
# F600A

## WEIGHING CONTROLLER

## OPERATION MANUAL

03JUN2011REV.1.01

UNIPULSE

# INTRODUCTION

Thank you very much for purchasing our Weighing Controller F600A.
For good performance, and proper and safe use of the F600A, be sure to read this instruction manual and properly understand the contents of it before use. Also, carefully keep this instruction manual so that it can be referred to at any time.

# SAFETY PRECAUTIONS

**For safety reasons, please read the following safety precautions thoroughly.**

In order to have an F600A Digital Indicator used safely, notes we would like you to surely follow divide into "⚠ WARNING" and "⚠ CAUTION", and are indicated by the following documents. Notes indicated here are the serious contents related safely. Please use after understanding the contents well.

## ⚠ WARNING

This sign forewarns the presence of hazards that could result in serious injury or fatality when incorrectly handled.

## ⚠ CAUTION

This sign forewarns the presence of hazards that could result in personnel injury or property damage when incorrectly handled.

# RoHS-COMPLIANT PRODUCT

The parts and attachments (including the instruction manual, packaging box, etc.) used for this unit are compliant with the RoHS Directive restricting the use of hazardous substances with regard to adverse effects on the environment and human body.

**What is RoHS?**

It is an abbreviation for Restriction on Hazardous Substances, which is implemented by the European Union (EU). The Directive restricts the use of six specific substances in electric and electronic equipment handled within EU borders. The six substances are lead, mercury, cadmium, hexavalent chromium, PBB (polybrominated biphenyls), and PBDE (polybrominated diphenyl ethers).

## ⚠ WARNING

**This sign forewarns the presence of hazards that could result in serious injury or fatality when incorrectly handled.**

### Warning on design

- For the entire system to function safely when the F600A becomes faulty or malfunctions, provide a safety circuit outside the F600A.

### Warning on installation

- Do not modify the F600A. Doing so may cause fire or electric shocks.
- Do not install in the following environments.
  - Places containing corrosive gas or flammable gas.
  - Where the product may be splashed with water, oil or chemicals.

### Warning on wiring

- Do not connect a commercial power source directly to the signal input/output terminals.
- Be sure to ground the protective ground terminal.
- Before performing the following, make sure that no power is applied.
  - Attachment/detachment of connectors of options, etc.
  - Wiring/connection of cables to the terminal boards.
  - Connection of the earth cable.
- For connection to the signal input/output terminals, check the signal names and pin assignment numbers, and then carry out wiring properly.
- Be sure to use crimp contacts for connection to the terminal boards, and do not to connect bare wires as they are.
- Be sure to install the attached terminal board cover after wiring to the power input terminals. Otherwise, electric shocks may result.
- Before applying power, carefully check the wiring, etc.

### Warning during startup and maintenance

- Use at a proper power supply voltage.
- Do not damage the power cord. Doing so may cause fire or electric shocks.
- Do not touch any terminal while applying power. Doing so may cause electric shocks or malfunctions.
- If the cover of the main body is opened, it may cause an electric shock internally. Even if the power is off, the internal capacitor is charged. Contact us for internal inspection or repair.
- In the case of smoke, an abnormal smell or strange sound, immediately turn off the power, and disconnect the power cable.
- As for the batteries used in F600A, do not at any time dismantle the batteries, change the batteries shape by subjecting it to pressure or throw the batteries into fires as these may cause the batteries to explode, catch fire or leak.

  | | |
  |---|---|
  | Typte: | CR2477-1HF made by Matsushita Battery Industrial Co., Ltd. |
  | Voltage: | 3V |
  | Capacity: | 1000mAh |

## ⚠ CAUTION

**This sign forewarns the presence of hazards that could result in personnel injury or property damage when incorrectly handled.**

### Caution on installation

- Use the F600A as it is incorporated in a control panel, etc.
- Do not install in the following environments.
  - Where the temperature/humidity exceeds the range of the specifications.
  - Places exposed to direct sunlight
  - Dusty places
  - Places containing large quantities of salt or iron powder.
  - Where the main body is directly affected by vibrations or shocks.
- Take adequate shielding measures when using at the following locations.
  - Near a power line.
  - Where a strong electric field or magnetic field is formed.
  - Where static electricity, relay noise or the like is generated.

### Caution on wiring

- Tighten the screws for the signal input/output terminals at the specified torque.
  If they are loose, shorts, fire or malfunctions may occur.
  Tightening torque: 0.5N•m
- For sensors, external inputs/outputs, RS-232C and options, use shielded cables.

### Caution during startup and maintenance

- For turning on/off the power, be sure to keep intervals of 5 seconds or more.
- If the F600A is not used by the specified method, its protective performance may be impaired.
- Maintenance
  - When performing maintenance, disconnect the power.
  - Do not wipe with a wet rag, or with benzine, thinner, alcohol, etc. Doing so may cause discoloration or deformation of the F600A. In the case of heavy contamination, wipe off the contamination with a cloth after dipping it into a diluted neutral detergent and wringing it well, and then wipe with a soft, dry cloth.

### Caution during transportation

- When the F600A is shipped, spacers made of corrugated cardboard are used as cushioning materials.
  Though it is factory-designed so that shocks can sufficiently be absorbed, breakage may result if shocks are applied when the spacers are reused for transportation. If you send the F600A to us for repair, etc., take adequate measures against shocks by using polyurethane materials, etc., separately.

### Caution during disposal

- If you dispose of the product, handle it as industrial waste.

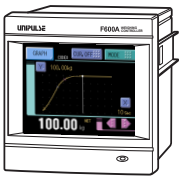
# CONTENTS

# 1. OUTLINE

## 1-1. Contents of the Package

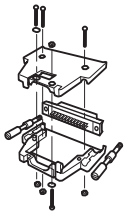
The packaging box contains the following.

Be sure to check them before use.



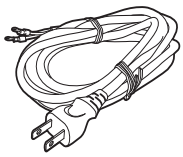
F600A body ･･･1

operation manual ･･･1

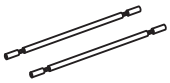


External input/output connector ･･･1set

[Connector : FCN-361J024-AU
Cover : FCN-360C024-B]

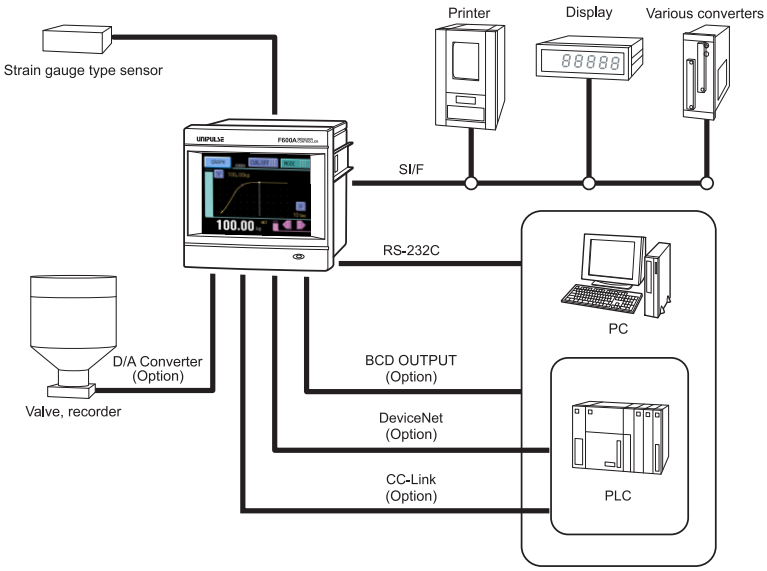


AC power cable･･･1
(Only at AC spec.)



