) Tare Reset (Tare OFF) 〈edge input〉 [pin 5]

Pressing TARE RESET brings the Net weight equal to Gross weight. This does not apply Preset Tare Weight.

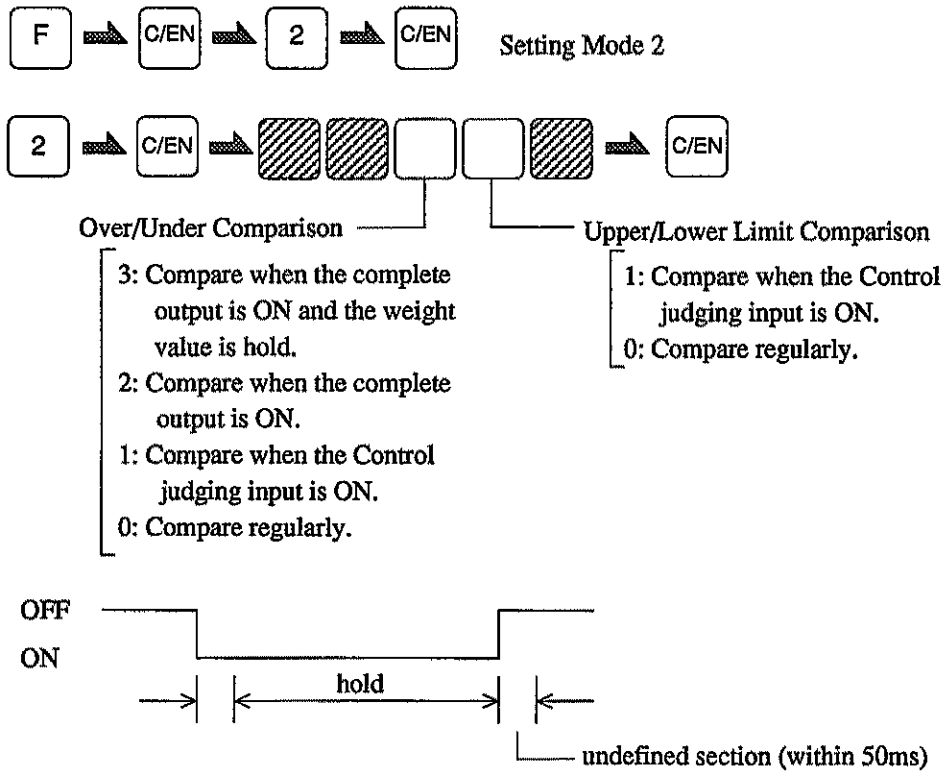
When External Input pin 5 is shorted to COM (OFF→ON) it brings the Net weight equal to Gross weight.



(5) Hold 〈level input〉 [pin 14]

The weighing value will be in a hold mode if pin 14 is shorted to COM. Setting Mode 2-2 Over/Under and Upper/Lower Limit Comparison must both be set to zero (0).

* Weighing value hold is decided by user.



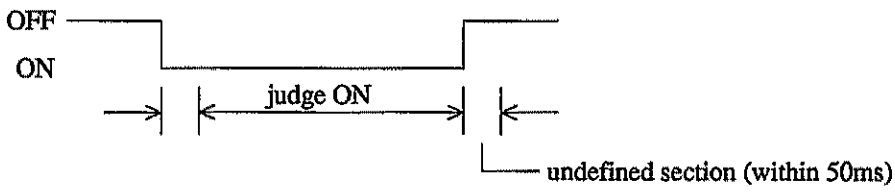

If Setting Mode 2-2 Over/Under and Upper/Lower Limit Comparison are not set to zero, then they can only be activated by Control input.

**NB**

In Sequence Mode (Setting Mode 2-4), Hold function is not available.

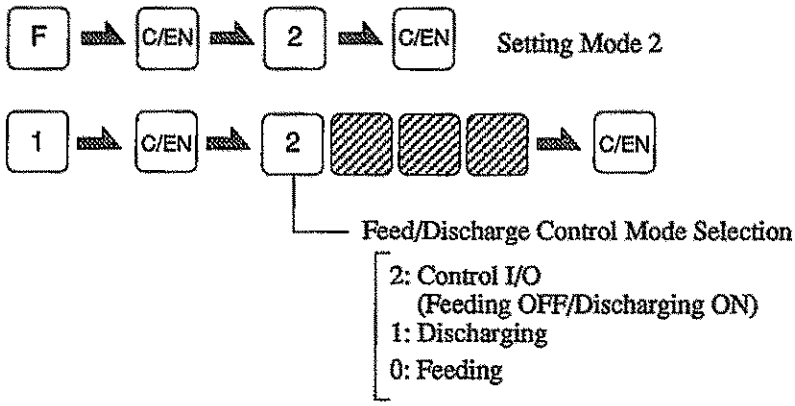
(6) Judge 〈level input〉 [pin 14]

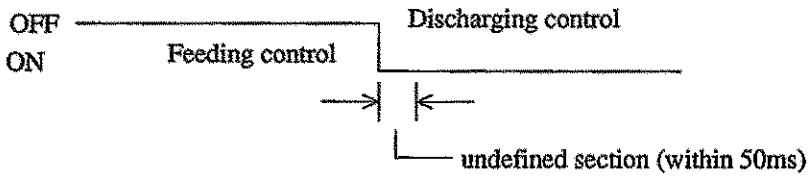
Judging Mode is activated by shorting pin 14 to COM. Setting Mode 2-2 Over/Under and Upper/Lower Limit Comparison must be set to one (1).



(7) Feed/ Discharge 〈level input〉 [pin 15]

Feed or Discharge is accessed by shorting or opening pin 15 to COM. Setting Mode 2-1 Feed/Discharge Control Mode Selection must be set to two (2).




(8) Start 〈edge input, level input〉 [pin 16]

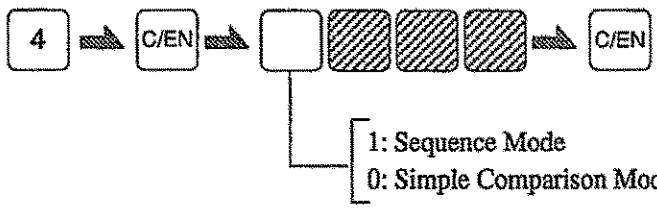
(9) Stop 〈edge input, level input〉 [pin 17]

Effective in Sequence Mode
(Refer to the section on sequence control)

**Selecting Sequence Mode**

1) Choose Setting Mode 2


2) Select 4, Sequence Mode



## 5.4 Control output Signal

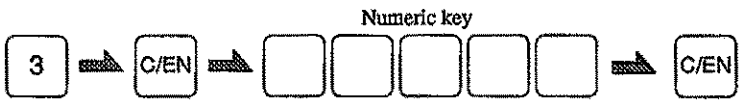
(1) Near Zero [pin 6]

When weighing value ≦ Near Zero set value Control Output Signal turns ON.

**Setting Near Zero**

1) Choose Setting Mode 0

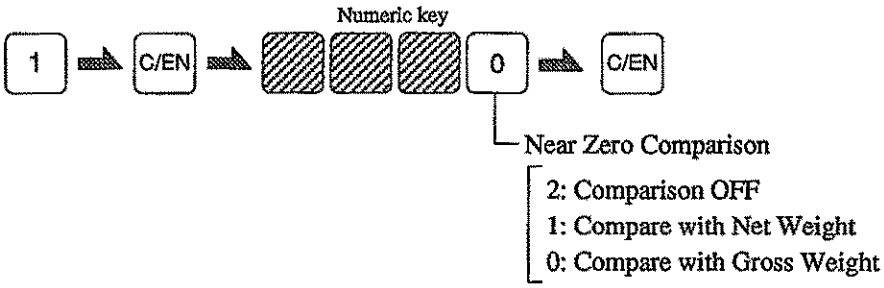

2) Select 3, Near Zero




**Selecting Near Zero Comparison**

1) Choose Setting Mode 2


2) Select 1, Weighing Function 1



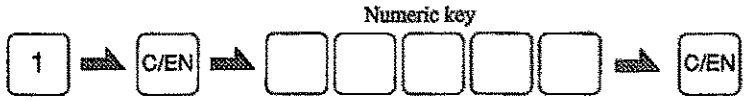
(2) Lower Limit, Upper Limit [pin 18, 19]

The Lower Limit output turns on when weight value < Lower Limit
The Upper Limit output turns on when weight value > Upper Limit

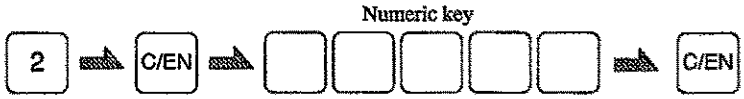
**Setting Upper Limit and Lower Limit**

1) Choose Setting Mode 0


2) Select 1, Upper Limit



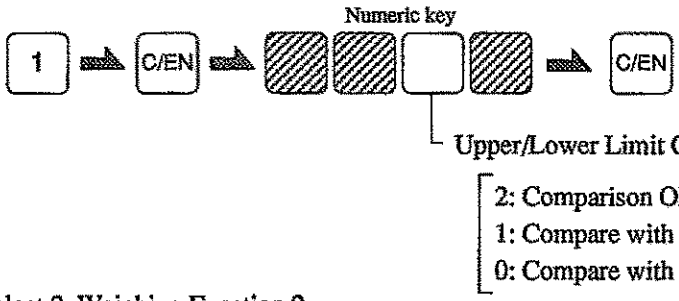

3) Select 2, Lower Limit



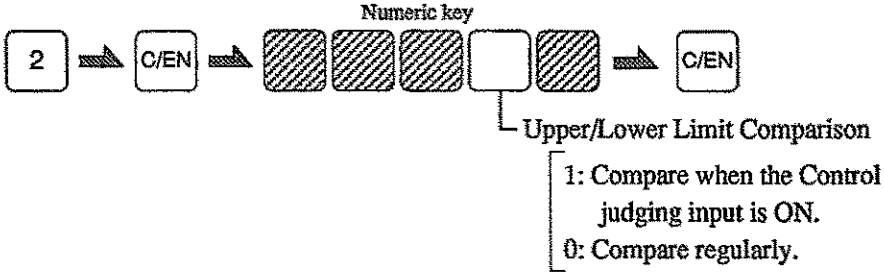

**Selecting Upper/Lower Limit Comparison**

1) Choose Setting Mode 2


2) Select 1, Weighing Function 1




3) Select 2, Weighing Function 2



(3) Stable [pin 20]

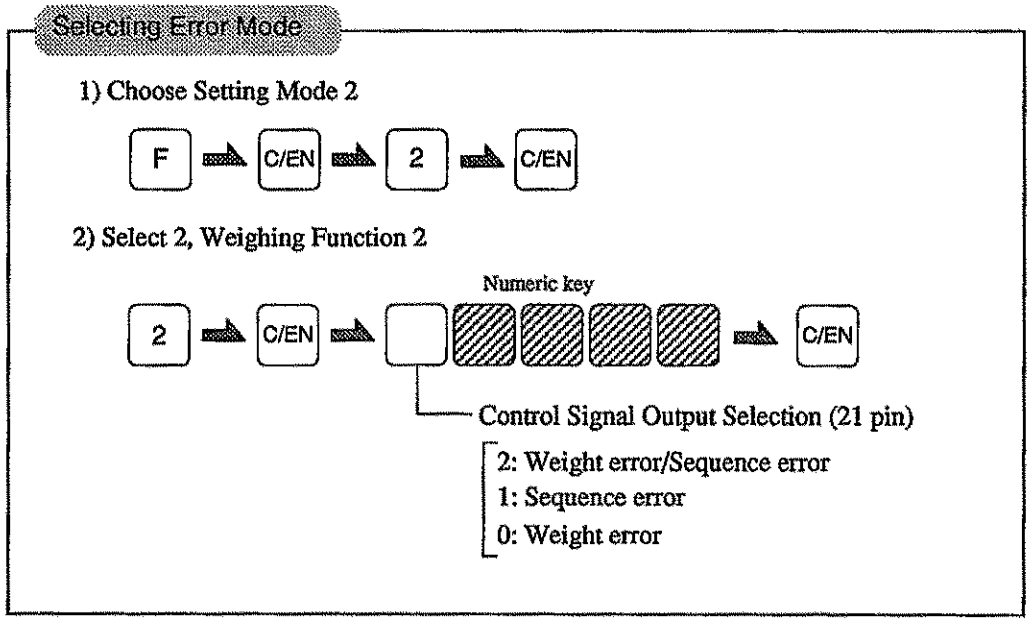
This output turns on when the weighing value is stable. Refer to the section 'Motion Detection'.

(4) Weight Error [pin 21]

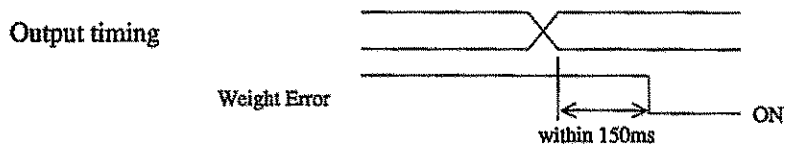
This output turns on when the **LoAd**, **-LoAd**, **oFL1**, **oFL2**, **oFL3** happen or **ZALM** lamps turns ON.

(5) Sequence Error [pin 21]

This output turns on when Sequence error happens.
Whether Output pin 21 is Weight Error or Sequence Error is decided by Setting Mode 2-2.




- Sequence Error information refer to page
- Weight Error
  When (FINAL−CPS) ≦ 0 Weight Error output signal turns on, not only in Sequence Mode but also in Simple comparison control.



(6) Run [pin 23]

This output turns on when the F701 is ready to operate.

(7) The output of SP1, SP2 and SP3. [pin 7, 8, 9]

In Simple Comparison Control Mode

SP1 turns on when weight value ≧ Final – Set Point 1

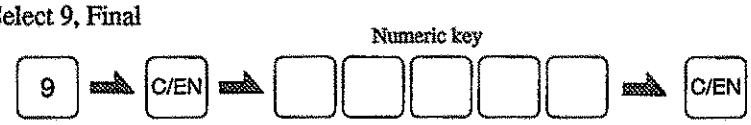
SP2 turns on when weight value ≧ Final – Set Point 2

SP3 turns on when weight value ≧ Final – CPS

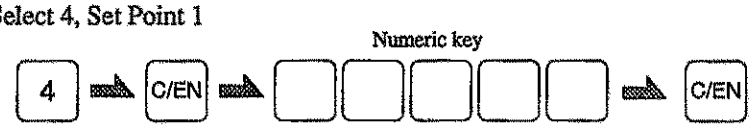
**Setting Comparison Items**

1) Choose Setting Mode 0

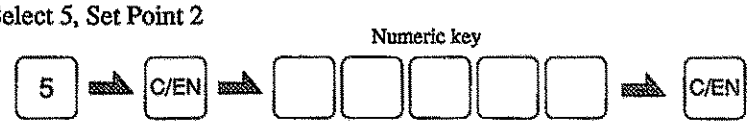

2) Select 9, Final



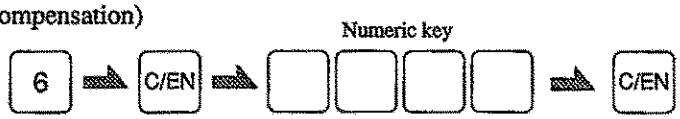

3) Select 4, Set Point 1




4) Select 5, Set Point 2

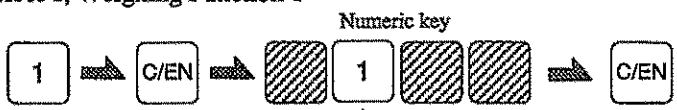



5) Select 6, CPS (Compensation)




6) Choose Setting Mode 2


7) Select 1, Weighing Function 1




Final, Over/Under Comparison

2: Comparison OFF
1: Compare with Net Weight
0: Compare with Gross Weight

In Sequence Control Mode

In Sequence Mode, the weighing sequence is started at the ON edge of the start signal (OFF →ON), SP1, SP2 and SP3 turn ON.

SP1 turns off when weight value ≧ Final – Set Point 1

SP2 turns off when weight value ≧ Final – Set Point 2

SP3 turns off when weight value ≧ Final – CPS

(8) Under, Go, Over [pin 10, 11, 22]

In Simple Comparison Control Mode

The Under signal turns on when weight value < Final – Under

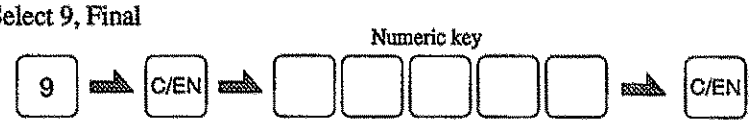
The Over signal turns on when weight value > Final + Over

The Go signal turns on when Final + Over ≧ weight value ≧ Final –Under

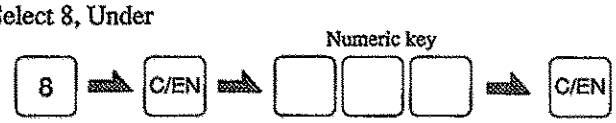
Setting Under/Over Comparison

1) Choose Setting Mode 0

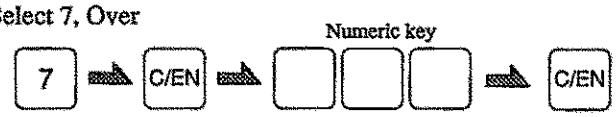

2) Select 9, Final




3) Select 8, Under

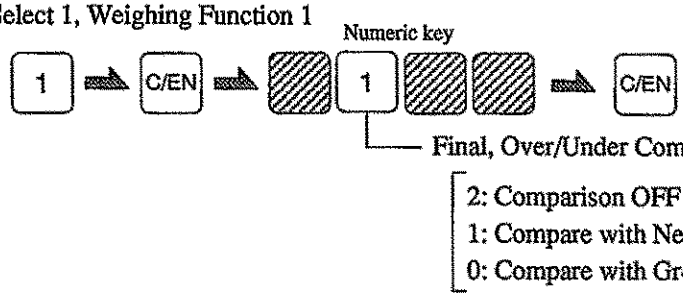



4) Select 7, Over

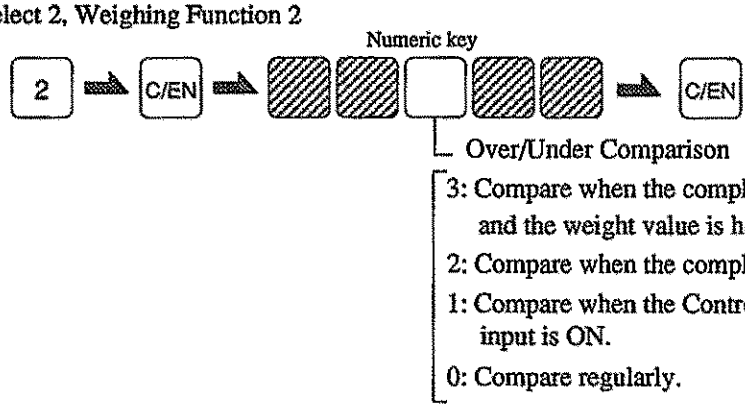



5) Choose Setting Mode 2


6) Select 1, Weighing Function 1



7) Select 2, Weighing Function 2




In Sequence Control Mode

The Under signal turns on when weight value < Final – Under

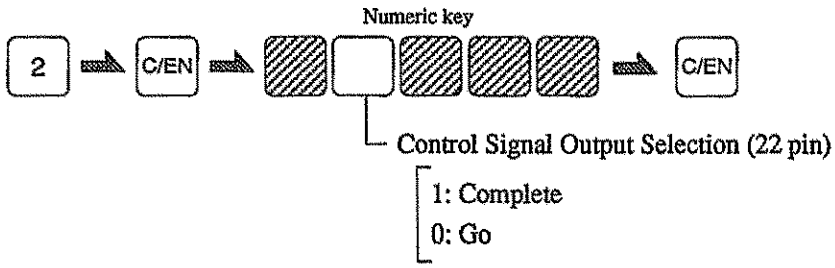
The Over signal turns on when weight value > Final + Over

The Go signal turns on when Final + Over ≧ weight value ≧ Final –Under

Setting Control Output pin 22

1) Choose Setting Mode 2


2) Select 2, Weighing Function 2




In Some applications Complete signal is more important, when Complete output is selected Complete signal is ON and Over, Under signals are OFF equals Go signal is ON.