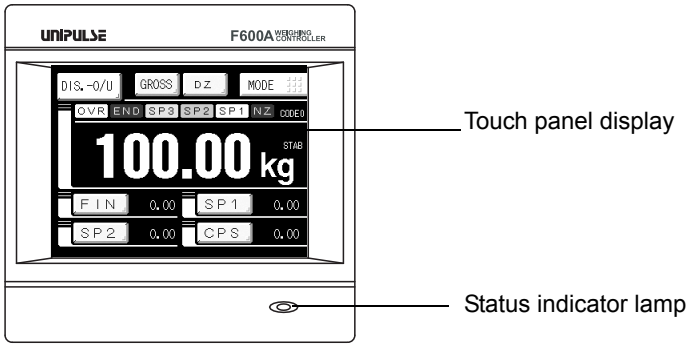
Jumper wire ･･･2

## 1-2. About Connectable Devices




## 1-3. Appearance Description

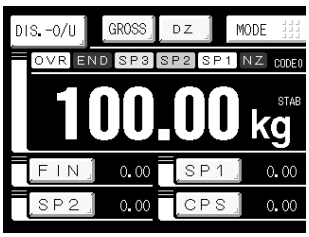
### 1-3-1. Front Panel



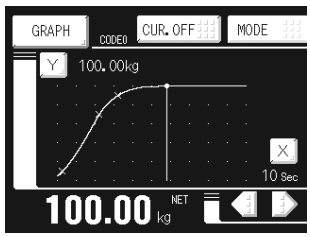
## ■ Touch panel display

This is the touch panel display for displaying an indicated value and graph set value and for setting various setting items of the F600A. During measurement, a comparison display, hold display and graph display can be selected according to the function in use.

Weight display




Graph display



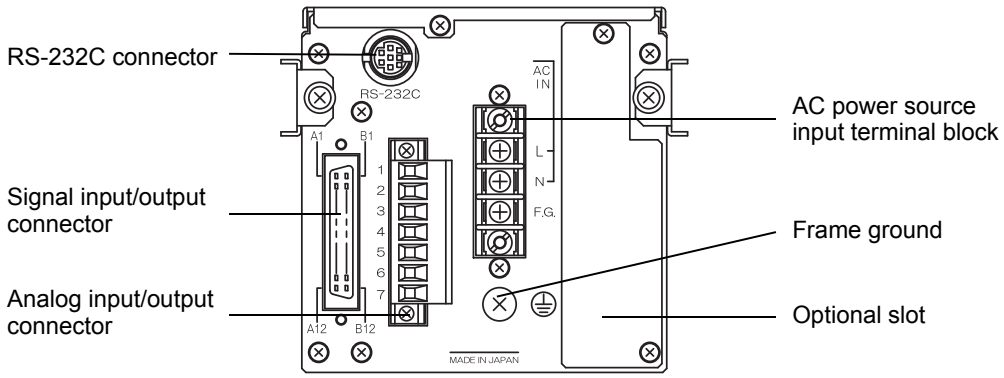

## ■ Status indicator lamp

| Lamp indication | Status |
|---|---|
| Green lighting | Steady state |
| Orange lighting | Writing into internal NOVRAM. Do not turn off the power of the F600A. |
| Yellow blink | Voltage drop of the internal memory backup battery.<br>Battery replacement is needed. |

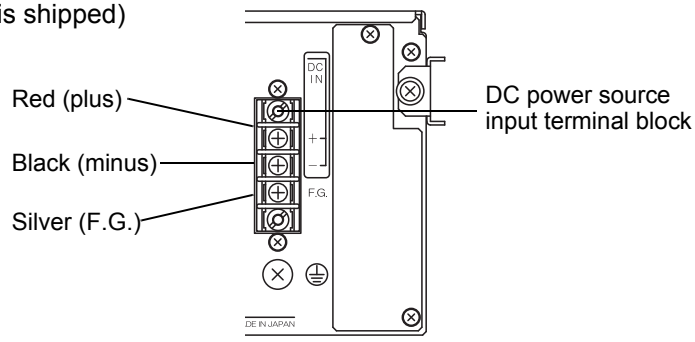
## ■ Prohibition of key operation

Setting of all the key operations or individual key operation ON/OFF is done by "SYSTEM". Please refer to "SYSTEM" on page 33 for details.

## 1-3-2. Rear Panel



*DC spec.
(Designated when it is shipped)




Notice

- Be aware that the voltage drops depending on the wire thickness and length.
- Never input an AC power source. Doing so will cause a failure.

## ■ AC power source input connector/ DC power source input terminal board

### ▪ AC spec.

Connect with AC power source cable supplied.
AC voltage is 100V to 240V(+10%, -15%) AC frequency is 50Hz/60Hz.

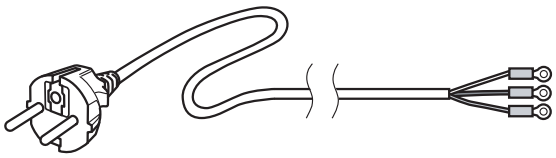
### ▪ DC spec. (Designated when it is shipped.)

Connect DC power source. Voltage input is DC24V ( ± 15%).

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-B2 : CEE7/7 Plug cable (2m)



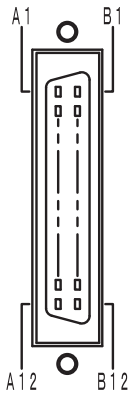
## ■ Analog input/output connector

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

Adaptable plug : ETB42-07P

## ■ Signal input/output connector

| | | | |
|---|---|---|---|
| A1 | COM | B1 | COM |
| A2 | HH/SP1 | B2 | CODE0 |
| A3 | HI/OVER | B3 | CODE1 |
| A4 | GO/SP2 | B4 | CODE2/KEY_LOCK |
| A5 | LO/UNDER | B5 | G/N |
| A6 | LL/SP3 | B6 | DZ |
| A7 | END | B7 | TARE ON |
| A8 | NZ | B8 | TARE OFF |
| A9 | STAB | B9 | HOLD/JUDGE |
| A10 | ERR | B10 | F/D |
| A11 | SI/F | B11 | START |
| A12 | SI/F | B12 | STOP |




Plug : FCN-365P024-AU (Adaptable jack : FCN-361J024-AU)

## ■ Frame ground (functional ground)

This is a ground terminal block. Be sure to ground the F.G. terminal to prevent electric shocks and failures due to static electricity.

## ■ RS-232C connector

RS-232C connector to transmit/receive measurement data and status information, etc.
The adaptable plug is HOSIDEN-manufactured TCP8080-015267 or equivalent.
Optionally available RS-232C cable (cross) [CA81-232X] is connectable.

## ■ Option slot

Any one of the following optional boards can be mounted.

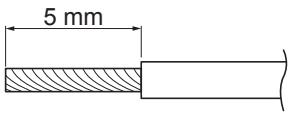
- BCD data output
- D/A converter (voltage or current output)
- CC-Link interface
- DeviceNet interface

# 2. CONNECTION

## 2-1. Analog Input/Output Terminals Connection

### How to connect

1. Strip 5mm of the covering of the wire to be connected. The size of connectable wires is from 0.21 to 3.31mm$^2$ (AWG12 to 24).

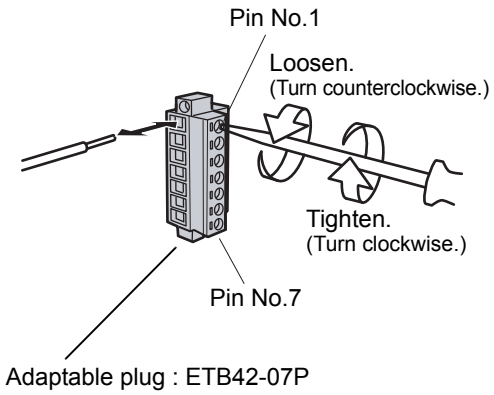



Twist the tip to such an extent that it will not spread out.

3. Loosen the screw with a screwdriver to open the connection hole.

   A Phillips screwdriver 3 to 3.5mm #1 in shaft diameter is recommended. (Precision screwdriver, etc.)

4. Insert the wire into the connection hole so as not to let the tip spread out.

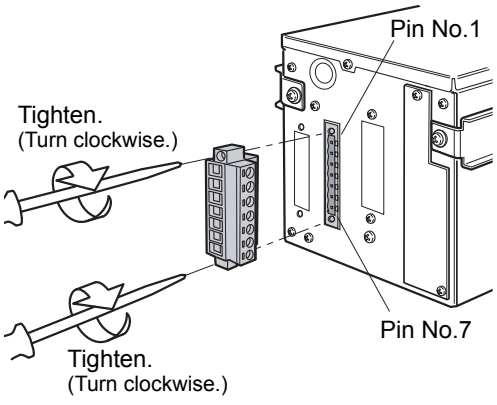



5. Tighten the screw with the screwdriver.

   0.5Nm of tightening torque is recommended.

6. Lightly pull the wire to make sure that it is securely clamped.

7. Insert the wire-connected plug into the F600A body, and tighten the screws (two).

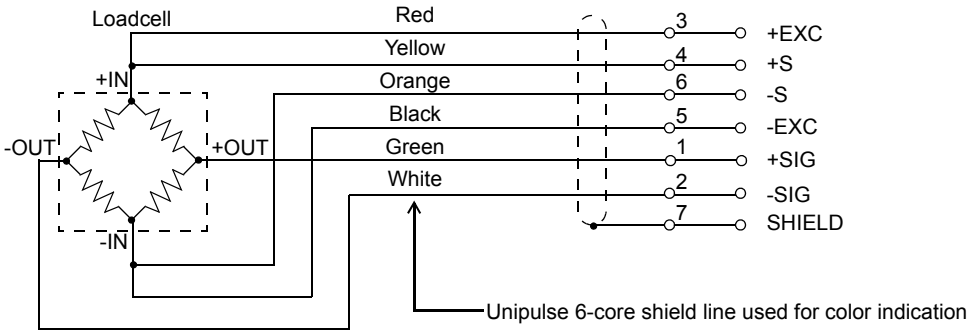


## 2-2. Loadcell Connection

The voltage application of this equipment is 10V, and the maximum current is 120mA, to which up to four 350 Ω loadcells can be connected in parallel.

### ■ 6-wire connection

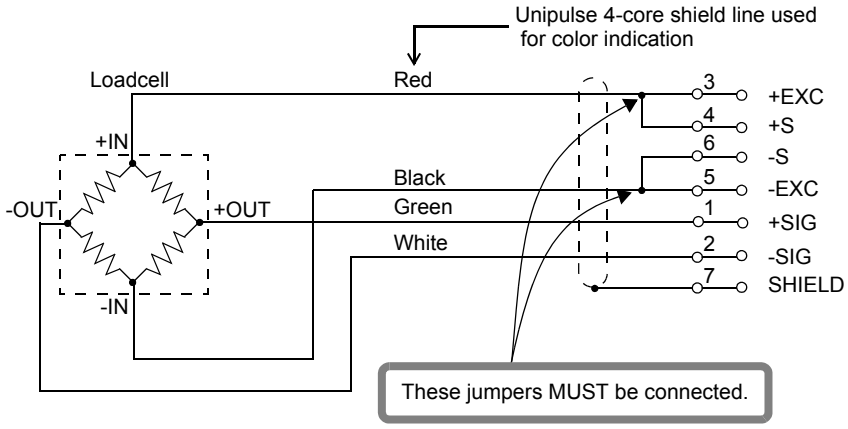
The loadcell input of the F600A is a 6-wire (remote sense) connection. 6-wire shielded loadcell cable should be used and kept separate from AC or other noise generating wire.




Remote sense lines are used to detect and correct variations in excitation voltage over long cable runs.

### ■ 4-wire connection

Connect 3 and 4, and 5 and 6 as shown below. Be sure to connect 4 and 6 on the terminal block with the accessory jumper lines because if the four-wire type is used when 4 and 6 are open, apparent normal operation is performed, but large errors are made in actuality.