(9) Complete [pin 22]

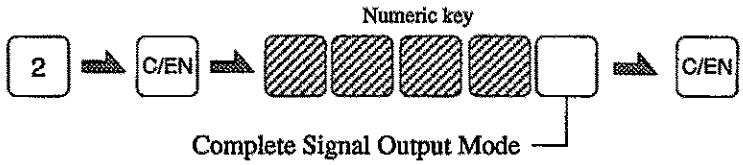
In Simple Comparison Control Mode

The Complete Signal Output Mode is selected in Setting Mode 2-2. The duration value of the Complete Signal is entered in Setting Mode 1-3.

**Selecting Complete Signal Output Mode**

1) Choose Setting Mode 2

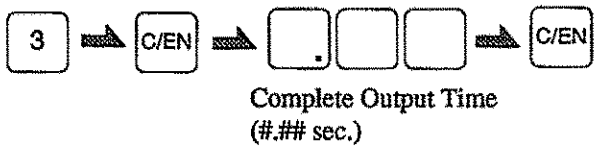

2) Select 2, Weighing Function 2




**Setting the duration of Complete signal**

1) Choose Setting Mode 1


2) Select 3, Complete Output Time

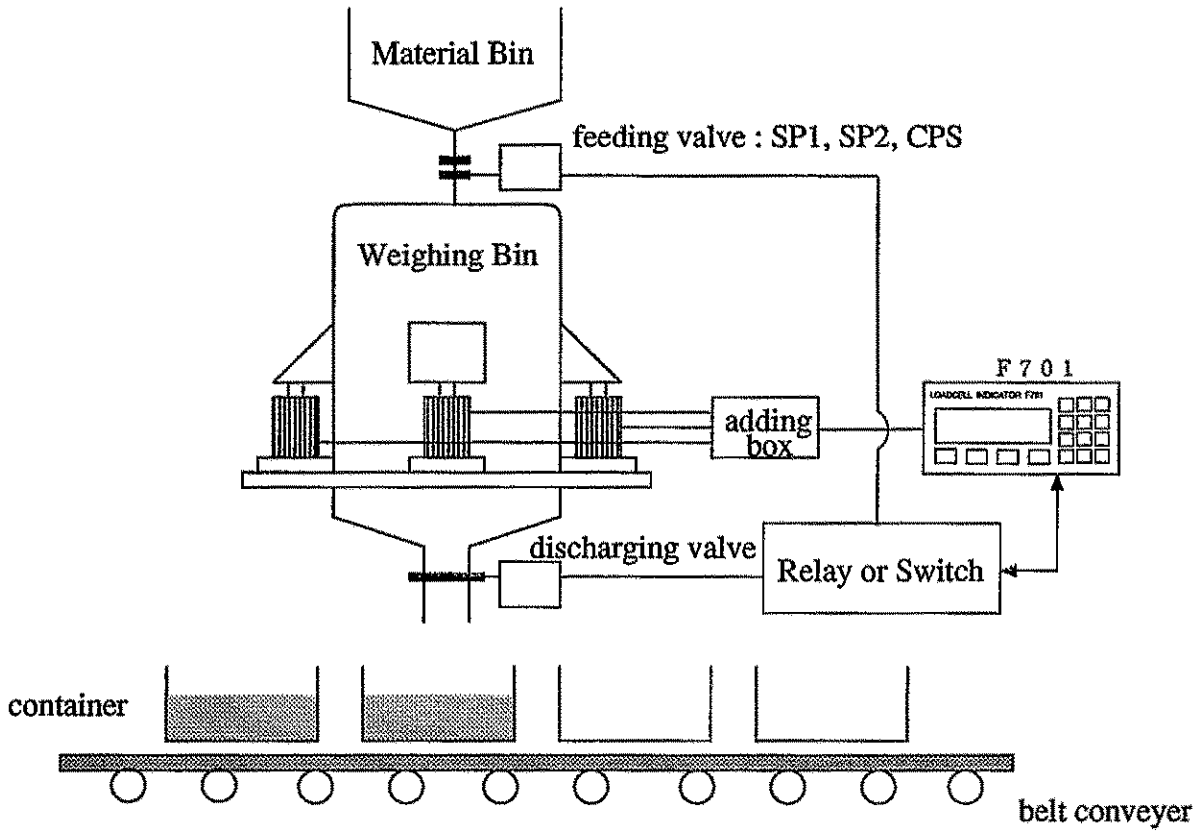


In Sequence Control Mode

- With judgment (the judging times in Setting Mode 1-2 is not 00)
  The Complete Signal Output Mode is selected in Setting Mode 2-2.
  The duration value of the Complete Signal is entered in Setting Mode 1-3.
- Without judgment (the judging times in Setting Mode 1-2 is 00)
  Complete Signal Output Mode in Setting Mode 2-2 is ignored. When the SP3 output signal has turned off (ON→OFF), the Complete signal turns ON. The duration value of the Complete Signal is entered in Setting Mode 1-3

## 5.5 The Example of Feeding Weighing

At start feeding weighing, the valve or valves of the Material Bin are fully opened. According to the set weighing parameter and weight fluctuations, close or dwindle down the valve till getting final weight and close valves. Then discharge from the Weighing Bin the the containers on the belt conveyer.




(1) Subtract the Tare weight by keypad operation or control signal input to zero the Net weight.

(2) Fully open the valve or valves of the Material Bin, when the weight gets Final – Set Point 1, SP1 signal ON close or dwindle down the relevant valve. (If Comparison Inhibit Time Setting Mode 1-1 is not 0, the timer starts)

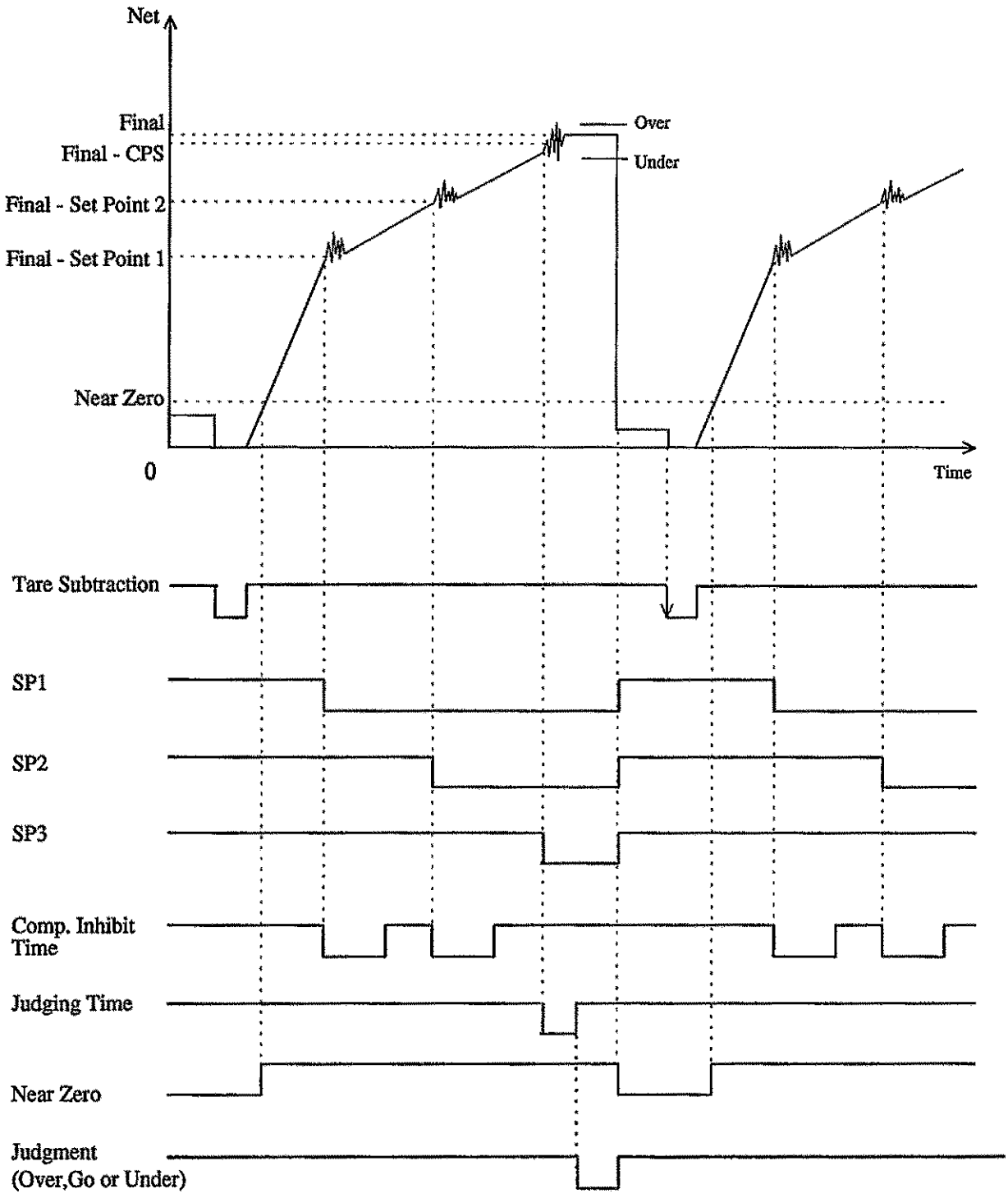
(3) When the weight gets Final – Set Point 2, SP2 signal ON close or dwindle down the valve.

(4) When the weight gets Final – CPS, SP3 signal ON close the valve. If the Judging time Setting Mode 1-2 is not 0, the timer starts.

(5) After Judging time is expired, start Over/Under Comparison give out Under/Over/Go signal.

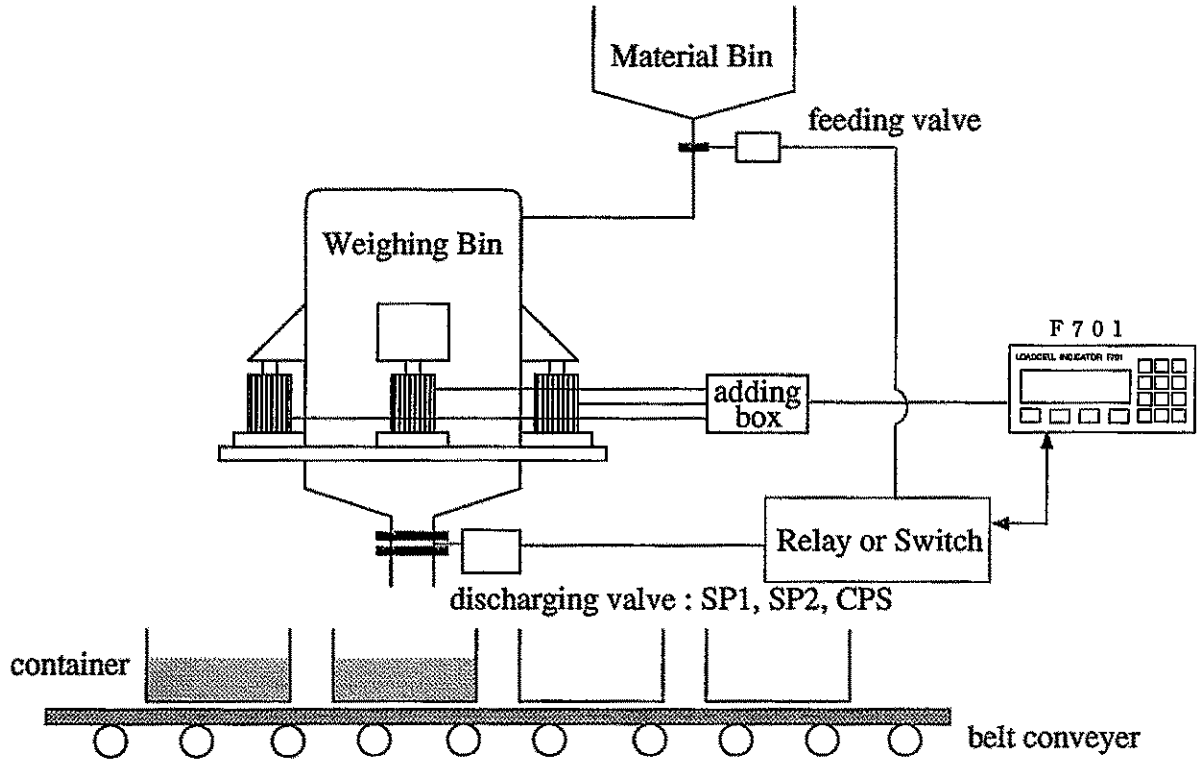
(6) Feeding Weighing is finished, discharge the material from Weighing Bin to the container on the belt conveyer. Open the valve of Weighing Bin till Near Zero signal gets on.

(7) One weighing circle is finished, repeat it follow the same procedure.


Net
Final
Final - CPS
Final - Set Point 2
Final - Set Point 1
Near Zero
0
Over
Under
Time
Tare Subtraction
SP1
SP2
SP3
Comp. Inhibit Time
Judging Time
Near Zero
Judgment (Over,Go or Under)

## 5.6 The Example of Discharging Weighing

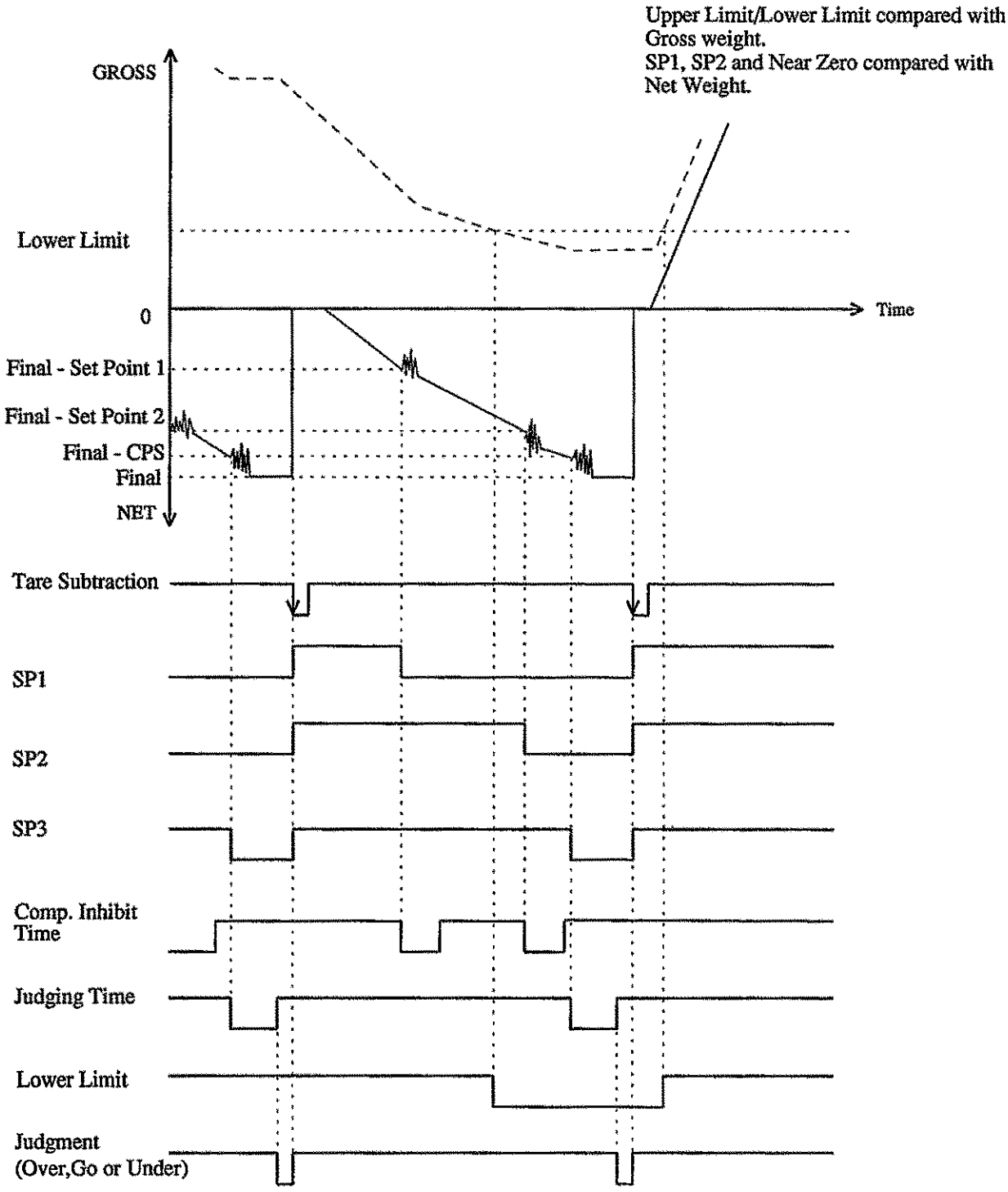
The Discharging Weighing is Loss-In-Weight application, in contrast Feeding Weighing is Gain-In-Weight application. The Material Bin supplies to Weighing Bin, Weighing Bin discharge to the container on the belt conveyer. At start the valve or valves of the Weighing Bin are fully opened. According to the set weighing parameter and weight fluctuations, close or dwindle down the valve till getting final weight and close valves. Repeat the discharging weighing circle till the remainder in Weighing Bin is not enough, to open the valve of Material Bin to get supplement.