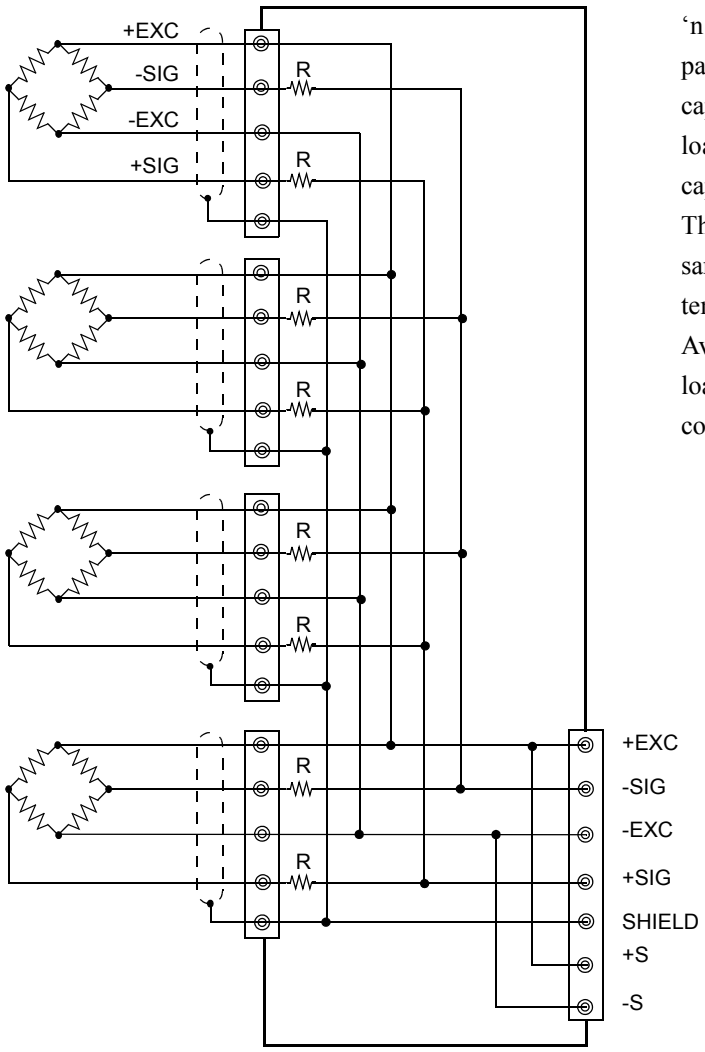



**Notice**

- The loadcell excitation voltage of the F600A is 10V. Heating or breakage may occur unless the loadcells maximum excitation voltage is 10V or more.

## 2-3. Connecting Loadcells In Parallel

Some industrial applications require several loadcells connected in parallel (e.g., tank or flow scales). A summing junction box should be used to facilitate connection and corner correction.




'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 ratios with a low temperature coefficient.
Averaging resistors are not needed if loadcells were designed for parallel connection.

**Notice**

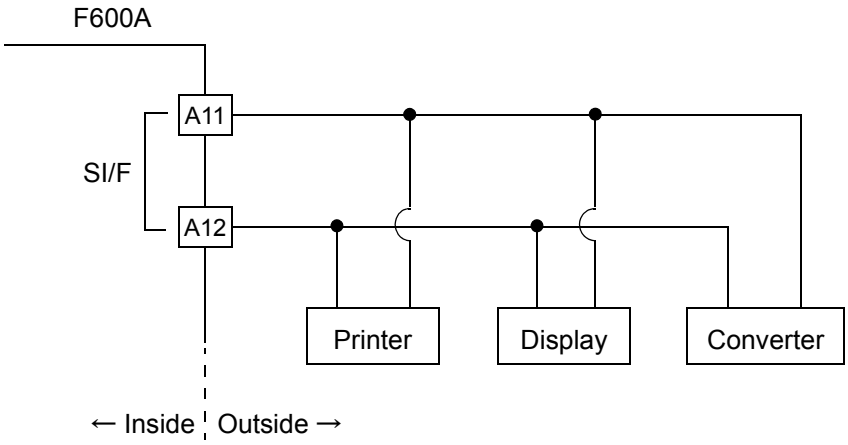
When connecting several loadcells in parallel, loadcell capacity should be higher than expected load to compensate for mechanical shock or eccentric loading.

## 2-4. Strain Gauge Sensor Cable Coloration

Sensor cable coloration differs according to manufacture.
See the operation manual (or test report) of the sensor, check the signal names and colors, and connect properly.

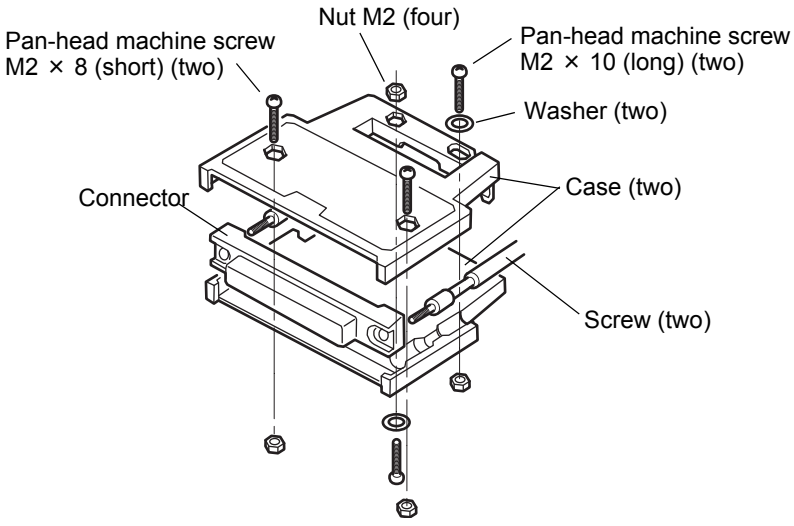
## 2-5. SI/F Connection

The 2-wire serial interface has connective ability for coupling a UNIPULSE 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 may be used for connection.




## 2-6. External I/O Connection

### 2-6-1. How to assemble the connector




1) Set the connector and screws (two) into the grooves of the case (one side).

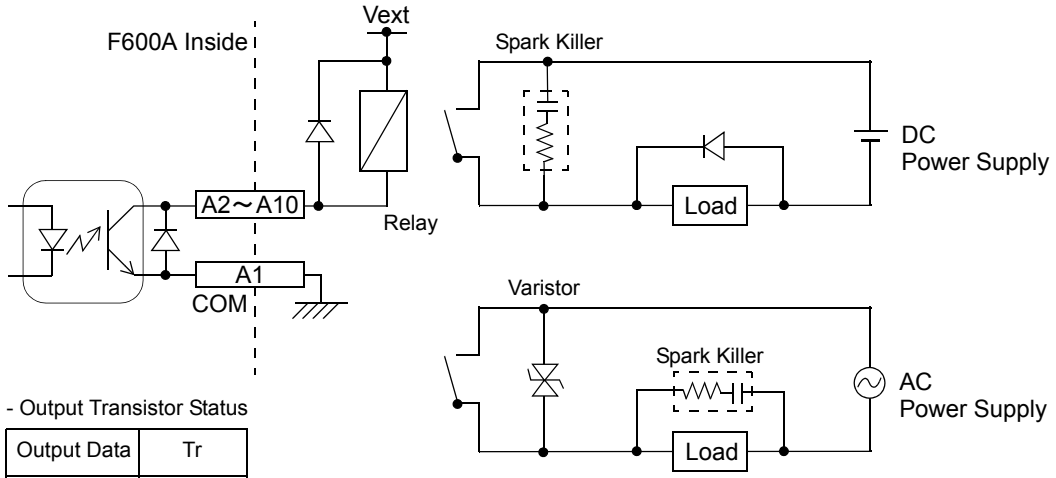
2) Cover with the other case, and fit the cases.