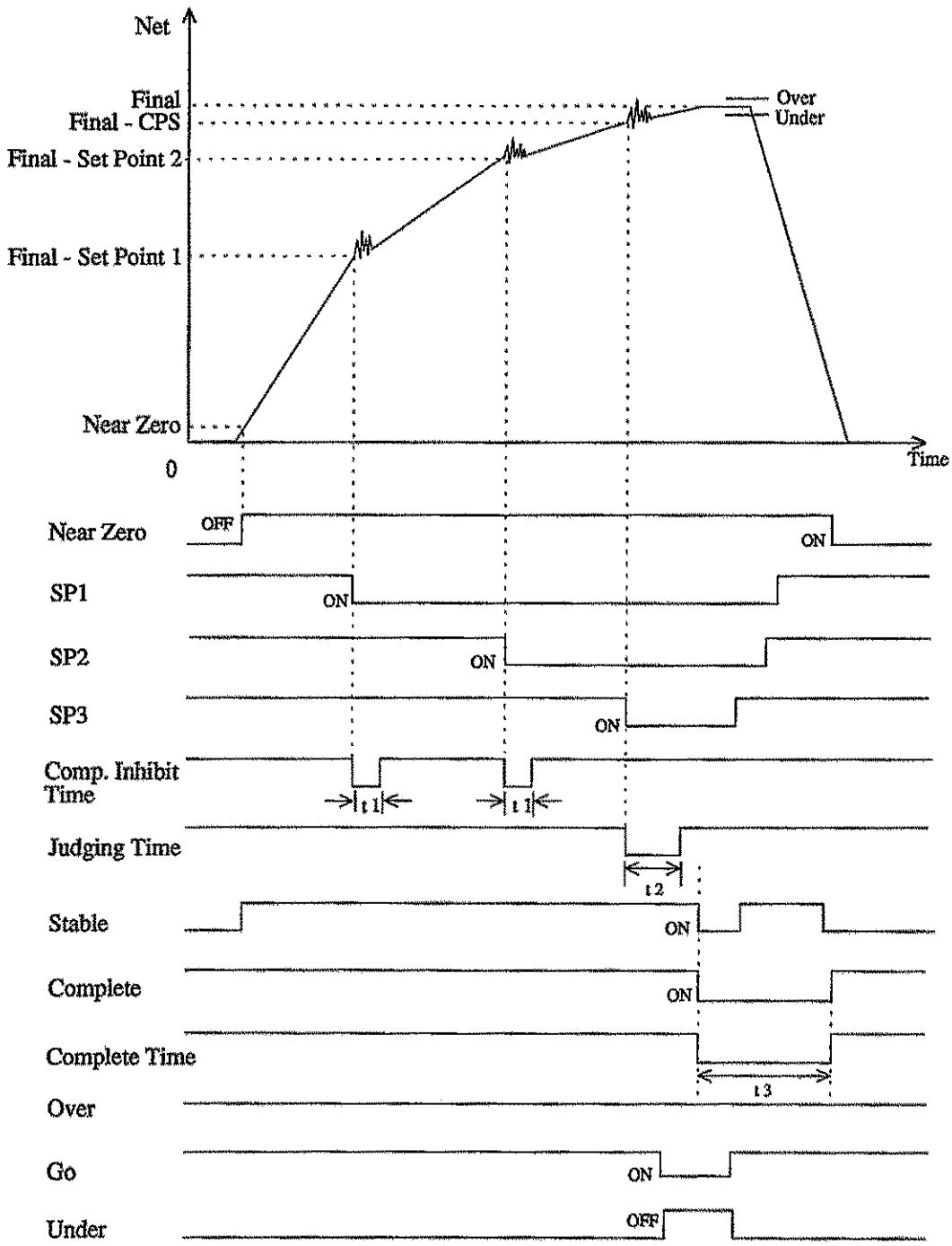

(1) Using Lower Limit and Upper Limit signal of Weighing Bin to control the Material Bin's supplement. When Lower Limit signal turns ON, open the valve of Material Bin until the Upper Limit signal turns ON close the valve.

(2) Refer to the procedure 1 ~ 7 of Feeding Weighing Example.

(3) When the Lower Limit signal turns ON, open the valve of Material Bin to get supplement.


Upper Limit/Lower Limit compared with Gross weight.
SP1, SP2 and Near Zero compared with Net Weight.
GROSS
Lower Limit
0
Time
Final - Set Point 1
Final - Set Point 2
Final - CPS
Final
NET
Tare Subtraction
SP1
SP2
SP3
Comp. Inhibit Time
Judging Time
Lower Limit
Judgment (Over,Go or Under)

# 5.7 Simple Comparison Control



◇ The duration of Over/Under Comparison is entered in Setting Mode 2-2. The time chart on the previous page uses a "Compare regularly" selection.

◇ The duration of the signal in "Complete Signal Output Mode" is entered in Setting Mode 2-2.

◇ t1 : Comparison Inhibit Time in the Setting Mode 1-1
t2 : Judging Time in the Setting Mode 1-2
t3 : Complete output time in the Setting Mode 1-3

◇ Conditional formulas

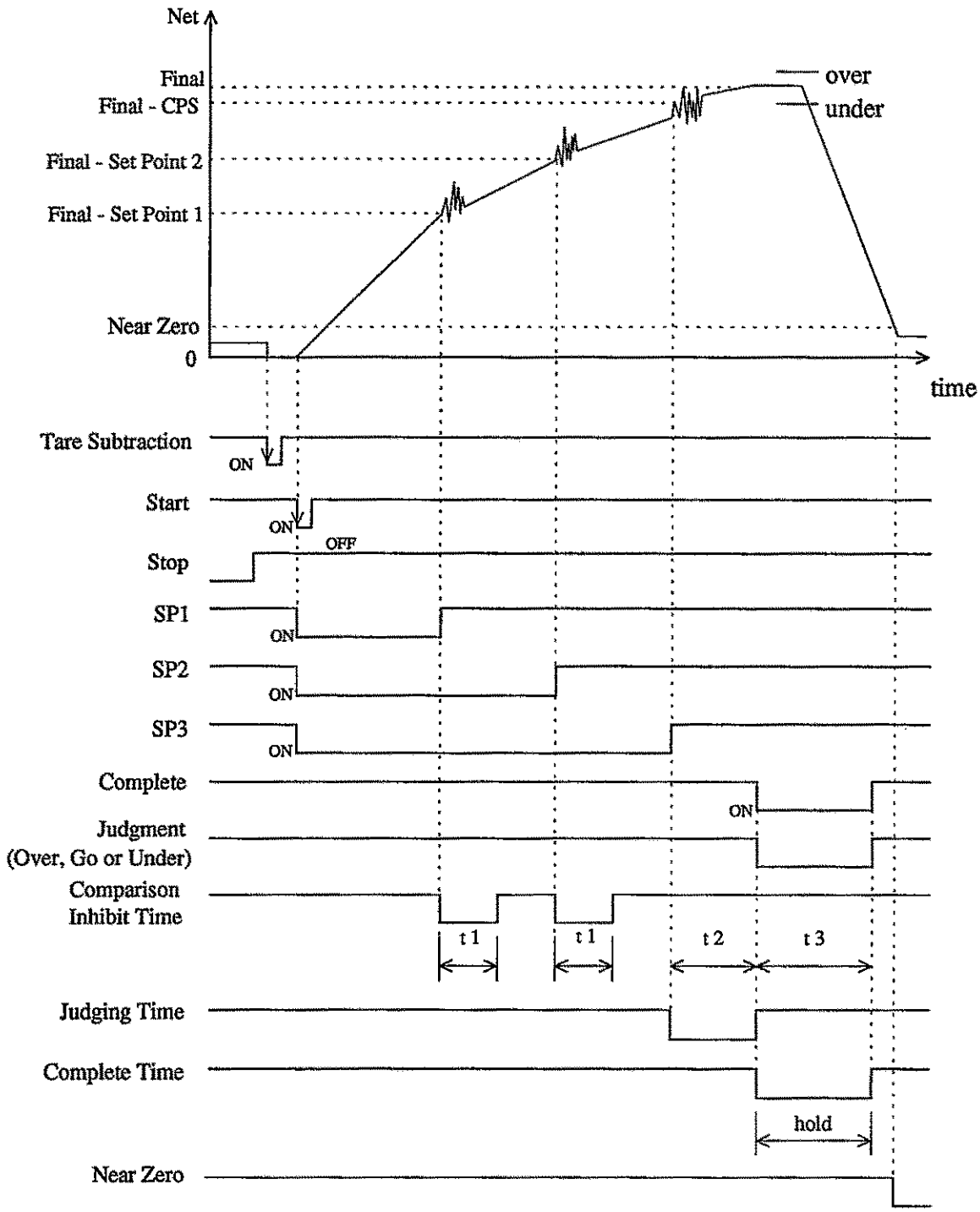
When weighing value ≦ set value of Near Zero, the Near Zero output signal turns on.
When weighing value ≧ Final–Set Point 1, the SP1 output signal turns on.
When weighing value ≧ Final–Set Point 2, the SP2 output signal turns on.
When weighing value ≧ Final–CPS, the SP3 output signal turns on.
When weighing value < Final–Under, the Under output signal turns on.
When weighing value > Final+Over, the Over output signal turns on.
When Final+Over ≧ weighing value ≧ Final–Under, the Go output signal turns on.

◇ The compared weighing value at Near Zero can be Gross or Net weight, selected in Setting Mode 2-1.

◇ The compared weighing value with Final, Over and Under can be Gross or Net weight, selected in Setting Mode 2-1.

# 5.8 Sequence Control

## 5.8.1 Sequence with Judgment



◇ The duration of signal from "Complete Signal Output Mode" is entered in Setting Mode 2-2.

◇ Sequence Mode **ignores** the set value of Over/Under and Upper/Lower Limit comparison in Setting Mode 2-2. The Over/Under Compare when Complete output is ON and weight value is held; Upper/Lower Limit Compare regularly.

◇ t1 : Comparison Inhibit Time in the Setting Mode 1-1
t2 : Judging Time in the Setting Mode 1-2
t3 : Complete output time in the Setting Mode 1-3

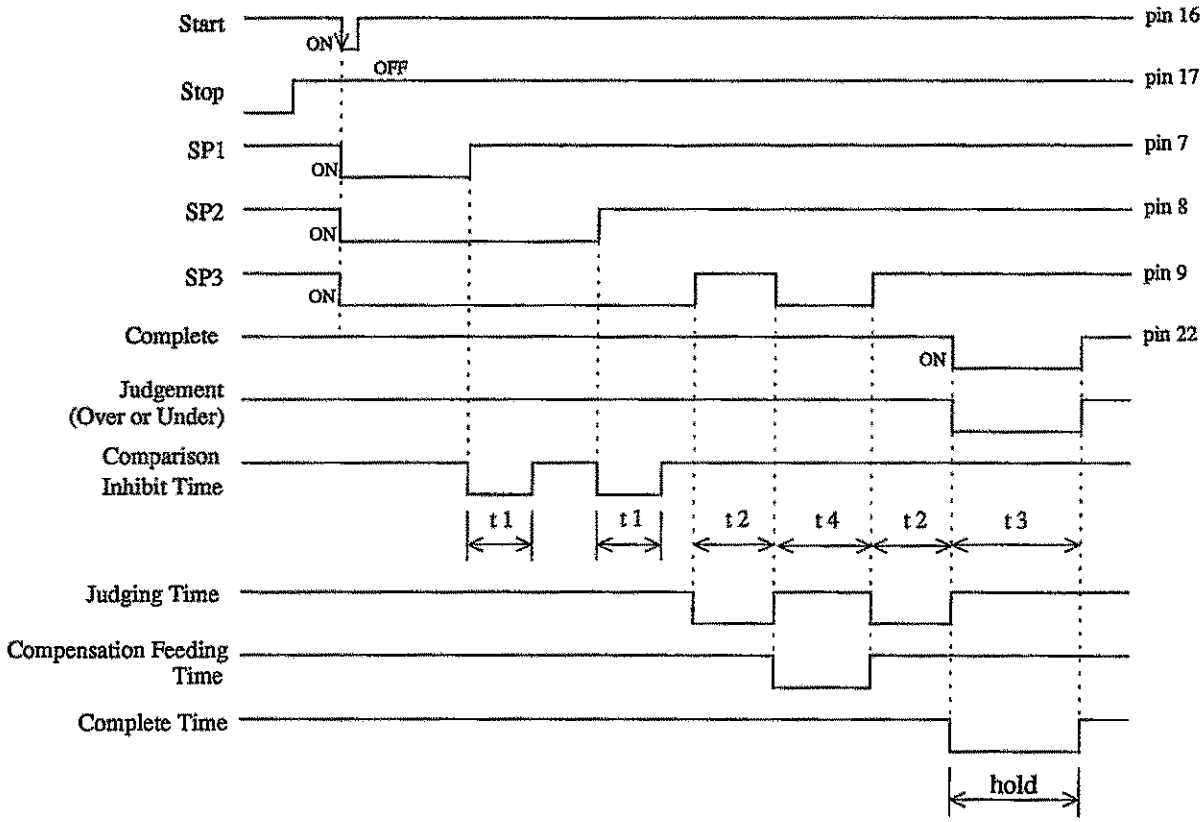
◇ Conditional Formulas

When weighing value ≦ set value of Near Zero, the Nesr Zero output signal turns on.
* Weighing sequence start at the ON edge of the start signal (OFF→ON), SP1, SP2 and SP3 turn ON.
When weighing value ≧Final–Set Point 1, the SP1 output signal turns off.
When weighing value ≧Final–Set Point 2, the SP2 output signal turns off.
When weighing value ≧Final–CPS, the SP3 output signal turns off.
When weighing value < Final–Under, the Under output signal turns on.
When weighing value > Final+Over, the Over output signal turns on.
When Final+Over ≧ weighing value ≧ Final–Under, the Go output signal turns on.

◇ The compared weighing value at Near Zero can be Gross or Net weight, selected in Setting Mode 2-1.

◇ The compared weighing value with Final, Over and Under can be Gross or Net weight, selected in Setting Mode 2-2.

## 5.8.2 Sequence with Adjust Feeding Effective



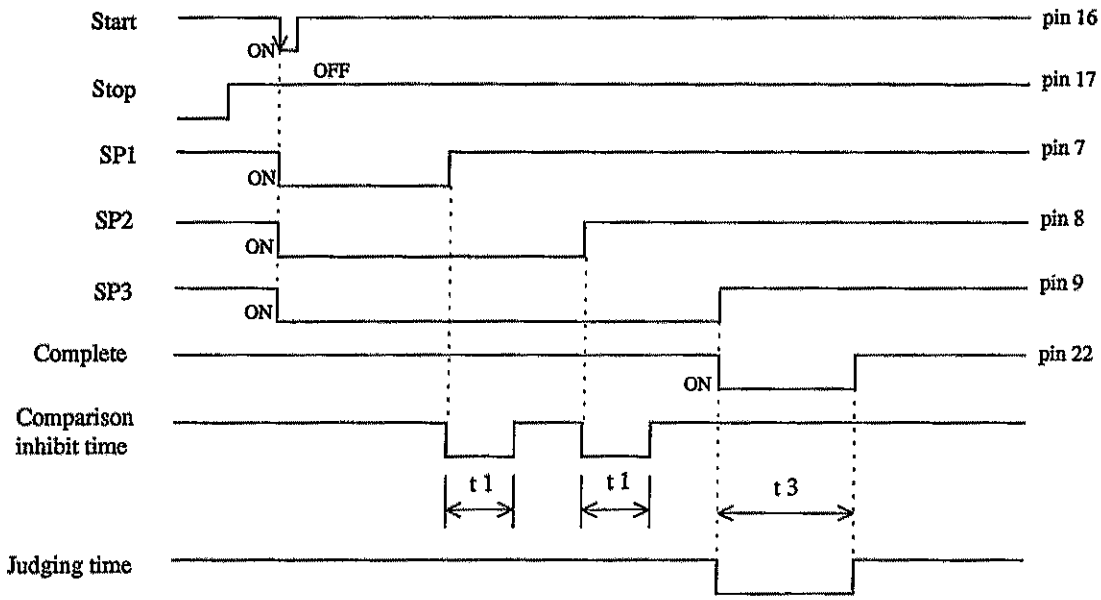

◇ Select Adjust Feeding ON in the Setting Mode 2-4.

◇ The duration of signal from "Complete Signal Output Mode" is entered in Setting Mode 2-2.

◇ Sequence Mode **ignores** the set value of Over/Under and Upper/Lower Limit Comparison in Setting Mode 2-2. The Over/Under Compare when Complete output is ON and weight value is held; Upper/Lower Limit Compare regularly.

◇ t1 : Comparison Inhibit Time in the Setting Mode 1-1
t2 : Judging Time in the Setting Mode 1–2
t3 : Complete output time in the Setting Mode 1-3
t4 : Compensation Feeding Time in the Setting Mode 1-4

### 5.8.3 Sequence without Judgment

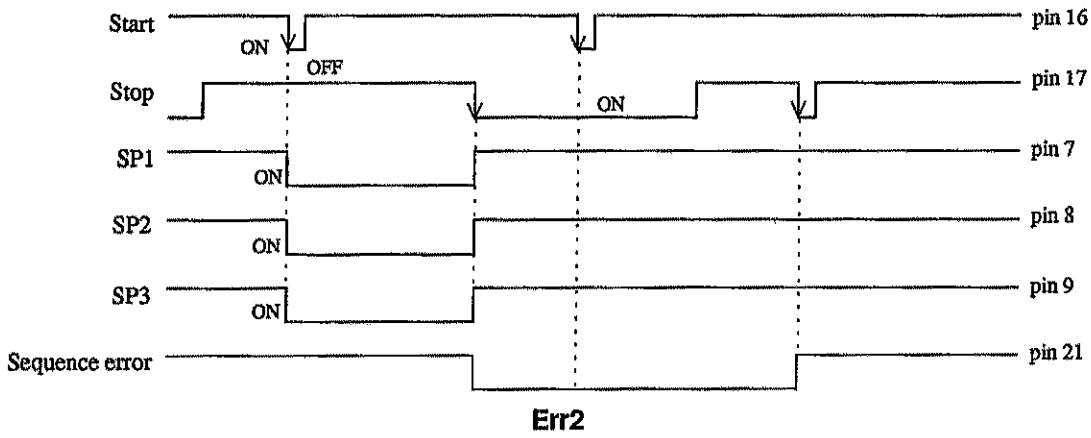



◇ Entering a Judging Count of 00 in Setting Mode 1-6 disables Over/Under comparison.

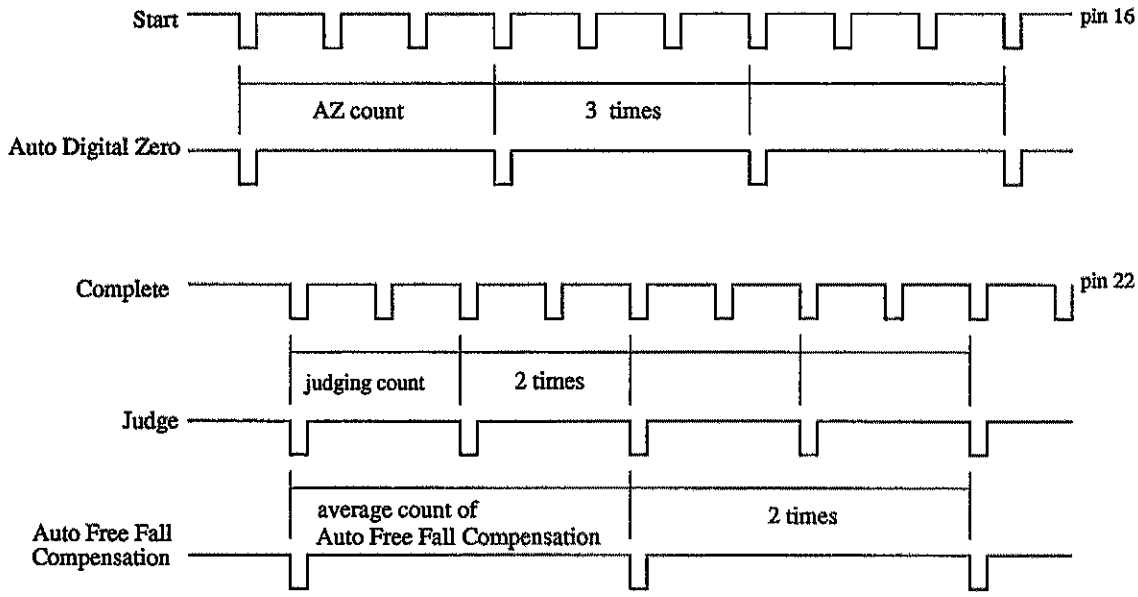
◇ In Sequence without judgment **ignores** the selection of complete signal output mode in Setting Mode 2-2. When the SP3 output signal at the OFF edge (ON→OFF) Complete signal turns ON.

◇ t1 : Comparison Inhibit Time in the Setting Mode 1-1
t3 : Complete output time in the Setting Mode 1-3

### 5.8.4 Stop Signal



## 5.8.5 AZ Count, Judging Count and Average Count of Auto Free Fall Compensation




◇ If the AZ count is 01, F701 will do an Auto Digital Zero before each start. (If in Net mode, do a tare before starting.)
If the AZ count is 02~99, F701 will do an Auto Digital Zero for that number of starts (02~99).
If the AZ count is 00, the Auto Digital Zero is inactive until key operation or Control input D/Z, Tare ON signal.

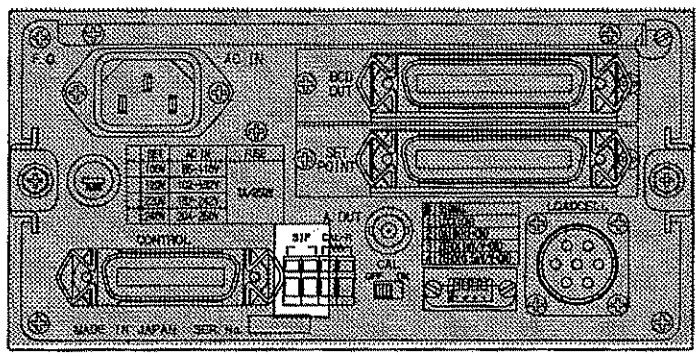
◇ If the Judging count 01, F701 will do an Over/Under comparison after each weighing.
If the Judging count is 02~99, F701 will do an Over/Under comparison for that number of complete signals (02~99).
If the Judging count is 00, Over/Under comparison is inactive.

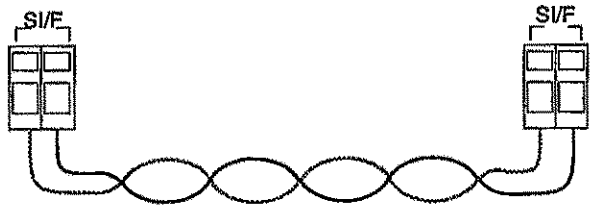
◇ Auto Free Fall Compensation is inactive if judging count is 00.

# 6 Interface

## 6.1 2-wire Serial Interface (SI/F)

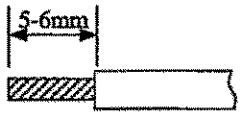
The 2-wire serial interface has connective ability for coupling a printer, external display, etc.
The interface is nonpolarized and up to three external instruments may be connected.
A two-core parallel cable or a cabtyre cable (Wire with covering thickened for construction) may be used for connection.
When a two-core parallel cable or a cabtyre cable is used, the transmitting distance is approximately 30m.
When a two-core shielded twisted pair cable is used, the transmitting distance is approximately 300m.
Do not parallel it with AC lines and high-voltage lines. It may cause of malfunction.



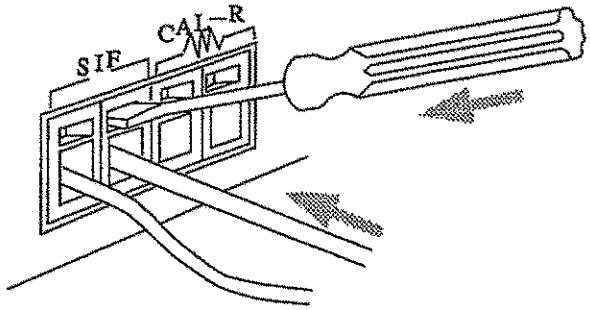


Connect 2-wire cables to the SI/F terminals on the rear panel.

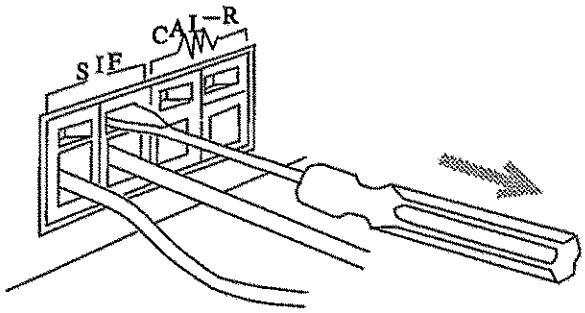
1. Peal the cover of the cable and twist the end.




2. Insert the supplied screwdriver into the the upper hole, lifting while pushing.
3. Insert the cable into the lower hole.




4. Remove the screw driver.
5. Pull the cable lightly to make sure the cable is firmly clamped.



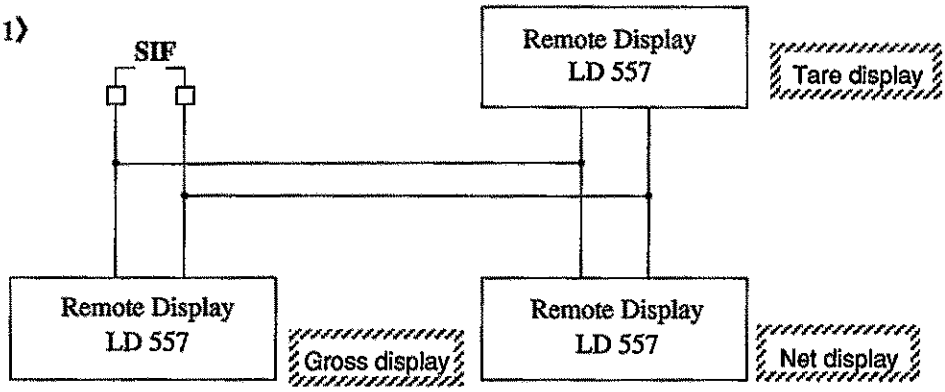

**NB**

- Cable can be from 24 to 14 AWG (0.2 to 2.5mm$^2$). Do not apply a pressure connector or solder to the end of a cable.
- To connect several cables, twist them before connecting.

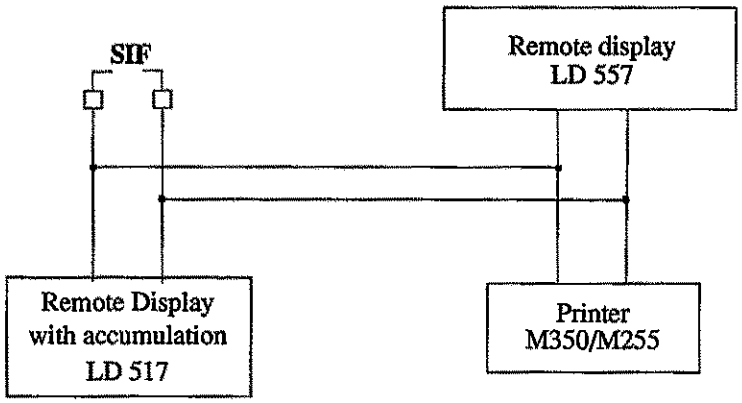
Cables such as twin-lead can be used.

Do not route cables near AC power or other noise generating wiring.

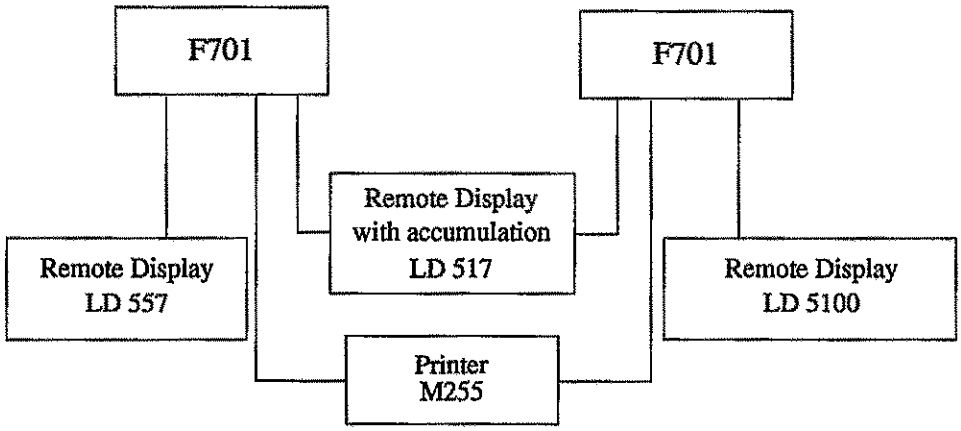
《Example 1》




《Example 2》




《Example 3》




◇ Auto print command

The F701 gives an automatic print command to any devices connected by SI/F interface. In Simple Comparison Control Mode the automatic print command is sent when the Complete output signal turns ON. In Sequence with Judgment Mode the automatic print command is sent when judgment output signals (Over; Go; Under) turn ON. In Sequence without Judgment the Setting Mode 1-6 Judging Count is set "00", **without the automatic print command** be sent out.

## 6.2 Interface for the Setpoint (Option 1)

· **Setting Value**

| | | | | | |
|---|---|---|---|---|---|
| Final | ··· | 5 digit | CPS | ··· | 4 digit |
| SP1 | ··· | 4 digit | SP2 | ··· | 5 digit |
| Over | ··· | 3 digit | Under | ··· | 3 digit |

· **Connector pin assignment** adaptable plug : DDK57-30360 or equivalent one

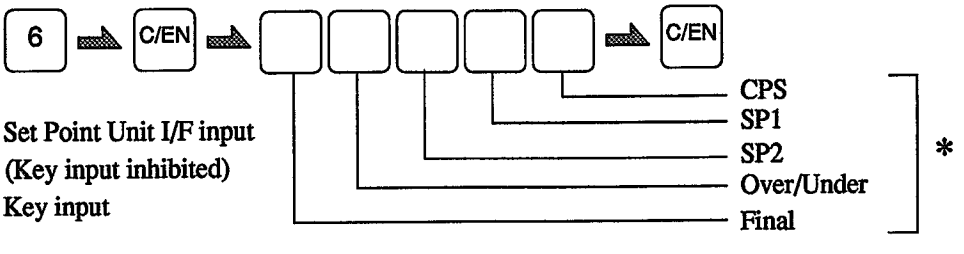
| | | | | | |
|---|---|---|---|---|---|
| 1 | COM | | 19 | COM | |
| 2 | Final | $10^0$ | 20 | SP1 | $10^2$ |
| 3 | Final | $10^1$ | 21 | SP1 | $10^3$ |
| 4 | Final | $10^2$ | 22 | SP1 | $10^4$ |
| 5 | Final | $10^3$ | 23 | CPS | $10^0$ |
| 6 | Final | $10^4$ | 24 | CPS | $10^1$ |
| 7 | Over | $10^0$ | 25 | CPS | $10^2$ |
| 8 | Over | $10^1$ | 26 | CPS | $10^3$ |
| 9 | Over | $10^2$ | 27 | DATA | 1 |
| 10 | Under | $10^0$ | 28 | DATA | 2 |
| 11 | Under | $10^1$ | 29 | DATA | 4 |
| 12 | Under | $10^2$ | 30 | DATA | 8 |
| 13 | SP2 | $10^0$ | 31 | N.C. | |
| 14 | SP2 | $10^1$ | 32 | N.C. | |
| 15 | SP2 | $10^2$ | 33 | N.C. | |
| 16 | SP2 | $10^3$ | 34 | N.C. | |
| 17 | SP2 | $10^4$ | 35 | COM | |
| 18 | SP1 | $10^1$ | 36 | COM | |

* Do not connect anything to N.C.

**Setting Set Point Interface**

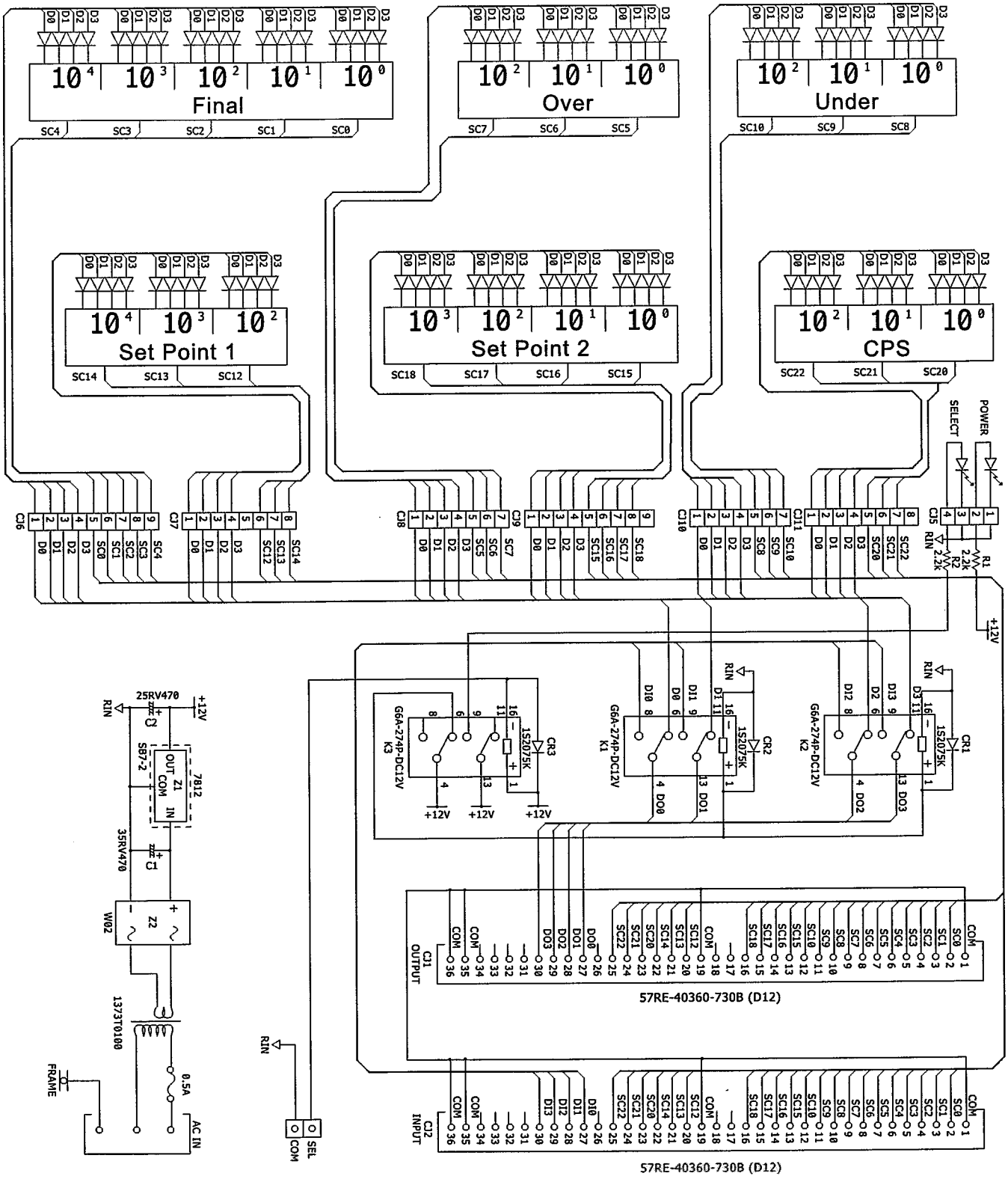
1) Choose Setting Mode 4


2) Select 6, Set Point Interface



· Set Point Unit E780 (Option)

Setting values can be inputted are Final 5 digit, CPS 3 digit, SP1 upper 3 digit, SP2 4 digit, Over 3 digit, and Under 3 digit.




When a digital switch is individually wired without using E780, it is possible to use each setting value up to Final 5 digit, CPS 4 digit, SP1 upper 4 digit, SP2 5 digit, Over 3 digit, and Under 3 digit.

## 6.3 BCD Parallel Data Output Interface (Option 2)

The BCD Data Output Interface is for transferring weighing values in BCD (Binary Coded Decimal) form to PC's, PLC's or sequences for controlling, processing and recording data. The internal and external circuits are opto-isolated.

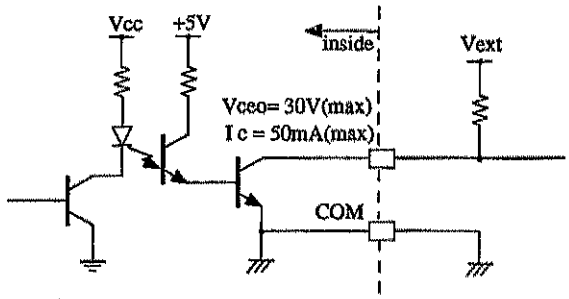
1. Connector pin assignment

Adaptable plug: DDK 57-30360 or equivalent one

| | | | | | |
|---|---|---|---|---|---|
| 1 | * | COM | 19 | * | COM |
| 2 | out | 1 | 20 | out | 20000 |
| 3 | out | 2 | 21 | out | 40000 |
| 4 | out | 4 | 22 | out | 80000 |
| 5 | out | 8 | 23 | out | MINUS |
| 6 | out | 10 | 24 | out | OVER |
| 7 | out | 20 | 25 | out | P.C |
| 8 | out | 40 | 26 | out | STROBE |
| 9 | out | 80 | 27 | in | Data Hold |
| 10 | out | 100 | 28 | in | Logic switch |
| 11 | out | 200 | 29 | in | Output Selection 1 |
| 12 | out | 400 | 30 | in | Output Selection 2 |
| 13 | out | 800 | 31 | in | |
| 14 | out | 1000 | 32 | in | |
| 15 | out | 2000 | 33 | in | |
| 16 | out | 4000 | 34 | in | |
| 17 | out | 8000 | 35 | | |
| 18 | out | 10000 | 36 | | |

- The common terminals (COM; Pin 1 and 19) are connected inside.
- No power voltage output.

2. Equivalent output circuit




The signal output circuit is open-collector output.

status of internal transistor

| output data | negative | positive |
|---|---|---|
| 0 | OFF | ON |
| 1 | ON | OFF |

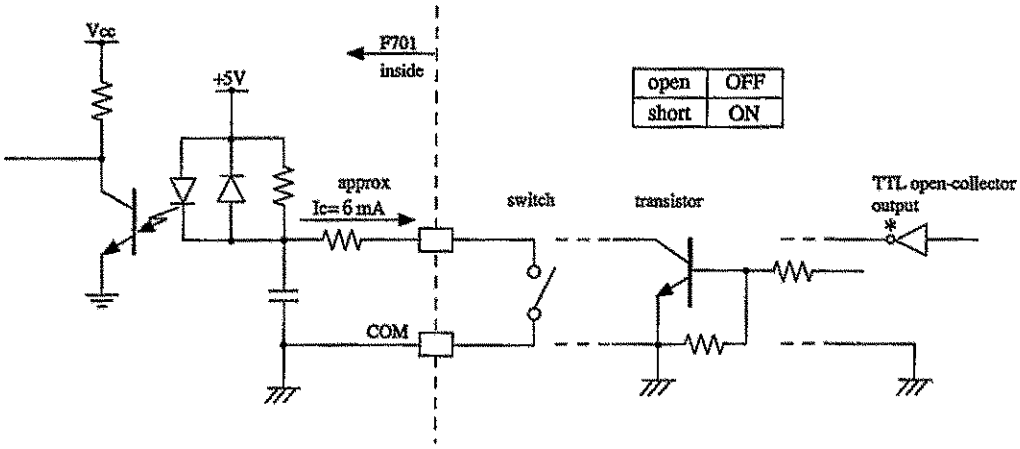
Pin 28: logic change

output pin level

| output data | negative | positive |
|---|---|---|
| 0 | H | L |
| 1 | L | H |

3. Equivalent input circuit

Signals are inputted by short-circuiting or opening between the input terminals and the COM terminal. Contacts (a relay, a switch) or contactless switches (a transistor, a TTL of open-collector output) are used for short-circuiting.