3) Tighten the M2 × 8 pan-head machine screws (two).
Tighten the M2 × 10 pan-head machine screws (two).
Be aware that washers should be set to the M2 × 10 pan-head machine screws (two).

## 2-6-2. External output connection

The external output circuit is operated through an open collector.
The open collector output capacity is 50mA and the withstand voltage is up to 30V.

### ・Equivalent circuit



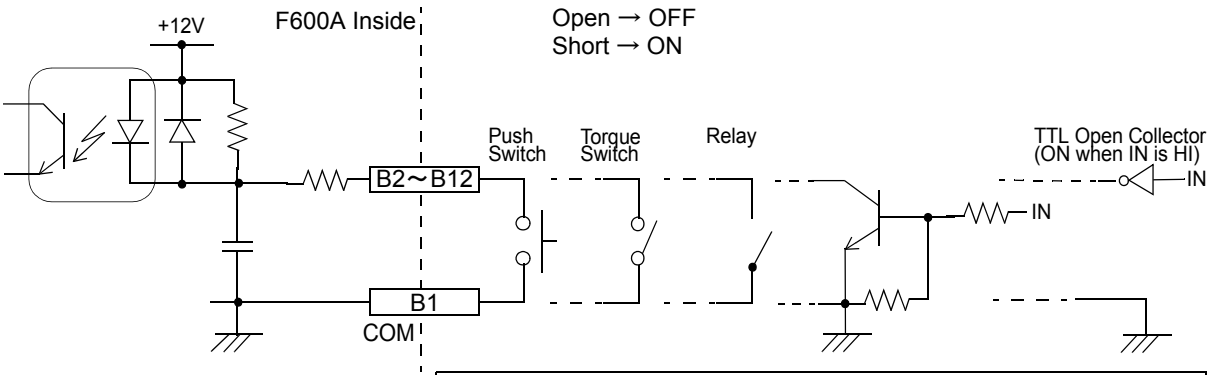

- Output Transistor Status

| Output Data | Tr |
|---|---|
| 0 | OFF |
| 1 | ON |

Supply an external power source for a relay drive power source (Vext).

## 2-6-3. External input connection

A signal is inputted to the signal input circuit by short-circuiting or opening the input terminal and the COM terminal. Short-circuiting is effected by means of a contact (such as a relay or a switch) or a noncontact (such as a transistor or an open-collector TTL).

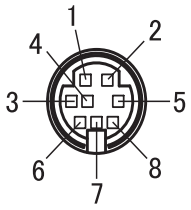



- The external element is required to withstand Ic=10mA.
- Leakage from the external element is required to be 100 $\mu$A or below.

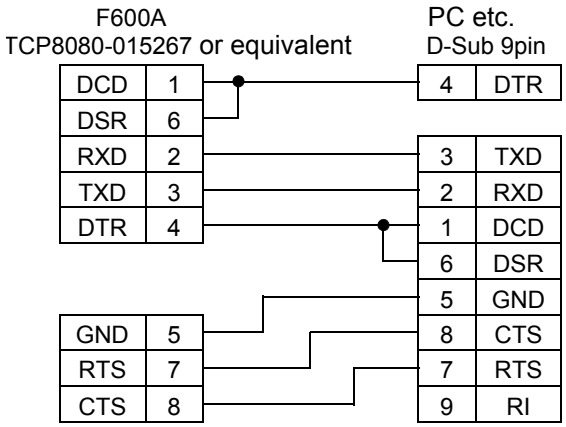
## 2-6-4. RS-232C interface connection

This connector connects the RS-232C.

| Pin No. | Signal name |
|---|---|
| 1 | DCD |
| 2 | RXD |
| 3 | TXD |
| 4 | DTR |
| 5 | GND |
| 6 | DSR |
| 7 | RTS |
| 8 | CTS |
| Case | F.G. |




Example of cabling) The following shows an example of connection between DTE-DTE terminals. This will require modification depending on the equipment to be connected. For details, see the operation manual of the equipment to be connected.



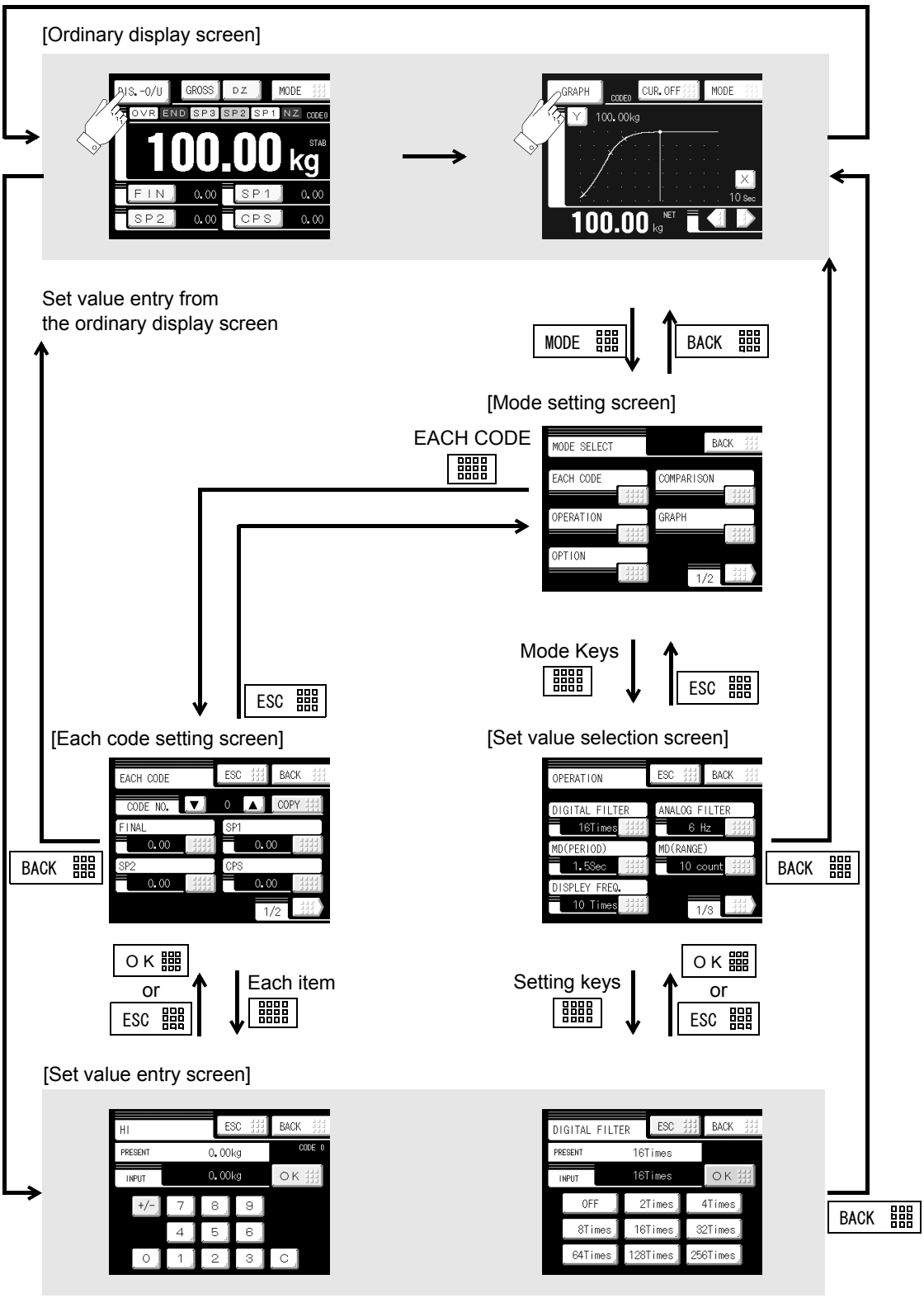

Cabling diagram
CA81-232X(optional)

* This connection diagram shows cabling applicable to the case where your PC is DTE (data terminal equipment).
  For connection with DCE (data circuit-terminating equipment), such as a modem, use straight type cabling.

* Prepare cabling after reconfirmation of the connector shape and signal lines (pin assignments) of the equipment you use.

# 3. SETTING MODE CONFIGURATION

## 3-1. F600A Screen Configuration



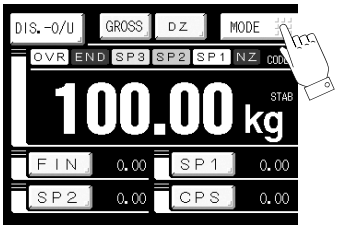
## 3-2. About a Setting Call

Example）LOCK2（Calibration Protection）
This call can be made by the following procedure.

### Operation

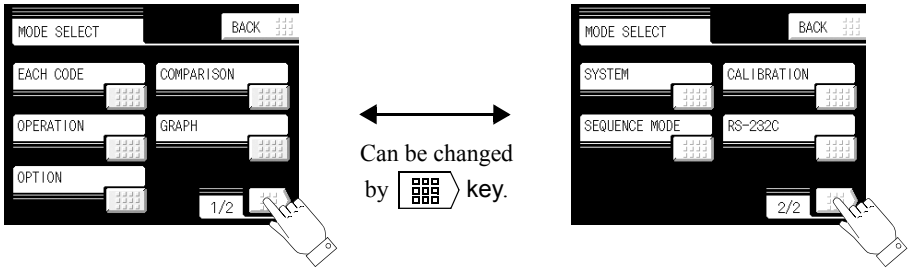
1）Press the MODE key on the ordinary display screen.

Setting call




2）The mode setting screen appears. Select the mode.