- Do not apply external voltage to the signal input circuit .
- Use external elements which withstand IC=10 mA.
- Leakage of external elements must be less than 100 $\mu$ A.

4. BCD data output

The weighing values are in 5-digit equivalent 4-bit BCD data.

| digit data | 8 | 4 | 2 | 1 |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 2 | 0 | 0 | 1 | 0 |
| 3 | 0 | 0 | 1 | 1 |
| 4 | 0 | 1 | 0 | 0 |
| 5 | 0 | 1 | 0 | 1 |
| 6 | 0 | 1 | 1 | 0 |
| 7 | 0 | 1 | 1 | 1 |
| 8 | 1 | 0 | 0 | 0 |
| 9 | 1 | 0 | 0 | 1 |

5. Polarity output (minus)

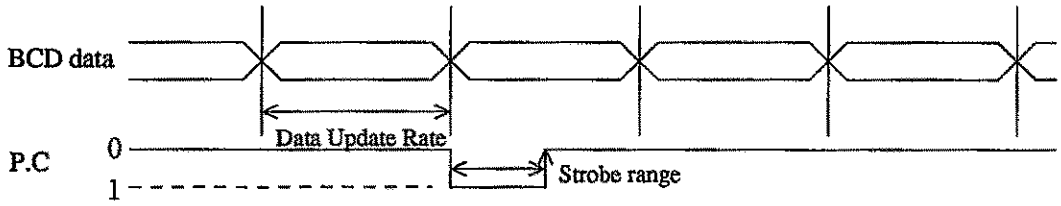
The output polarity of weighing values by BCD are "0" for plus and "1" for minus.

6. Over status output (over)

| | | |
|---|---|---|
| Net Weight | When Net weight > set Net Over | **oFL1** |
| Gross Weight | When Gross weight > set Gross Over | **oFL3** |
| Tare Weight | When Tare ≧ 99999 | no display |

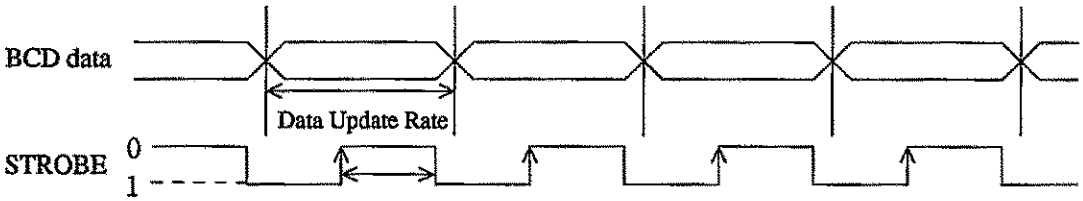
7. Auto Print Command (P.C.)

The Judgment output is synchronously with the Over, Under or Go.
Use the end edge of pulse to read data.




8. Data strobe (strobe)

The BCD data is renewed by each A/D conversion and a strobe pulse is output synchronously with the BCD data. Use the end edge of a pulse to read data.




The Data Update Rate is 100 times per second. If the connected peripheral device speed is not fast enough to catch each data, changing the Data Update Rate to follow peripheral device in Setting Mode 4-7. (refer to page 22).

9. Data Hold input

The BCD data is held when this input terminal shorted to COM.
(No strobe pulse output during Hold.)

10. Logic switch input

Change the output logic. Open: negative. Short: positive.

11. Output selection input

Select the output weighing value by BCD code.

| selection 1 | selection 2 | weighing value |
|---|---|---|
| open | open | follow F701 display |
| open | short | Net weight |
| short | short | Gross weight |
| short | open | Tare |

# 6.4 RS-232C Communication Interface (Option 3)

1. Specifications

| | |
|---|---|
| Signal level | : Based on the RS-232C |
| Transmitting distance | : Approx. 15m (16.4yds) |
| Transmitting method | : Asynchronous, full duplex |
| Transmitting speed | : 1200, 2400, 4800 or 9600 bps selectable |
| Bit configuration | : Start 1 bit |
| | Character length 7 or 8 bits selectable |
| | Stop 1 or 2 bits selectable |
| | Parity none, odd or even selectable |
| Code | : ASCII |

2. Connector Pin Assignment

Connecting plug; JAE DB-25P-N or OMRON XM2A-2501

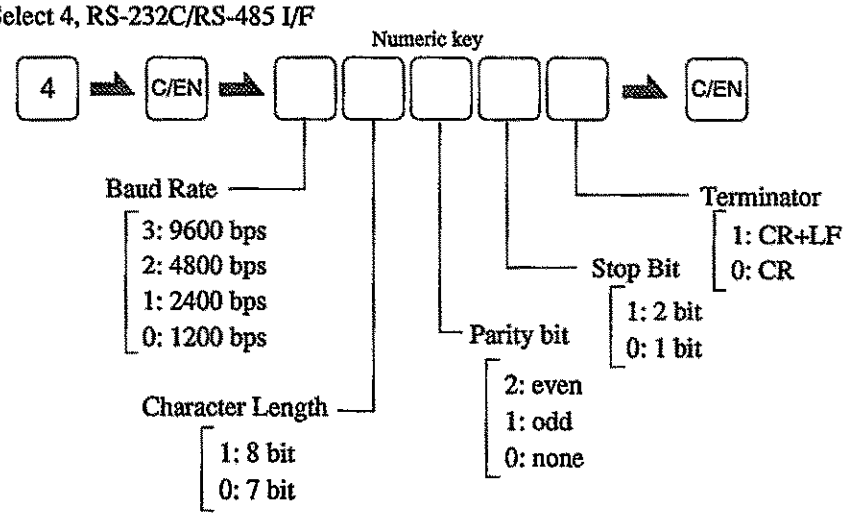
| | | | | | |
|---|---|---|---|---|---|
| 1 | * | FG | 14 | | |
| 2 | out | TxD | 15 | | |
| 3 | in | RxD | 16 | | |
| 4 | out | RTS | 17 | | |
| 5 | in | CTS | 18 | | |
| 6 | | | 19 | | |
| 7 | * | SG | 20 | out | DTR |
| 8 | | | 21 | | |
| 9 | | | 22 | | |
| 10 | | | 23 | | |
| 11 | | | 24 | | |
| 12 | | | 25 | | |
| 13 | | | | | |

### 3. Setting RS-232C

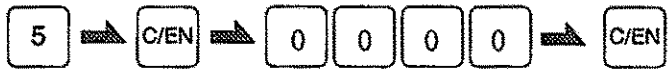
**Setting RS-232C**

1) Choose Setting Mode 4


2) Select 4, RS-232C/RS-485 I/F

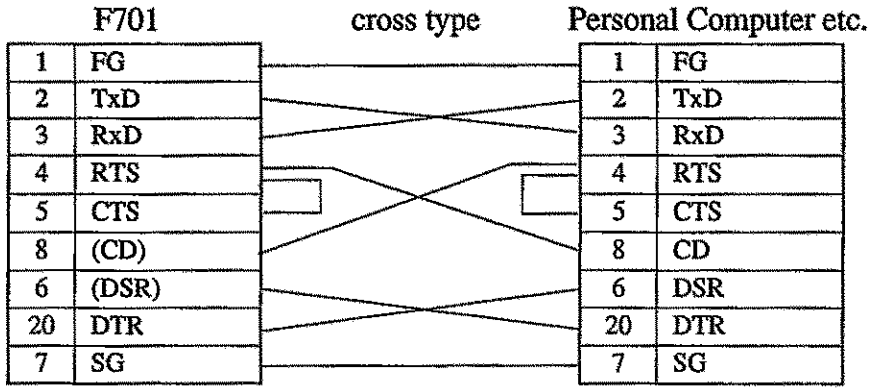



3) Select 5, ID number




ID number must be "0000" here

4. Cable




The diagram is for connecting a personal computer as a DTE ( Data Terminal Equipment) device. If it is a DCE (Data Circuit-terminating Equipment) device, connect pin to pin (DTR to DTR, DSR to DSR etc.)

Cable should be prepared after checking connector type and pin assignments of the connected device.

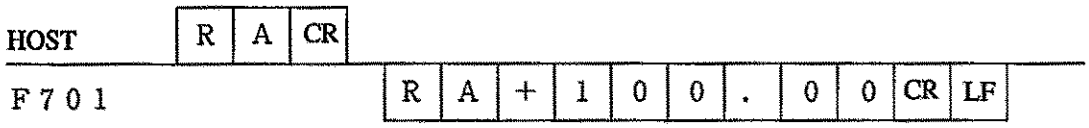
5. Example program by N88-BASIC

Set Tare weight to F701; Read out Net weight

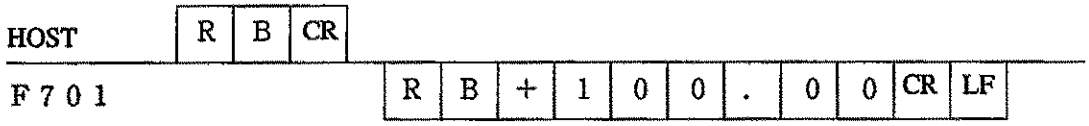
```
100 CLS
110 OPEN "COM:O71NN" AS #1              ' Parity   ODD
120                                     ' Data bit 7 , Stop bit 1
130                                     ' Xon/Xoff Ineffective , SI/SO Ineffective
140 PRINT #1,"CD"                       ' Gross/Net command
150 PRINT #1,"CF"                       ' Tare Reset command
160 '
200 INPUT "Tare weight = ",TARE
210 IF TARE>99999 THEN GOTO 200
220 TARE$=STR$(TARE)
230 TARE$=RIGHT$("0000"+RIGHT$(TARE$,LEN(TARE$)-1),5)
240 '
250 PRINT #1,"W25"+TARE$                ' Write Tare Setting
260 PRINT #1,"W25" : INPUT #1,CHK$      ' Read out Tare Setting
270                          ' Data check
280 IF CHK$<>"W25"+TARE$ THEN PRINT "Missing data !" : GOTO 200
290 '
300 PRINT #1,"RG" : INPUT #1,ST4$       ' Read out status 4
310 PRINT #1,"RB" : INPUT #1,NET$       ' Read out Net weight
320 NET=VAL(RIGHT$(NET$,7))
330 PRINT "Net weight = ";
340 IF MID$(ST4$,6,1)<>"0" THEN PRINT        " Error   "
                           ELSE PRINT USING "###.###kg";NET
350 GOTO 300
```

6. Communication Format

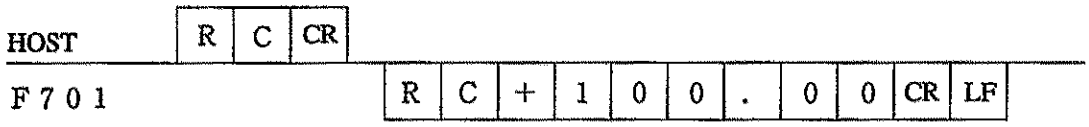
- Reading out the Gross weight (sign, 5-digit weighing value, decimal point)



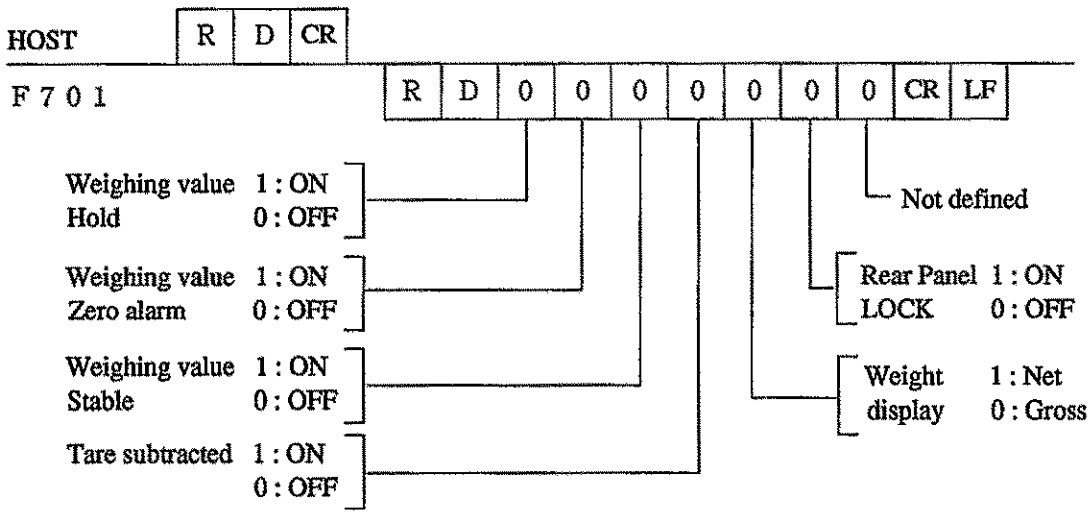

- Reading out the Net weight (sign, 5-digit weighing value, decimal point)



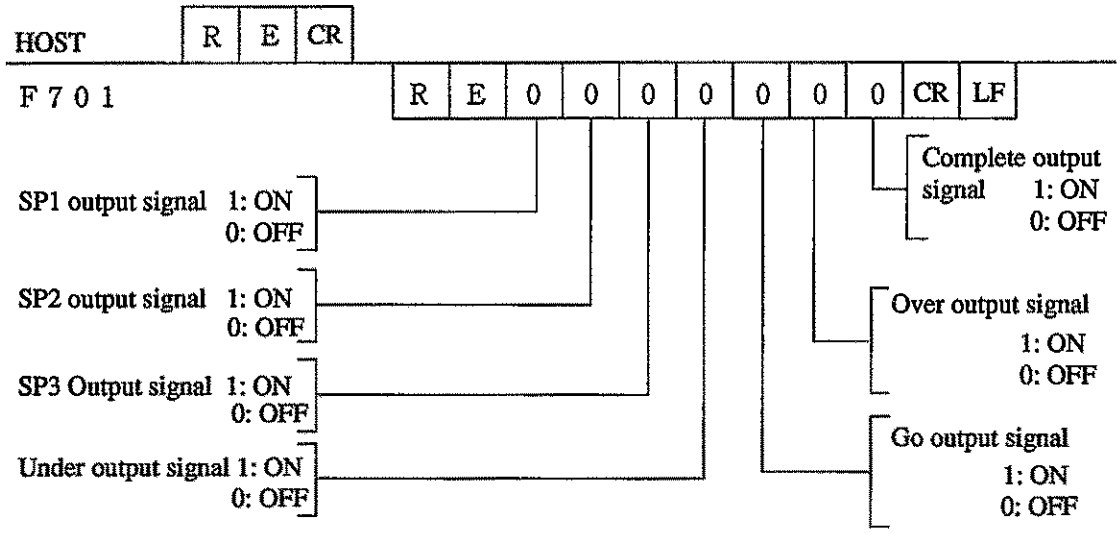

- Reading out the Tare (sign, 5-digit weighing value, decimal point)



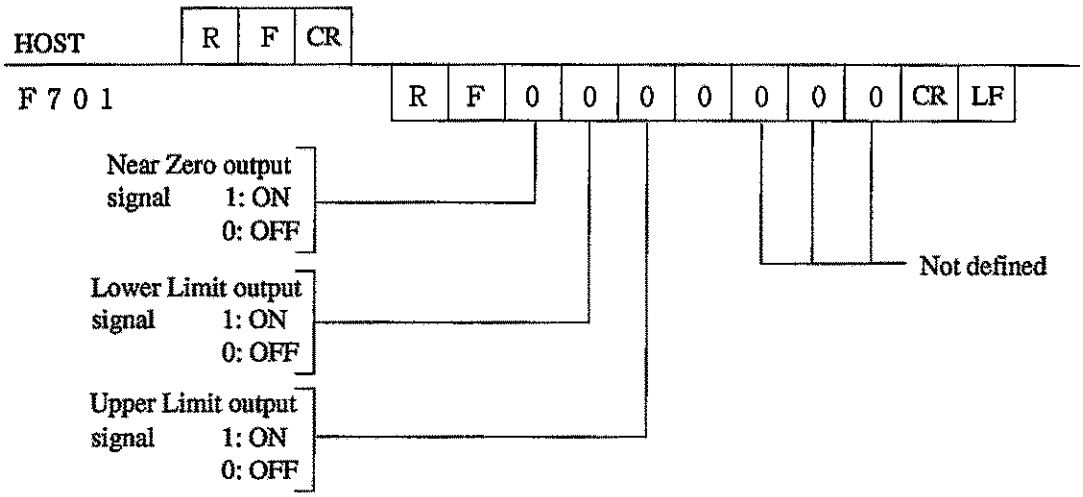

- Reading out Status 1 (7-digit)



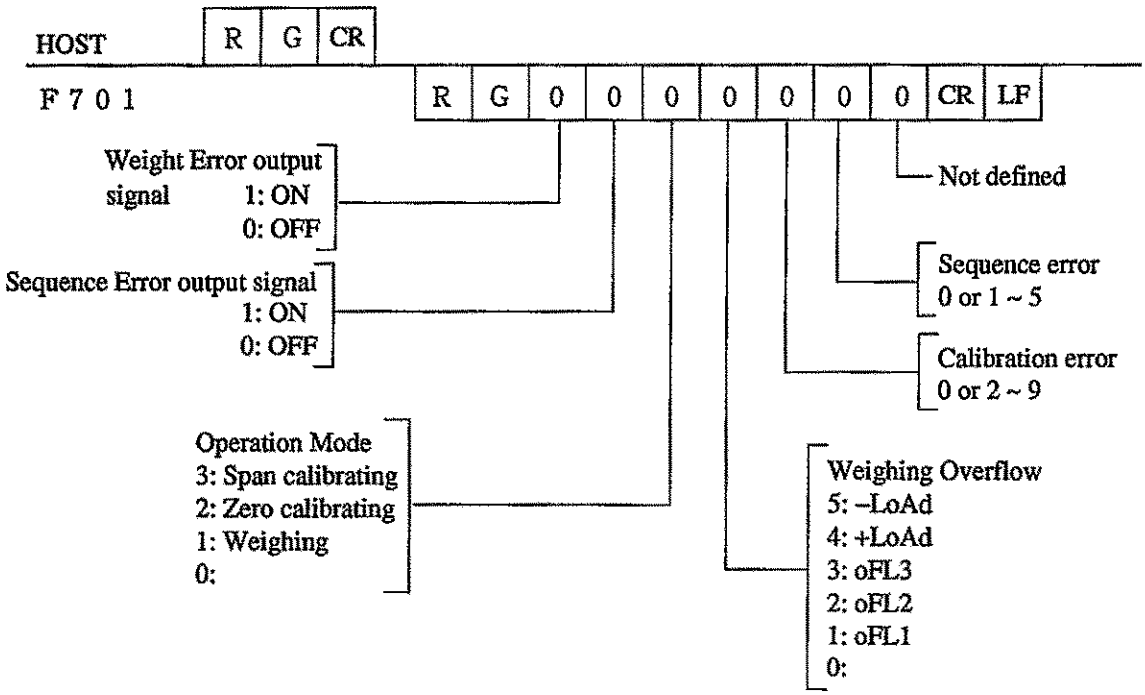
• Reading out Status 2 ( 7-digits)



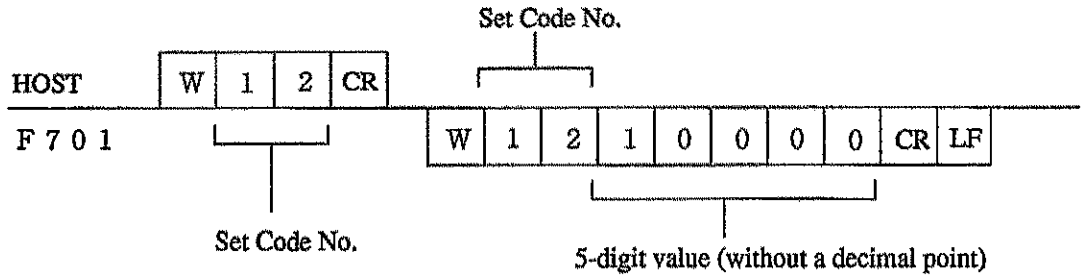

• Reading out Status 3 (7-digits)



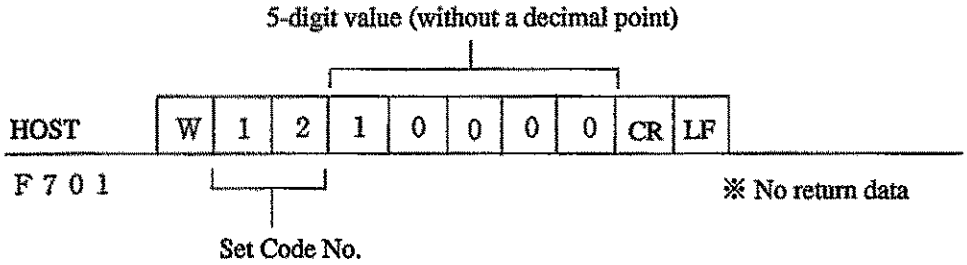
· Reading out Status 4 (7-digits)



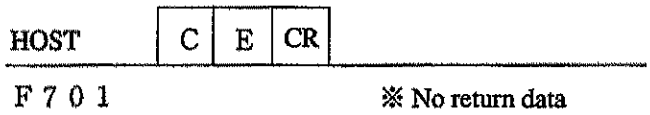
· Reading out the set value (ex. the FINAL )



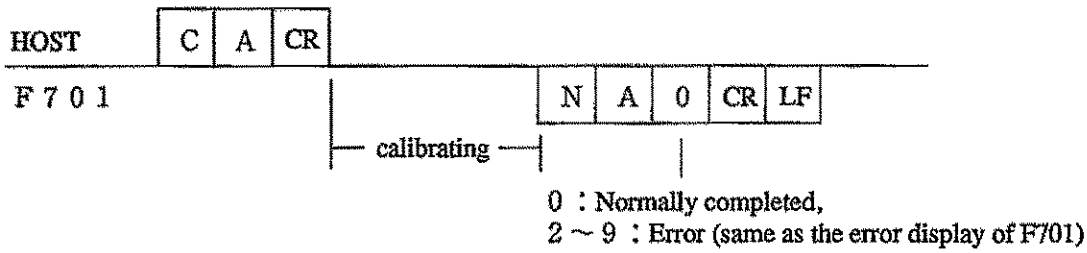

· Write in the set value (ex. the FINAL)



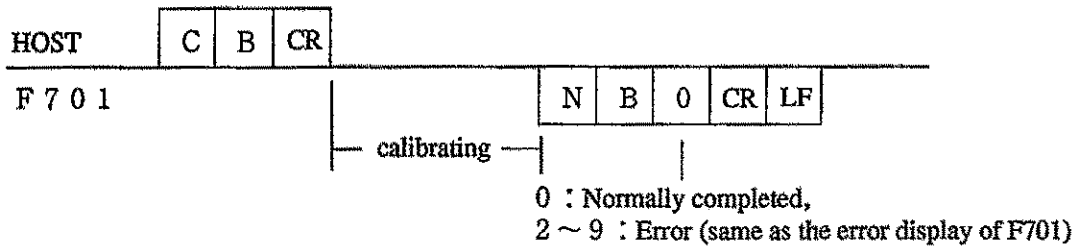

· Command (ex. Tare Subtraction)




· Zero Calibration




· Span Calibration




*Before sending the command, set the Capacity, Min. Scale Division and Balance Weight

7. Table for Set Value

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Set Point 1 | W | 1 | 0 | | | | | | CR | LF | When LOCK1 cannot write in |
| Set Point 2 | W | 1 | 1 | | | | | | CR | LF | When LOCK1 cannot write in |
| Final | W | 1 | 2 | | | | | | CR | LF | When LOCK1 cannot write in |
| Over | W | 1 | 3 | 0 | 0 | | | | CR | LF | When LOCK1 cannot write in |
| Under | W | 1 | 4 | 0 | 0 | | | | CR | LF | When LOCK1 cannot write in |
| CPS | W | 1 | 5 | 0 | | | | | CR | LF | When LOCK1 cannot write in |
| Auto Free Fall Comp. Regulation | W | 1 | 6 | | | | | | CR | LF | When LOCK2 cannot write in |
| Compensation Feeding Time | W | 1 | 7 | 0 | 0 | | | | CR | LF | When LOCK2 cannot write in |
| Judging Time | W | 2 | 0 | 0 | 0 | | | | CR | LF | When LOCK2 cannot write in |
| Comparison Inhibit Time | W | 2 | 1 | 0 | 0 | | | | CR | LF | When LOCK2 cannot write in |
| Upper Limit | W | 2 | 2 | | | | | | CR | LF | When LOCK1 cannot write in |
| Lower Limit | W | 2 | 3 | | | | | | CR | LF | When LOCK1 cannot write in |
| Near Zero | W | 2 | 4 | | | | | | CR | LF | When LOCK1 cannot write in |
| Preset Tare Weight | W | 2 | 5 | | | | | | CR | LF | When LOCK1 cannot write in |
| Auto Zero Count | W | 2 | 6 | 0 | 0 | 0 | | | CR | LF | When LOCK2 cannot write in |
| Judging Count | W | 2 | 7 | 0 | 0 | 0 | | | CR | LF | When LOCK2 cannot write in |
| Complete Output Time | W | 2 | 8 | 0 | 0 | | | | CR | LF | When LOCK2 cannot write in |
| Sequence Mode | W | 3 | 0 | 0 | | | | | CR | LF | When LOCK2 cannot write in |
| Weighing Function 1 | W | 3 | 1 | 0 | | | | | CR | LF | When LOCK2 cannot write in |
| Weighing Function 2 | W | 3 | 2 | | | | | | CR | LF | When LOCK2 cannot write in |
| Weighing Function 3 | W | 3 | 3 | 0 | 0 | | | | CR | LF | When LOCK2 cannot write in |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Function Key Disablement | W | 3 | 4 | 0 | | | | | CR | LF | When LOCK2 cannot write in |
| Filter | W | 3 | 5 | 0 | 0 | 0 | | | CR | LF | When LOCK2 cannot write in |
| Motion Detection | W | 3 | 6 | | | 0 | | | CR | LF | When LOCK2 cannot write in |
| Zero Tracking | W | 3 | 7 | | | 0 | | | CR | LF | When LOCK2 cannot write in |
| Setting Value Lock | W | 3 | 8 | 0 | 0 | 0 | | | CR | LF | When LOCK2 cannot write in |
| Balance Weight | W | 4 | 0 | | | | | | CR | LF | When LOCK2 and LOCK SW cannot write in |
| Capacity | W | 4 | 1 | | | | | | CR | LF | When LOCK2 and LOCK SW cannot write in |
| Min. Scale Division | W | 4 | 2 | 0 | 0 | | | | CR | LF | When LOCK2 and LOCK SW cannot write in |
| Over Net | W | 4 | 3 | | | | | | CR | LF | When LOCK2 and LOCK SW cannot write in |
| Over Gross | W | 4 | 4 | | | | | | CR | LF | When LOCK2 and LOCK SW cannot write in |
| Function Selection | W | 4 | 5 | 0 | 0 | | | | CR | LF | When LOCK2 cannot write in |
| Gravitational Acceleration | W | 4 | 6 | 0 | 0 | 0 | | | CR | LF | When LOCK2 cannot write in |
| Digital Zero Regulation Value | W | 4 | 7 | 0 | | | | | CR | LF | When LOCK2 and LOCK SW cannot write in |

8. Command (Host → F701)

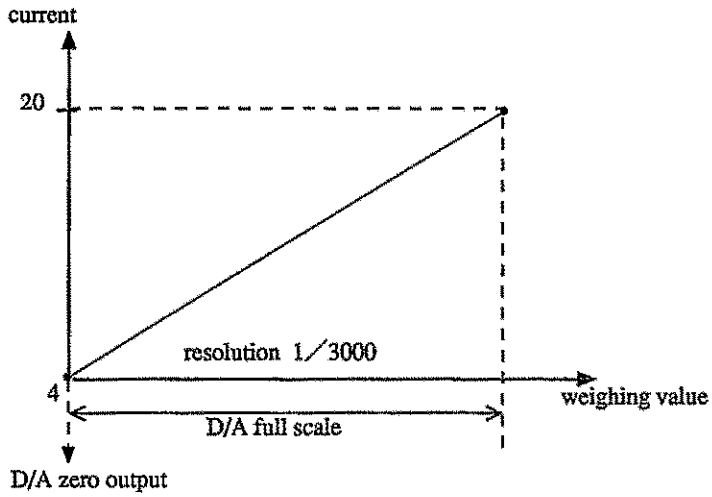
| | | | | | | |
|---|---|---|---|---|---|---|
| Zero Calibration | C | A | CR | Span Calibration | C | B | CR |
| Gross weight display | C | C | CR | Net weight display | C | D | CR |
| Tare Subtraction | C | E | CR | Tare Subtraction Reset | C | F | CR |
| Digital Zero | C | G | CR | Digital Zero Reset | C | H | CR |

## 6.5 D/A Converter (Option 4)

The D/A Converter Interface sends an analog signal for each weighing value in 4~20 mA. Current over range limit is +10% of full scale.

1. D/A Zero & Gain Adjustment

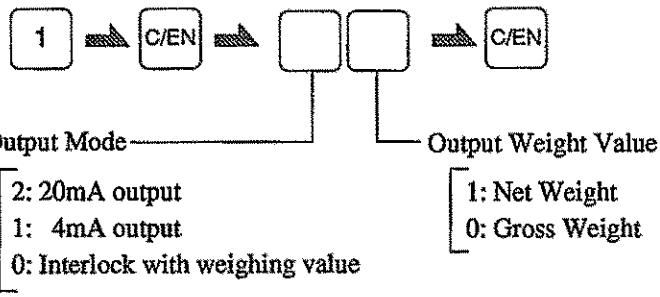
The D/A converter in the F701 provides an analog output of a set weight value in current 4 mA form as well as the span weight value in current 20 mA. These output selections and values can be entered in Setting Mode 4.




### Setting D/A Converter

1) Choose Setting Mode 4


2) Select 1, D/A Output Mode




3) Select 2, D/A Zero Output Weight Value


Initial value "0"

Enter the display value to output 4mA. The default value is "0".

4) Select 3, D/A Full Scale Value

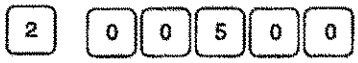

Initial value "10000"

Enter the display value to output 20mA.
The default value is "10000".

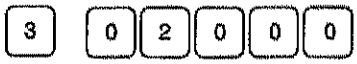
《Ex.》

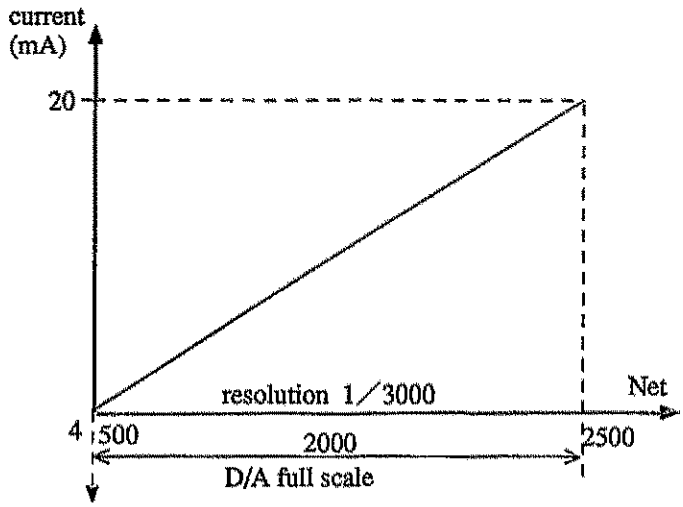
· D/A Output Mode


· D/A Zero Output Weight Value




· D/A Full Scale Value




D/A Zero Output Weight Value

| Net Weight | Current (mA) |
|---|---|
| 480 | 3.84 |
| Zero → 500 | 4.00 |
| 1000 | 8.00 |
| Full scale — 1500 | 12.00 |
| 2500 | 20.00 |
| 2520 | 20.16 |

2. D/A Resolution

The resolution of the D/A converter is 1/3000. Therefore, the min. units of current is as follows.

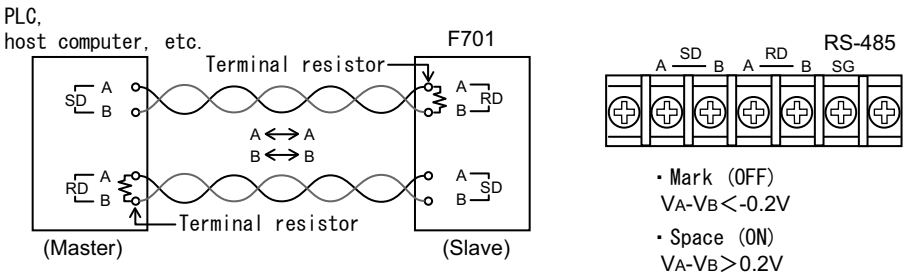
Current : (20mA - 4mA) × 1/3000 = 5.3 $\mu$ A

The min. unit of a weighted value is as follows

( D/A full scale ) × 1/3000

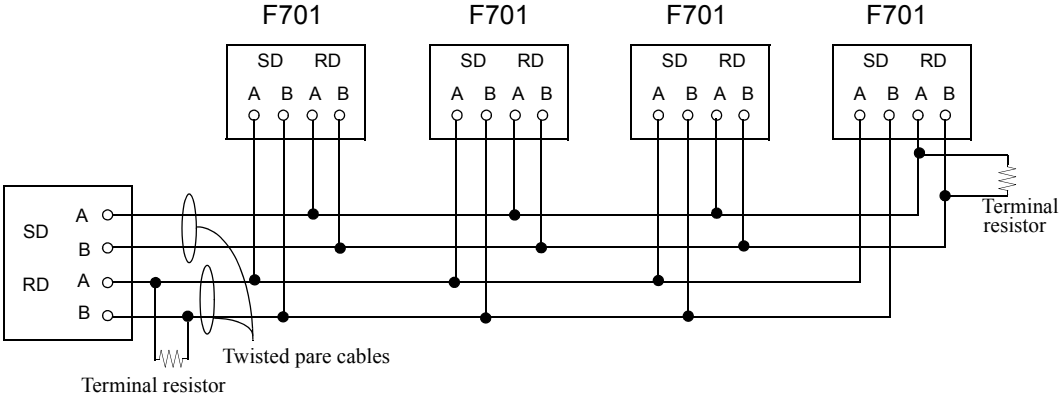
## 6.6 RS-485 Communication Interface (Option 5)

### ● One to one connection




- Use twisted pair cables for connection. (Noise margin will be expanded.)
  However, parallel 2-core cables may be used for short-distance connection.
- Install 100 - 200 Ω level terminal resistors on the receiving side.
- The terminal SG is a grand terminal used on the circuit for protecting the circuit.
  When the main body of F701 and the device connected to F701 are grounded by D type ground, there is usually no need to use the terminal SG.
  However, confirm the specifications of the devise connected before connecting the terminal SG, when it is necessary to connect it according to the situation of the site.

### ● One to multiple connection




•How to communicate

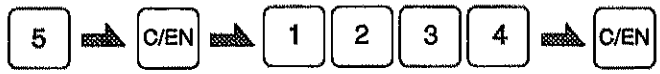
1. Set the ID number for each F701(ID ≠ 0000).
2. Send Start command including ID number.
3. One F701 specified by master is now open to communication.
4. Communication commands are RS-232C format.
5. Send Stop command including ID number.

＊ Do not use “0000” as an ID number in a system with multiple F701’s, Communication is opened at start up with ID number “0000”.

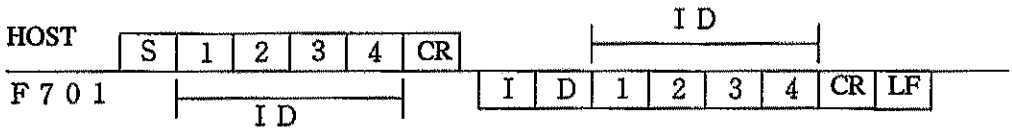
**Setting the ID number**

1) Choose Setting Mode 4

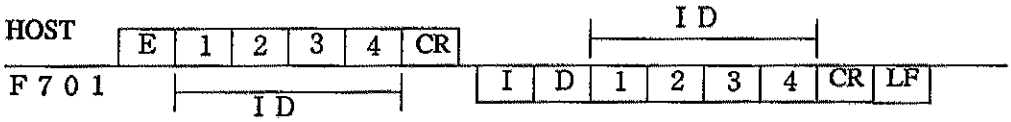

2) Select 5, ID number




· Start communication command




· Terminate communication command



# 7 Trouble Shooting

## 7.1 Self-Check & Memory Clear

The F701 contains SELF-CHECK and WATCHDOG TIMER functions which automatically check the RAM, ROM & NOV.ROM detecting errors and doing a visual display check.

### Operation of Self-Check

1) Turn off the power switch of F701

2) Hold GROSS/NET while turning on power starts Self-Check

3) Self-Check procedure

| | Self-Check Item | |
|---|---|---|
| 1 | The software version | display |
| 2 | All the display lamps turn on | display |
| 3 | RAM Read/Write check AC81 | automatic |
| 4 | ROM sum check AC81 | automatic |
| 5 | Each status display check in sequence | display |
| 6 | Numeric display (7-segment) check | display |
| 7 | NOV.RAM Read/Write check | automatic |
| 8 | PASS | display |

* If there is something wrong in RAM Read/Write, display Error1 and stop self-check.
* If there is something wrong in ROM sum, display Error2 and stop self-check.
* If there is something wrong in NOV.RAM Read/Write, display Error3 and stop self-check.
* PASS has displayed, self-check completed.