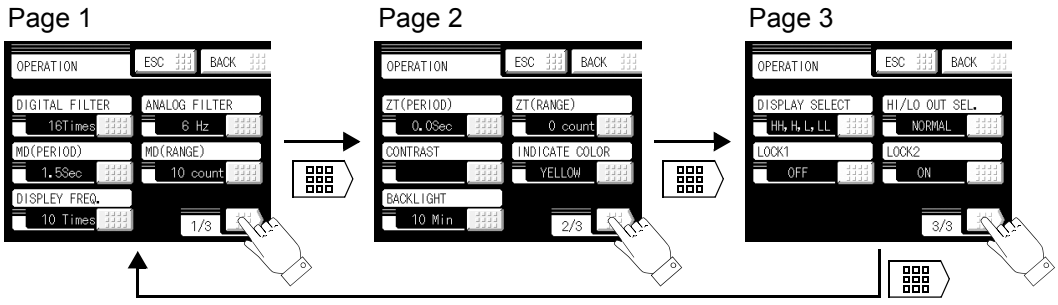
Operation setting



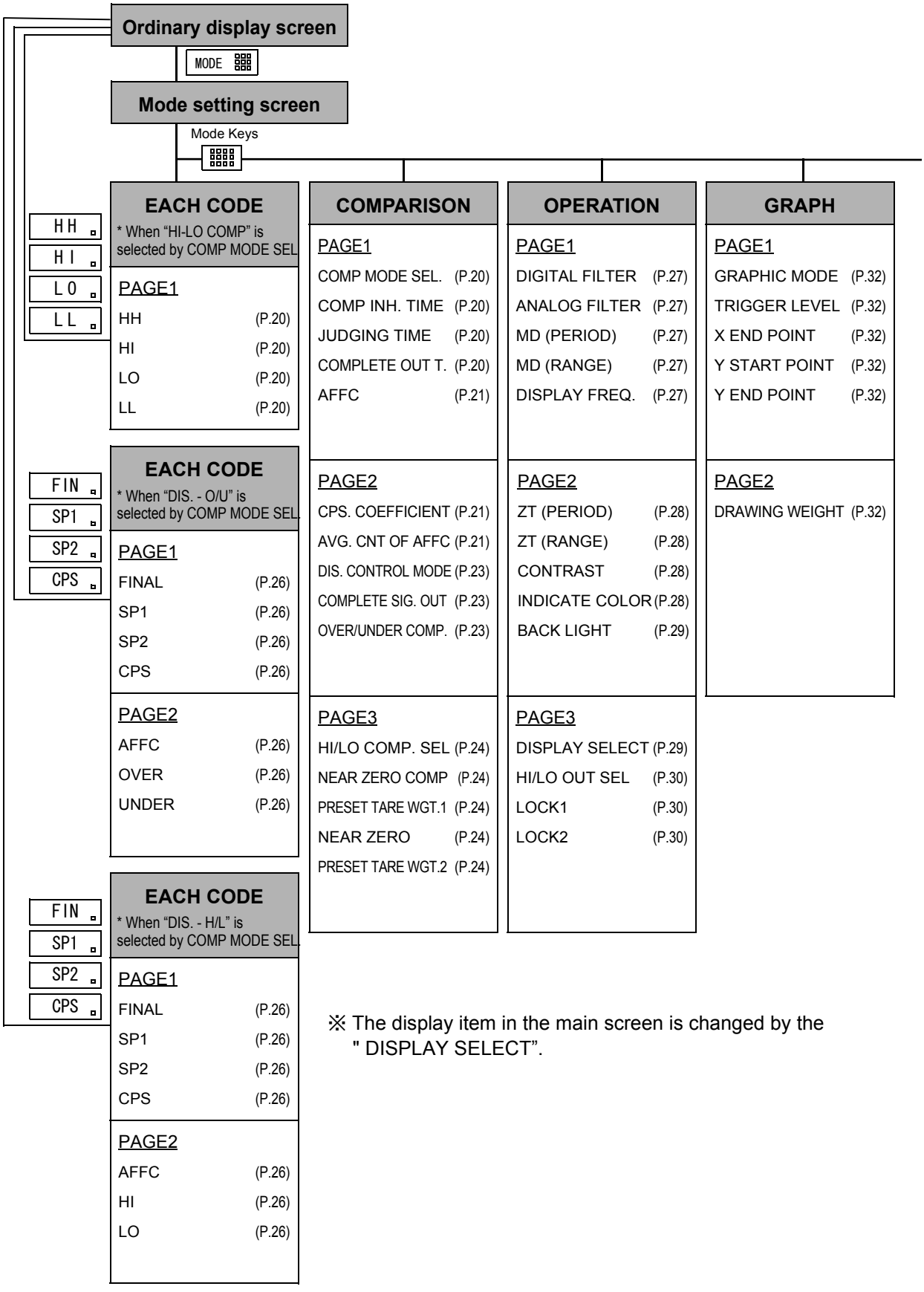

Modes are as follows:

| | | |
|---|---|---|
| - EACH CODE | - COMPARISON | - OPERATION |
| - GRAPH | - OPTION | - SYSTEM |
| - CALIBRATION | - SEQUENCE MODE | - RS-232C |

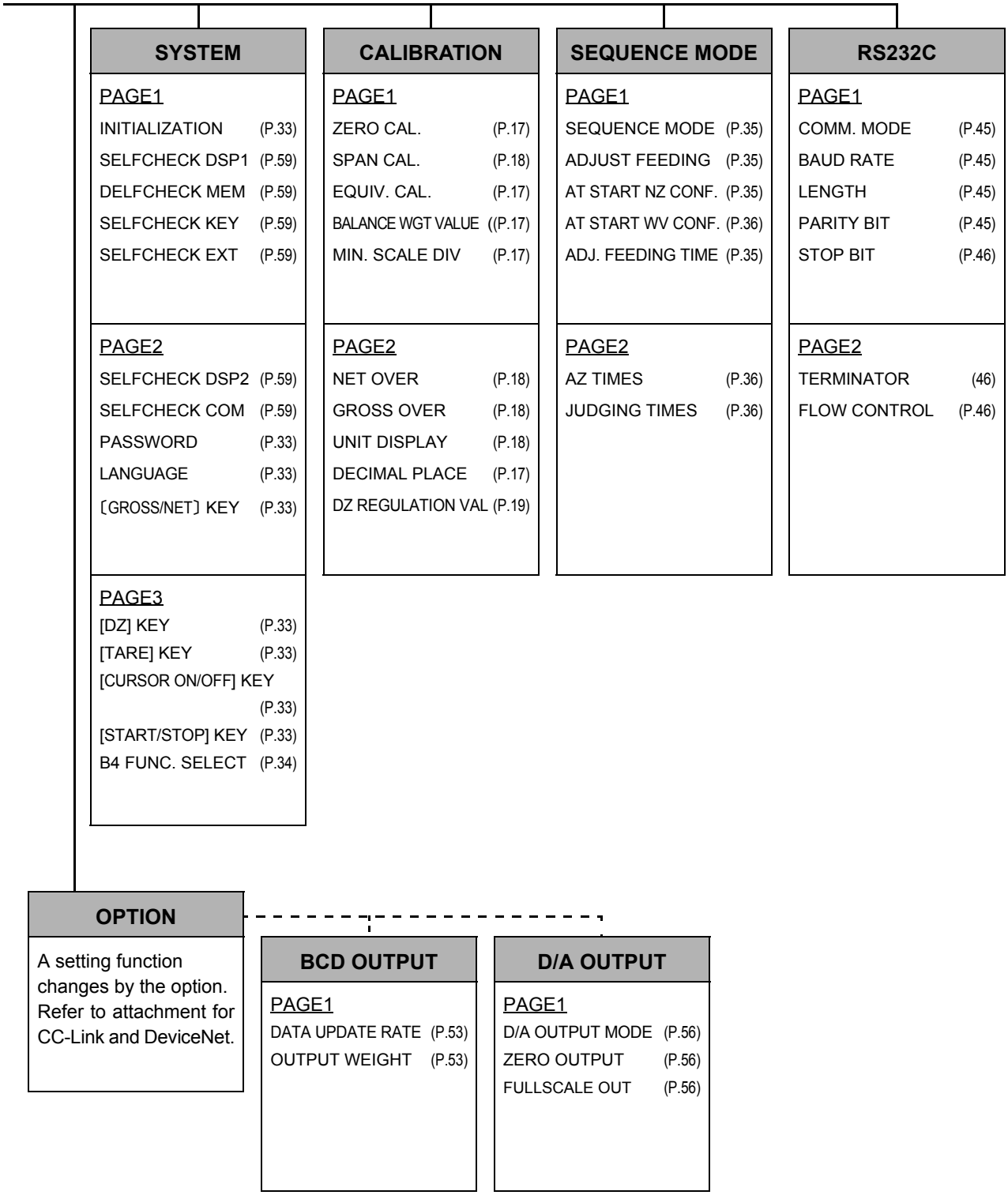
3）The setting function setting screen appears. Select the function.



## 3-3. Setting Modes Tree




※ The display item in the main screen is changed by the " DISPLAY SELECT".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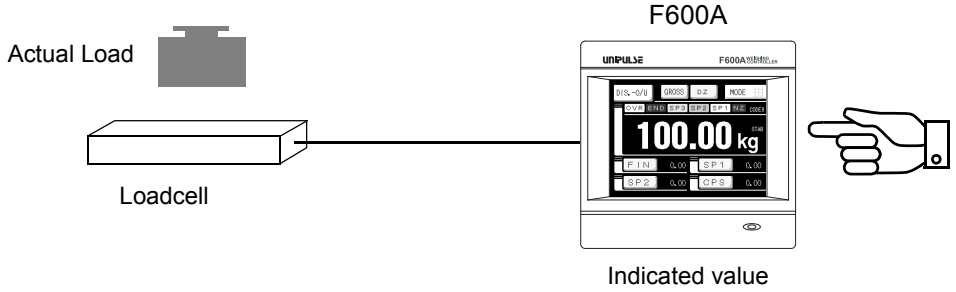
# 4. CALIBRATION

Calibration is performed for matching the F600A to a loadcell. The following two types of calibration are available for the F600A.