4) NOV.RAM check cannot be performed if Calibration Lock is set on rear panel

5) If Error message appears during Self-Check, contact your Distributor.

## Operation of Memory Clear

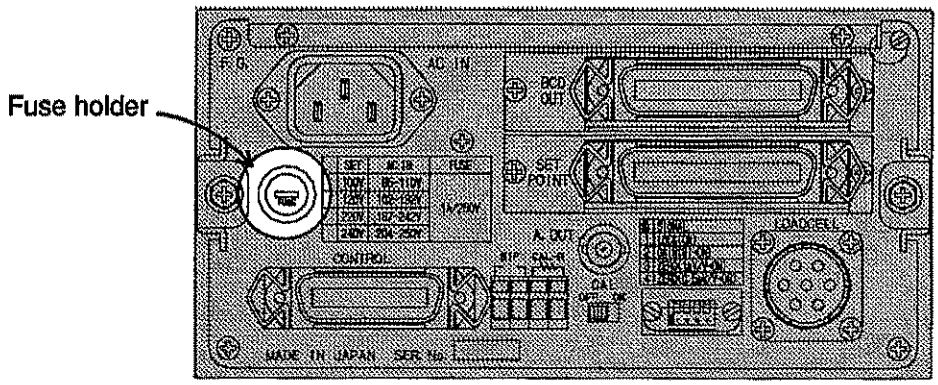
1) Turn off the power switch of F701

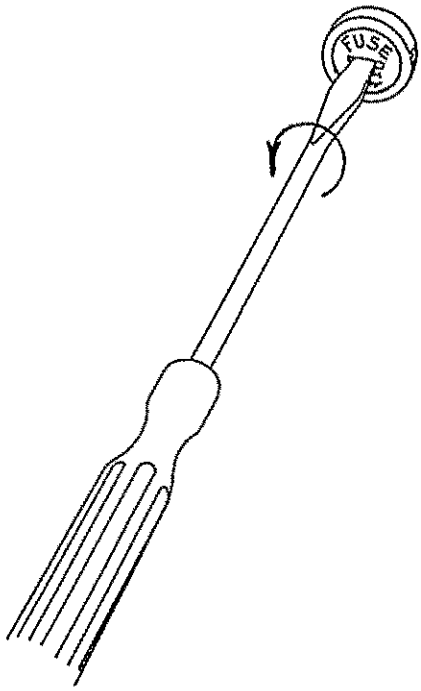
2) Hold GROSS/NET + CNG/ENT keys while turning on power

3) All user data (Setting, Weighing and Accumulation values) will be cleared. Memory returns to the Initial Setting values except the values in NOV.RAM

- Refer to page 107 for initial setting value list after executing memory clear.
- If Self-Check aborts, please retry. If Error message appears during Self-Check, contact you Distributor please.

## 7.2 Replacing a Fuse




1) Turns the fuse holder counterclockwise while pressing it, then the holder can be disconnected.
The fuse capacity is 1A.

2) Replace the fuse and insert the holder and turn it clockwise while pressing it.

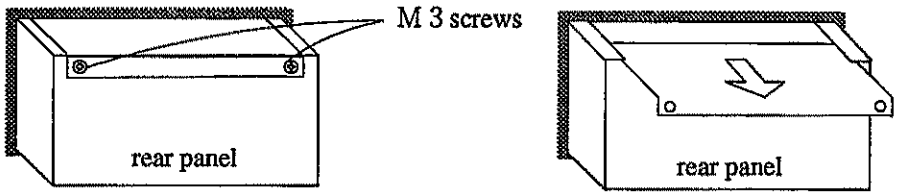
**NB**

Turn off the power before replacing the fuse.

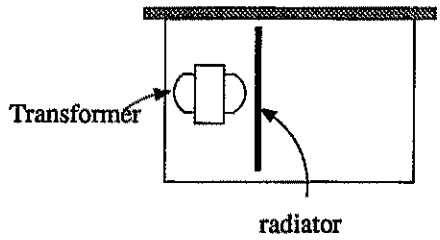
## 7.3 Replacing the Back-Up Battery

Battery life for the lithium cell backing up memory is about 7 years.

1. Pull the power cable out of the F701.
2. Remove the two M3 screws on the upper part of the rear panel. Pull the top cover out.




3. The lithium battery is fixed on the radiator next to the transformer. Detach the connector and the nylon clamp and replace the battery with a new one.




Replacing battery : CR14250 (with H2P)
Contact us and specify the lithium battery for the F701.

4. Initialize the F701 after replacing lithium battery. (Apply power while holding the GROSS/NET and CNG/ENT keys at the same time.)

**NB**

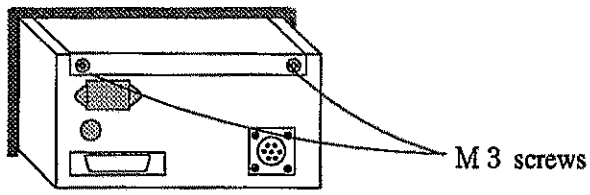
All the data in the memory except the NOV RAM (non-volatile RAM) will be cleared if you replace the back-up lithium battery. Check all the set values after replacing the battery.

## 7.4 Changing the AC power voltage

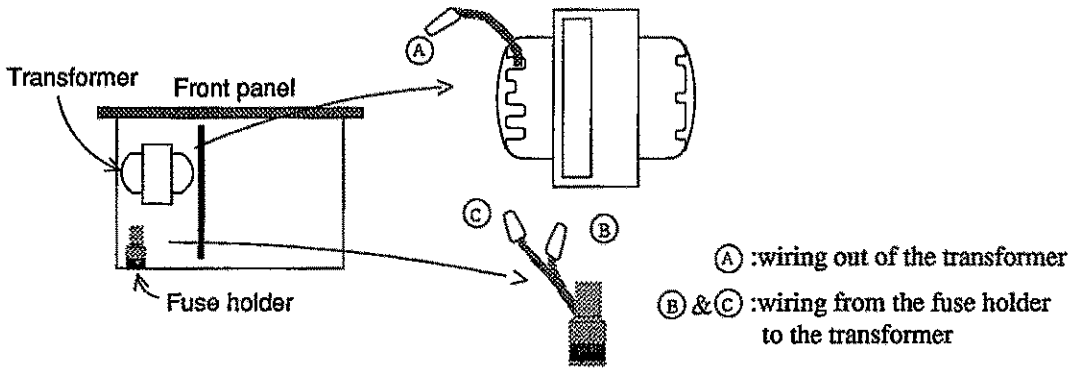
The AC power voltage can be easily switched by changing the wiring of the transformer. The table below shows the available ranges.

| SET | AC－IN | FUSE |
|---|---|---|
| 100V | 85～110V | 1A／250V |
| 120V | 102～132V | |
| 200V | 170～220V | |
| 220V | 187～242V | |
| 240V | 204～250V | |

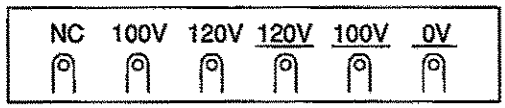
1. Pull out the power cable from the AC Input Connector of the F701.
2. Remove the two M3 screws on the upper part of the rear panel. Pull out the top cover.




3. The transformer and fuse holder are located in the left.




4. The label shows the voltage of the terminals.




＊There is no underline on the transformer.

5. Change the wiring following the table below.

| Power voltage | Connection |
|---|---|
| AC100V | A → 0V<br>B → 100V<br>C → 100V |
| AC120V | A → 0V<br>B → 120V<br>C → 120V |
| AC200V | A → 100V<br>B → 100V<br>C → NC |
| AC220V | A → 100V<br>B → 120V<br>C → NC |
| AC240V | A → 120V<br>B → 120V<br>C → NC |

6. Verify wiring is correct. Plug the F701 in.

7. Operate a Self-Check (Apply power while holding the GROSS/NET key.) Verify unit operates properly.

# 7.5 Over Scale Display & Error Display

· Over Scale

| | |
|---|---|
| The input signal from the loadcell exceeds the Span adjustment range | LoAd |
| Net weight > the Over Net Value | oFL 1 |
| Gross weight > Capacity + 9 scale division | oFL 2 |
| Gross weight > the Over Gross Value | oFL 3 |

· Sequence Error

| | |
|---|---|
| When Start signal turns on, the Stop signal turns on. | Err 1 |
| During weigh cycle, the Stop signal turns on. | Err 2 |
| "**ZALM**"(Zero Alarm) turns on according to set Auto Zero Count. | Err 3 |
| During weigh cycle, Near Zero output signal turns off (Setting Mode 2-4 "At start, Near Zero confirmation ON" is selected for Sequence Control). | Err 4 |
| During weigh cycle, the value ≧ Set Point 1 (Setting Mode 2-4 "At start, Weight value confirmation ON" is selected for Sequence Control). | Err 5 |

· Calibration Error

| | |
|---|---|
| The initial tare is beyond the zero adjustment range. | cErr 2 |
| The initial tare is minus. | cErr 3 |
| The input Balance weight is beyond the Capacity. | cErr 4 |
| The input Balance weight is 0 0 0 0 0. | cErr 5 |
| The loadcell output does not reach the span adjustment range. | cErr 6 |
| The loadcell output is minus. | cErr 7 |
| The loadcell output is beyond the span adjustment range. | cErr 8 |
| The Weight value is not stable and Calibration stopped. | cErr 9 |

# 7.6 Settlement

## 1. Over Scale Error

### LoAd (A/D Converter overload)

An input signal from the loadcell exceeds F701 span adjustment range.
Loadcell output is beyond the calibrated span range. Verify if the loadcell cable is connected. Check that the loadcell cable is not severed or broken. This message appears when nothing is connected to the loadcell connector on the rear panel.

### oFL1 (Net weight > Net Over set value)

Net weight exceeds the Net Over set value.
Decrease the signal coming from the loadcell until the normal display returns.
Reset the Net Over value;
If the Net Over value is as the same as or within the value of the Capacity, oFL1 will not be displayed.

### oFL3 (Gross weight > Gross Over set value)

Decrease the signal coming from the loadcell until the normal display returns.
Reset the Gross Over value;
If the Gross Over value is as the same as or within the value of the Capacity, oFL3 will not be displayed.

### oFL2 (Gross weight > Capacity + 9 scale division)

Gross weight exceeds Capacity + 9 scale division.

Decrease the signal coming from the loadcell until the normal display returns.

**NB**

Do not change the Capacity of the indicator to cancel oFL2. The Capacity is an important set value for the F701 to be a weighing instrument. If Capacity is changed, indicator must be re-calibrated.

## 2. Error Display

**Err1** (Sequence error)

When Start signal turns on, the Stop signal turns on.
Turn OFF Stop signal then start weighing;

**Err2** (Sequence error)

During weigh cycle, the Stop signal turns on.
Turn OFF Stop signal then start weighing;

**Err3** (Sequence error)

"**ZALM**" (Zero Alarm) turns on according to set Auto Zero Count.
Remove excess material causing alarm, set Digital Zero.
Turn OFF Stop signal then start weighing;

**Err4** (Sequence error)

During weigh cycle, Near Zero output signal turns off (Setting Mode 2-4 "At start, Near Zero confirmation ON" is selected for Sequence Control).
Confirm the Near Zero set value can compensate for excess material. Confirm the Start signal time period after discharge has finished.

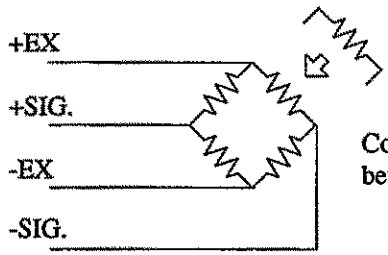
**Err5** (Sequence error)

During weigh cycle, the value ≧ Set Point 1 (Setting Mode 2-4 "At start, Weight value confirmation ON" is selected for Sequence Control).
Confirm Set Point 1 and Final value. Confirm the Start signal time period after discharge has finished and verify Code No.
Turn OFF Stop signal then start weighing;

## 3. Calibration Error

### cErr2

Initial Dead Load is above Zero adjustment range.
Remove any excess load from loadcell or scale. If cErr2 is still displayed, connect a resistor between +EX and -SIG. loadcell connections. This should shift the Zero point. Do Zero Calibration again.



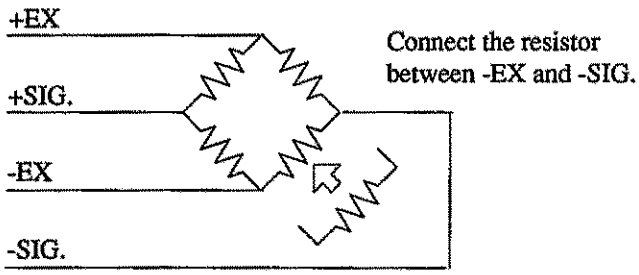

Connect the resistor between +EX and -SIG.

- This table is for a 350 ohm loadcell.
- The temperature coefficient of the connected resistor directly influences the accuracy of the indicator.
- Use a resistor with a temperature coefficient.

| RESISTANCE | | STRAIN | |
|---|---|---|---|
| calculated value | approx. value | $\mu$-STRAIN | mV / V |
| 875 KΩ | 866 KΩ | 200 | 0.1 |
| 437 KΩ | 442 KΩ | 400 | 0.2 |
| 291 KΩ | 294 KΩ | 600 | 0.3 |
| 219 KΩ | 221 KΩ | 800 | 0.4 |
| 175 KΩ | 174 KΩ | 1000 | 0.5 |
| 146 KΩ | 147 KΩ | 1200 | 0.6 |
| 125 KΩ | 124 KΩ | 1400 | 0.7 |
| 109 KΩ | 110 KΩ | 1600 | 0.8 |
| 97 KΩ | 97.6KΩ | 1800 | 0.9 |
| 87.3KΩ | 86.6KΩ | 2000 | 1.0 |
| 79.4KΩ | 78.7KΩ | 2200 | 1.1 |
| 72.7KΩ | 73.2KΩ | 2400 | 1.2 |
| 67.1KΩ | 66.5KΩ | 2600 | 1.3 |
| 62.3KΩ | 61.9KΩ | 2800 | 1.4 |
| 58.2KΩ | 57.6KΩ | 3000 | 1.5 |
| 54.5KΩ | 54.9KΩ | 3200 | 1.6 |
| 51.3KΩ | 51.1KΩ | 3400 | 1.7 |
| 48.4KΩ | 48.7KΩ | 3600 | 1.8 |
| 45.9KΩ | 46.4KΩ | 3800 | 1.9 |
| 43.6KΩ | 43.2KΩ | 4000 | 2.0 |
| 41.5KΩ | 41.2KΩ | 4200 | 2.1 |
| 39.6KΩ | 39.2KΩ | 4400 | 2.2 |
| 37.9KΩ | 38.3KΩ | 4600 | 2.3 |
| 36.3KΩ | 36.5KΩ | 4800 | 2.4 |
| 34.8KΩ | 34.8KΩ | 5000 | 2.5 |

### cErr3

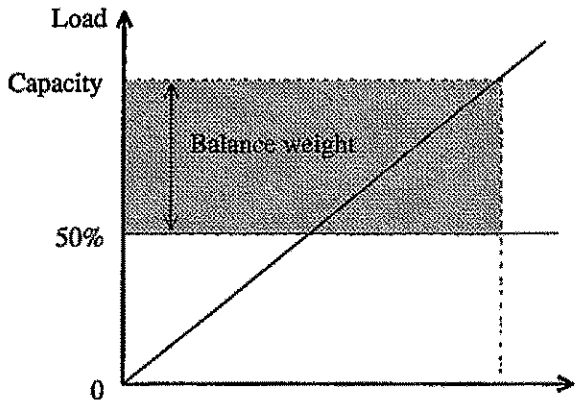
Initial Dead Load is negative.
Check that loadcell is mounted in the correct direction; check that load is being applied to the loadcell in the correct direction; check that the +SIG. and -SIG. lines are properly connected.
If cErr3 is still displayed, connect a resistor between -EX and -SIG. loadcell connections. This should shift the Zero point. Do Zero Calibration again. Refer to Table.




### cErr4

The Balance weight is larger than the Capacity.
Re-enter the Balance weight equal to or less than the Capacity. Do Span Calibration again.

The relationship between Capacity and Balance weight.




Balance weight must be between 50% to 100% of Capacity in order to do Span Calibration correctly.

### cErr5

The Balance weight setting is "00000". Set adequate Balance weight.

### cErr 6

The loadcell output does not reach the Span range of the F701.
Check how load is applied to loadcell; check loadcell has sufficient output (mV/V) to reach Span range. Do Span Calibration again.

### cErr7

Loadcell output is negative.
Check that loadcell is mounted in the correct direction; check that load is being applied to the loadcell in the correct direction; check that the +SIG. and -SIG. lines are properly connected.

### cErr8

Loadcell output is beyond Span adjustment range.
Check how load is applied to loadcell; check loadcell has sufficient output (mV/V) to reach Span range. Do Calibration again.

### cErr9

The Load is not stable enough for correct Calibration.
Adjust the Stable Period and Stable Range of Motion Detection so "**STAB**" display lights during Calibration. Do Calibration again.

# 8 Specifications

## 8.1 The List of Initial Setting Value

◇ Setting Mode 0


| Item | | Initial value | LOCK 1 (SRAM) | LOCK 2 (NOV.RAM) | LOCK SW (NOV.RAM) | Display |
|---|---|---|---|---|---|---|
| 1 | Upper Limit | 000.00 | ◎ | | | |
| 2 | Lower Limit | 000.00 | ◎ | | | |
| 3 | Near Zero | 000.00 | ◎ | | | |
| 4 | Set Point 1 | 000.00 | ◎ | | | |
| 5 | Set Point 2 | 000.00 | ◎ | | | |
| 6 | CPS | 00.00 | ◎ | | | |
| 7 | Over | 0.00 | ◎ | | | |
| 8 | Under | 0.00 | ◎ | | | |
| 9 | Final | 000.00 | ◎ | | | |

◇ Setting Mode 1


| Item | | Initial value | LOCK 1 (SRAM) | LOCK 2 (NOV.RAM) | LOCK SW (NOV.RAM) | Display |
|---|---|---|---|---|---|---|
| 1 | Comparison Inhibit Time | 0.50 | | ◎ | | |
| 2 | Judging Time | 1.50 | | ◎ | | |
| 3 | Complete Output Time | 3.00 | | ◎ | | |
| 4 | Compensation Feeding Time | 1.00 | | ◎ | | |
| 5 | Auto Zero Count | 01 | | ◎ | | |
| 6 | Judging Count | 01 | | ◎ | | |
| 7 | Auto Free Fall Compensation Regulation | 098.00 | | ◎ | | |
| 8 | | 0 | | | | ◎ |
| 9 | Preset Tare Weight | 000.00 | ◎ | | | |

◇ Setting Mode 2


| Item | | Initial value | LOCK 1 (SRAM) | LOCK 2 (NOV.RAM) | LOCK SW (NOV.RAM) | Display |
|---|---|---|---|---|---|---|
| 1 | Weighing Function 1 | 0000 | | ◎ | | |
| 2 | Weighing Function 2 | 00000 | | ◎ | | |
| 3 | Weighing Function 3 | 0141 | | ◎ | | |
| 4 | Sequence Mode | 0000 | | ◎ | | |
| 5 | Function Key Disablement | 1111 | | ◎ | | |
| 6 | Filter | 42 | | ◎ | | |
| 7 | Motion Detection | 1.5-05 | | ◎ | ◎ | |
| 8 | Zero Tracking | 0.0-00 | | ◎ | ◎ | |
| 9 | Setting Value Lock | 00 | | | | |

◇ Setting Mode 3


| Item | | Initial value | LOCK 1 (SRAM) | LOCK 2 (NOV.RAM) | LOCK SW (NOV.RAM) | Display |
|---|---|---|---|---|---|---|
| 1 | Balance Weight | 100.00 | | ◎ | ◎ | |
| 2 | Capacity | 100.00 | | ◎ | ◎ | |
| 3 | Min. Scale Division | 0.01 | | ◎ | ◎ | |
| 4 | Over Net | 999.99 | | ◎ | ◎ | |
| 5 | Over Gross | 999.99 | | ◎ | ◎ | |
| 6 | DZ Regulation Value | 02.00 | | ◎ | ◎ | |
| 7 | Function Selection | 3213 | | ◎ | ◎ | |
| 8 | Gravitational Acceleration | 09 | | ◎ | ◎ | |
| 9 | Optional Board | 0000 | | | | ◎ |

◇ Setting Mode 4

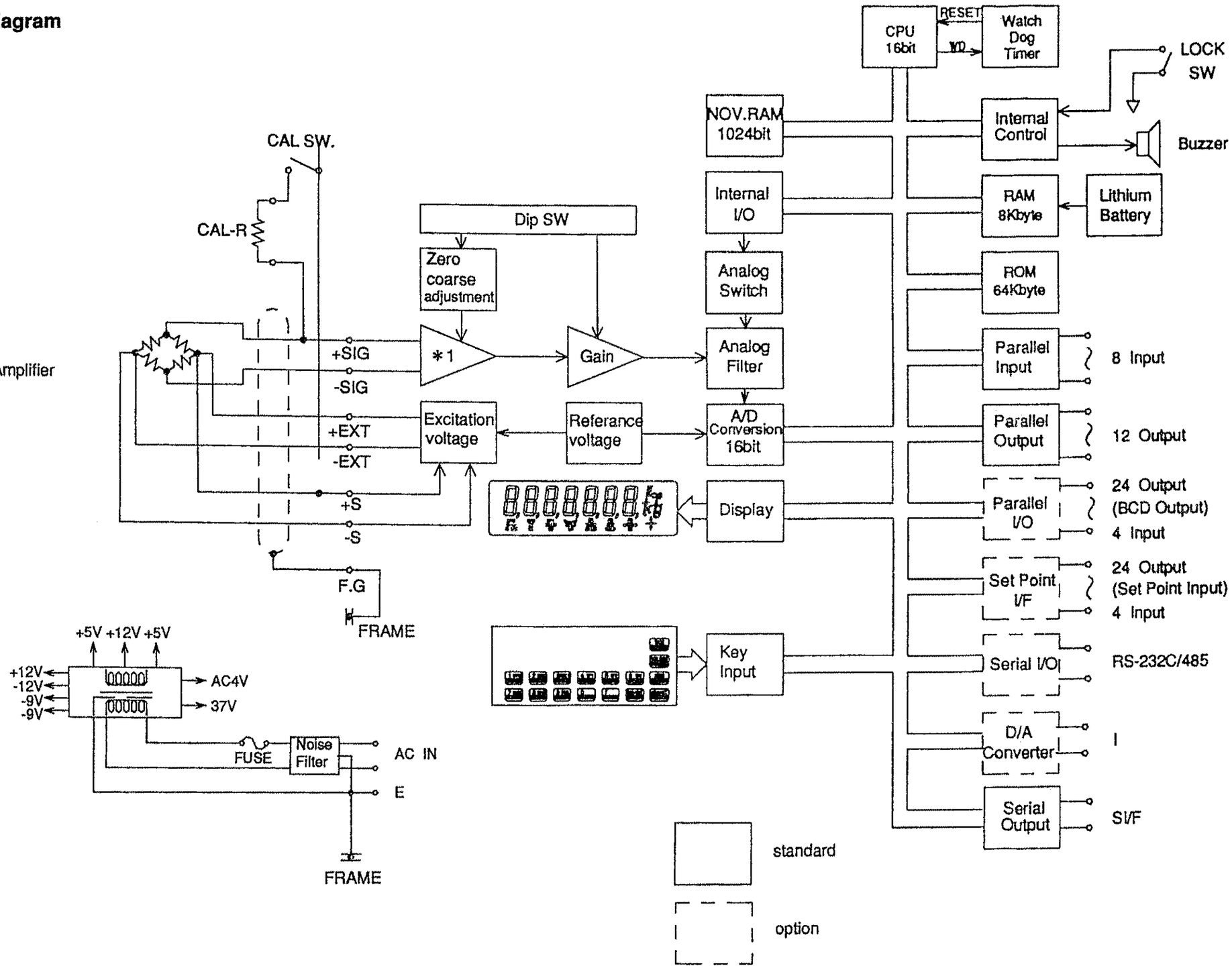

| | Item | Initial value | LOCK 1 (SRAM) | LOCK 2 (NOV.RAM) | LOCK SW (NOV.RAM) | Display |
|---|---|---|---|---|---|---|
| 1 | D/A Output Mode | 00 | | ◎ | | |
| 2 | D/A Zero Output Weight Value | 000.00 | | ◎ | | |
| 3 | D/A Full Scale | 100.00 | | ◎ | | |
| 4 | RS-232C I/F, RS-485 I/F | 30101 | | ◎ | | |
| 5 | ID Number | 0000 | | ◎ | | |
| 6 | Set Point Interface | 00000 | | ◎ | | |
| 7 | External Function Selection | 00000 | | ◎ | | |
| 8 | | 0 | | | | ◎ |
| 9 | Standard/NTEP Mode Selection | 1111 | | ◎ | | |

◇ Setting Mode 9
( Calibration Mode)


| | Item | Initial value | LOCK 1 (SRAM) | LOCK 2 (NOV.RAM) | LOCK SW (NOV.RAM) | Display |
|---|---|---|---|---|---|---|
| 1 | Span Calibration | 100.00 | | ◎ | ◎ | Command |
| 2 | | 0 | | | | ◎ |
| 3 | | 0 | | | | ◎ |
| 4 | | 0 | | | | ◎ |
| 5 | | 0 | | | | ◎ |
| 6 | | 0 | | | | ◎ |
| 7 | | 0 | | | | ◎ |
| 8 | | 0 | | | | ◎ |
| 9 | | 0 | | | | ◎ |
| Zero | Zero Calibration | 0 | | ◎ | ◎ | Command |

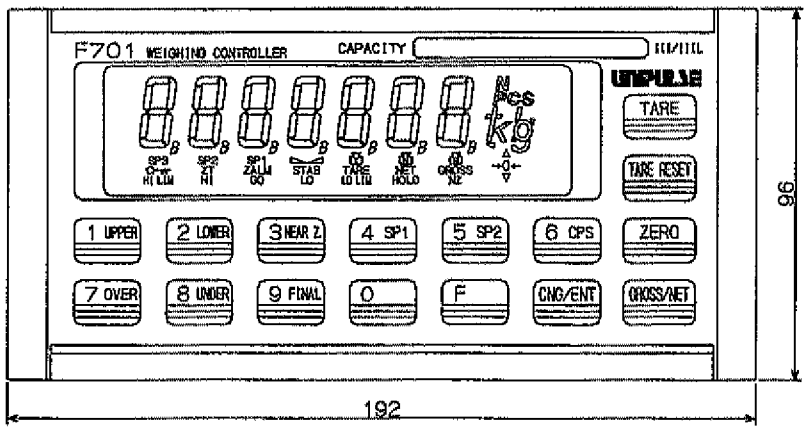
Initial value : Values at the time of shipment.
LOCK 1 : Software Lock (Setting Mode 2-9) prevents changing set values back up in S-RAM by lithium battery
LOCK 2 : Software Lock (Setting Mode 2-9) prevents changing set values back up in NOV.RAM.
LOCK SW : Calibration Lock Switch on rear panel. When dip switch number 1 is ON, prevents any changes in calibration held in NOV.RAM.
Display : Display only.

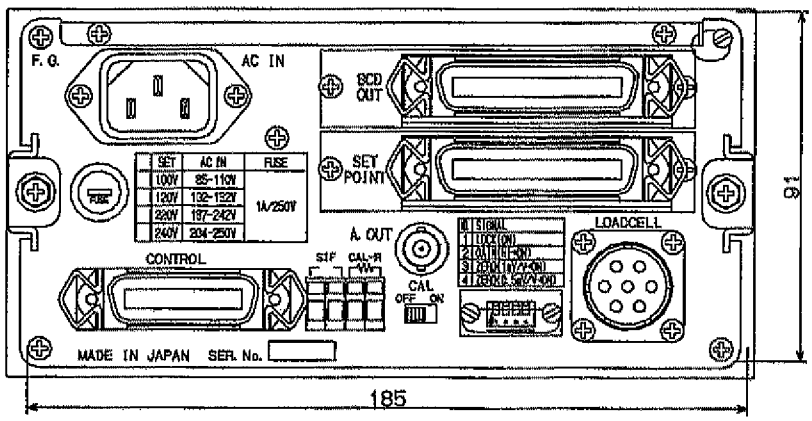
## 8.2 Block Diagram

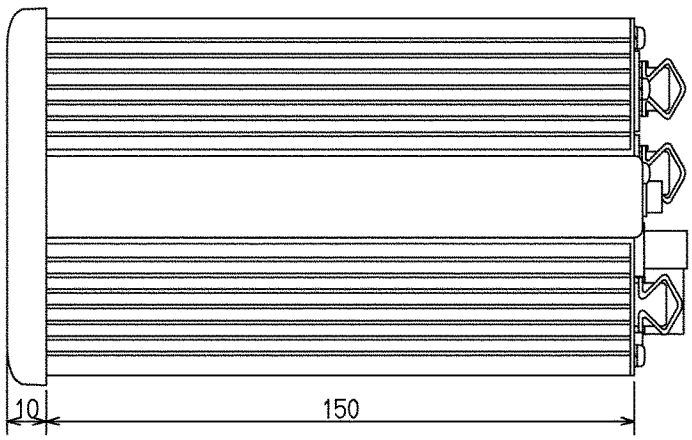



*1 : Input Amplifier

## 8.3 Dimensions



## 8.4 Specifications

1. Analog

| | |
|---|---|
| Loadcell excitation | DC 10V ±5% |
| Loadcell current | 120 mA (4-350 ohm loadcells) |
| Loadcell cabling | 4-wire standard |
| | 6-wire with remote sensing |
| Zero adjustment range | 0-1.5 mV/V for HI gain |
| | 0-3.0 mV/V for LOW gain |
| | (digital adjustment) |
| | Input of approx. 0.5 mV/V or 1.0 mV/V |
| | selectable adjust to zero by dip switch on the rear panel |
| Span adjustment range | 0.5-1.5 mV/V for HI gain |
| | 1.0-3.0 mV/V for LOW gain |
| | (digital adjustment) |
| | 2 types gain selectable according to the output of loadcell |

**Analog Input Signal**

| | |
|---|---|
| Sensitivity | 0.5 $\mu$ V/count |
| Stability | Zero drift: within 0.2 $\mu$ V/℃ RTI |
| | (referred to input) |
| | Gain drift: 15ppm/ ℃ |
| Non-linearity | within 0.01%FS |
| Noise | within 0.1 $\mu$ Vp-p RTI |
| Analog filter | Bezel type low-pass filter (-12dB/oct.) |
| | 2,4,6,8 Hz selectable |
| Conversion rate | 100 times/sec. (10mS) |
| Resolution | 16 bits |
| Display resolution | 1/10,000 (Legal for Trade), 1/40,000 expanded |
| Secondary Calibration | Secondary calibration be carried out without actual load, just connecting a resistor to one of the bridges |

2. Display

| | |
|---|---|
| Display | Original Vacuum Fluorescent Display |
| Figure display | Seven (7) digits, 18.5mm (0.73 inch) high |
| Weighing value display | 5 digit, Plus/Minus sign in |
| Decimal point | Configurable to 0, 0.0, 0.00, 0.000 |
| Display frequency | 3,6,13,25 times/sec. selectable |
| | (internal 100 times/sec.) |
| Scale capacity | 5 digit (up to 99999) |
| Min. scale division | 1 to 100 selectable |

| | |
|---|---|
| Over-scale display | Input of A/D conversion overflow/ Net weight over the set net value/ Gross weight over the Capacity plus 9 scale division/ Gross weight over the set gross value/ |
| Center zero | ' →0← ' turns on when the displayed value is at the center zero (0±1/4 scale). |
| Unit | Selectable **lb, N, kg, g, t,** none |
| Status display | Indicated by fixed character display.<br>SP3 /SP2 /SP1 /○⊤ /ZT /ZALM / STAB / TARE / NET<br>GROSS /HI LIM /HI /GO /LO /LO LIM /HOLD /NZ |

3. Setting

| | |
|---|---|
| Setting Method | Keyboard operation (with key click buzzer) or setting through the host computer by RS-232C (Option) |
| Memory of set values | Initial set values:<br>NOV RAM (Non-volatile RAM)<br>Other set values:<br>C-MOS RAM backup by a lithium battery (Effective more than 7 years, depending on operating conditions) |
| Protections of set values (LOCK) | Set values and calibration can be protected from MIS-operation |

4. External I/O Signal

| | |
|---|---|
| Input signals (8) | Signals are input by shorting or opening Input and COM terminals.<br>Gross/ Net, Digital Zero ON, Tare Subtraction ON, Tare Subtraction OFF, Hold/ Judgment, Feed/ Discharge, Start and Stop |
| Output Signals (12) | The output signal circuit is an open-collector output of a transistor.<br>Near Zero, SP1, SP2, SP3, Under, Over, Lower Limit, Upper Limit, Stable, Weight error/ Sequence error, Go/ Complete, Run |

Connector pin assignment

Adaptable plug : DDK 57-30240 (attached to the F701) or its equivalent

| | | | | | |
|---|---|---|---|---|---|
| 1 | * | COM | 13 | * | COM |
| 2 | in | G/N | 14 | in | Hold or Judgement |
| 3 | in | D/Z ON | 15 | in | Feed/Discharge |
| 4 | in | Tare Subtraction ON | 16 | in | Start *1 |
| 5 | in | Tare Subtraction OFF | 17 | in | Stop *1 |
| 6 | out | Near Zero | 18 | out | Lower Limit |
| 7 | out | SP1 | 19 | out | Upper Limit |
| 8 | out | SP2 | 20 | out | Stable |
| 9 | out | SP3 | 21 | out | Weight Error or Sequence Error *2 |
| 10 | out | Under | 22 | out | Go or Complete *2 |
| 11 | out | Over | 23 | out | RUN |
| 12 | * | COM | 24 | * | COM |

5. Interface

2-wire serial interface (SIF)

2-wire serial interface for connecting to peripheral equipment such as printer and remote displays
Transmitting system: Asynchronous
Transmitting speed: 600bps

Interface for the set point (SP1) (Option)

Interface for inputting set values for discharging via digital switches.
Set values:

| | | |
|---|---|---|
| Final | ··· | 5 digit |
| CPS | ··· | 4 digit |
| SP1 | ··· | 4 digit |
| SP2 | ··· | 5 digit |
| Over | ··· | 3 digit |
| Under | ··· | 3 digit |

BCD parallel data output interface (BCO) (Option)

Weighing value in BCD form to PC's, PLC's or sequences for controlling processing and recording data. The internal and external circuits are opt.-isolated.
Output signals: Weight data (5 digits) sign, over, strobe, printing command
Output logic: Positive/negative selectable
Output circuit: Open-collector
Input signal: Logic switching, hold, output data selection
Input circuit: Operated by a contact or an open-collector circuit (Ic=10mA min.)

| | |
|---|---|
| RS-232C communication interface (232) (Option) | Weight data and various status can be transmitted and writing (changing) and reading of set values can be carried out by commands from the host computer<br>Signal level: Based on RS-232C<br>Transmitting distance: Approx. 15m (16.41yd)<br>Transmitting system: Asynchronous<br>Transmitting speed: 1200, 2400, 4800 or 9600 bps selectable<br>Bit configuration: Start 1 bit<br>Character length 7 or 8 bits selectable<br>Stop 1 or 2 bits selectable<br>Parity none, odd or even selectable<br>Code: ASCII |
| RS-485 communication interface (485) (Option) | Addressable serial communication for connecting units. Transmission distance is longer than RS-232C<br>Signal level: Based on RS-485<br>Transmitting distance: Approx. 1km (1000 yd)<br>Transmitting system: Asynchronous<br>Transmitting speed: 1200, 2400, 4800 or 9600 bps selectable<br>Bit configuration: Start 1 bit<br>Character length 7 or 8 bits selectable<br>Stop 1 or 2 bits selectable<br>Parity none, odd or even selectable<br>Code: ASCII |
| D/A converter (DAC) (Option) | The D/A Converter Interface sends an analog signal for each weighing value (4 ~ 20 mA).<br>Current over range limit is +10% of full scale.<br>Current output: 4 ~ 20mA (load resistance 350 ohm max.)<br>D/A conversion speed: 100 times/sec.<br>Resolution: 1/3000<br>Over range: Full scale +/-10%<br>Current 2.4 ~ 21.6mA |

## 6. General Specifications

| | |
|---|---|
| Power voltage | AC100V, 120V, 200V or 220V<br>+10%, -15% selectable 50/60Hz |
| Power consumption | 15VA |
| Environment | Operating temperature: –10 to +40℃<br>Storage temperature: –20 to +85℃<br>Humidity: 85%RH max. (non-condensing) |
| Dimensions | 192W × 96H × 150D mm<br>(7.56W × 3.78H × 6.30D inch) |
| Panel cutout size | 186W × 92H × +0.5/–0mm<br>7.32W × 3.62H +0.02/–0 inch) |
| Weight | Approx. 2.2kg (4.85 lb) |

## 7. Attachments

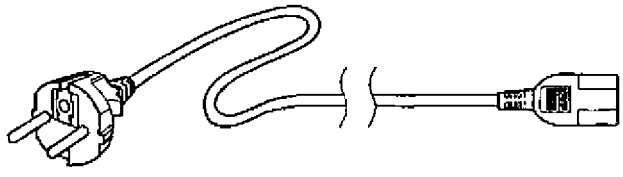
Power cable (2m[6.56ft]) .....1
Spare fuse (1A) .....1
Loadcell input connector (Hirose JR16PK-7S).....1
Control signal input/output connector (DDK 57-30240) .....1
Minus screwdriver .....1
Set point unit connector (for set point unit option) .....1
BCD output connector (for BCD output option) .....1
D/A converter connector (for D/A converter option) .....1
Operation manual .....1

### About the power cable

- The power cable attached to this product as standard equipment can be used in the AC100V power supply in Japan. (Official ratings voltage AC125V)
  Please use the power cable authorized in the country when you use this product outside Japan.

- Our company sells following resistance pressure cable AC250V (European standard product) separately.
  Please purchase it from us when you need after confirming its plug shape/ voltage.

CAAC3P-CEE7/7-P1.5 : CEE7/7 Plug cable (1.5m)



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