### ◇ Actual load calibration

Apply an actual load to the loadcell and enter the actual load value by the keys for calibration. Calibration is accurately performed with reductions in errors.

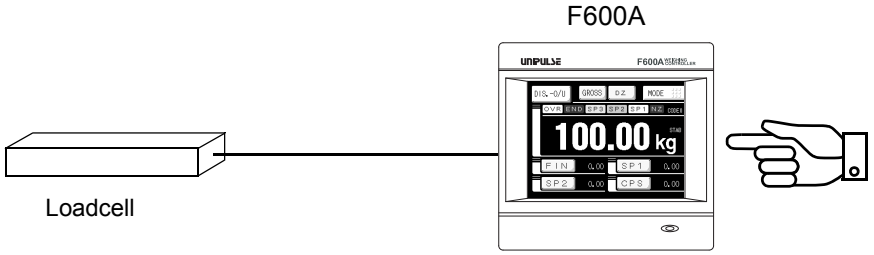



### ◇ Equivalent input calibration

Calibration is performed without an actual load by entering the rated output value (mV/V) and the capacity (to be indicated) of the strain-gage sensor by the keys. Calibration is easily performed when no actual load is available.
For example, the gain is automatically determined by entering:

In case of the load 2.001mV/V (Rated Output) — 100.0kg (capacity)

as indicated for a load.




Rated output value (mV/V) + Indicated value

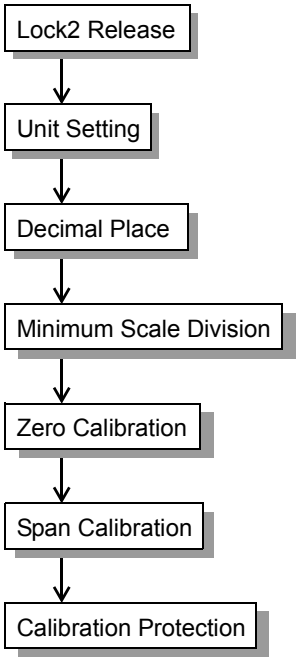
A data sheet is attached to a loadcell at the time of purchase.
The data sheet provides data including:

| | |
|---|---|
| Capacity | Load (in kg, t, etc.) |
| Rated Output | voltage (in mV/V) |

non-linearity, hysteresis,input resistance,output resistance and zero balance.
Enter the capacity and the rated output value required for equivalent input calibration into the F600A.

## 4-1. Span Calibration Procedure

Follow the steps below to perform span calibration.




Release the calibration protection.

Set the unit of the load to be displayed.

Determine the decimal point place of the indicated value.
(Can be omitted if there is no change.)

Enter the minimum value of digital increments.
(Can be omitted if there is no change.)

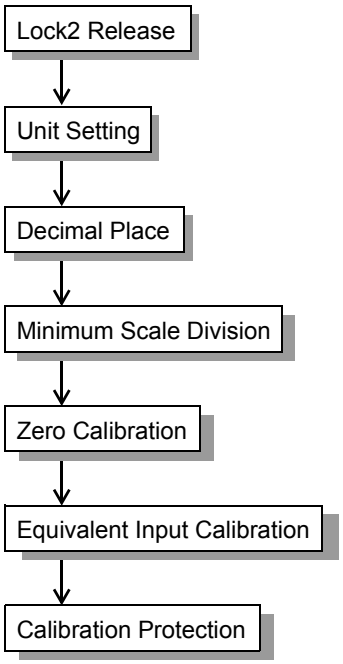
Set the zero point of the loadcell in no-load condition
(with the loadcell unloaded).

Enter the span (gain) point of the loadcell with a load applied to the loadcell.

Turn on the calibration protection for preventing misoperation.

## 4-2. Equivalent Input Calibration Procedure

Follow the steps below to perform equivalent input calibration.




Release the calibration protection.

Set the unit of the load to be displayed.

Determine the decimal point place of the indicated value.
(Can be omitted if there is no change.)

Enter the minimum value of digital increments.
(Can be omitted if there is no change.)

Set the zero point of the loadcell in no-load condition
(with the loadcell unloaded).

Register the rated output value and capacity of the loadcell.

Turn on the calibration protection for preventing misoperation.

# 4-3. Calibration Setting

## 4-3-1. LOCK2（Calibration value LOCK）

MODE → [OPERATION] → Twice → [LOCK2]

Set values relating to calibration are locked so as not to be changed by misoperation.
Cancel the lock before performing calibration.

Alternatives： ［OFF］ ［ON］

## 4-3-2. Minimum scale division (Can be omitted if there is no change)

MODE → Once → [CALIBRATION] → [MIN. SCALE DIV.]

Set the minimum scale division of the indicated value.

Setting range： 001 to 100

## 4-3-3. Decimal place

MODE → Once → [CALIBRATION] → Once → [DECIMAL PLACE]

Set the decimal point place of the indicated value. Selection can be made from the following.

Alternatives： ［NONE］ ［0.0］ ［0.00］ ［0.000］

## 4-3-4. Zero calibration

MODE → Once → [CALIBRATION] → [ZERO CAL.]

Set the zero point in no-load condition.

## 4-3-5. Equivalent input calibration

MODE → Once → [CALIBRATION] → [EQUIV. CAL.]

Set the rated output value and reading of the sensor.

Rated output value： 0.001 to 3.000mV/V
Rated value： 00001 to 99999

About the [BALANCE WGT VALUE] setting

For performing calibration, weight value input can be omitted by setting a weight value to [BALANCE WGT VALUE] beforehand. [BALANCE WGT VALUE] is ganged with the weight value inputs of [SPAN CAL.] and [EQUIV. CAL.].

### 4-3-6. Span calibration

MODE → Once → [CALIBRATION] → [SPAN CAL.]

Set the actual load value under an actual load.

Setting range : 00001 to 99999(The decimal point is selectable.)

## 4-4. Net Over/ Gross Over

MODE → Once → [CALIBRATION] → Once → [NET OVER]

MODE → Once → [CALIBRATION] → Once → [GROSS OVER]

When the net weight value or gross weight value exceeds a fixed regulation, an alarm is given by this function.

NET OVER : 00000 to 99999
GROSS OVER : 00000 to 99999

The alarm is given when the following conditions are met.

| | Conditional expression | Display |
|---|---|---|
| NET OVER | Net weight ＞ “NET OVER” set value | NET OVER |
| GROSS OVER | Gross weight ＞ “GROSS OVER” set value | GROSS OVER |

## 4-5. Unit Setting

MODE → Once → [CALIBRATION] → Once → [UNIT DISPLAY]

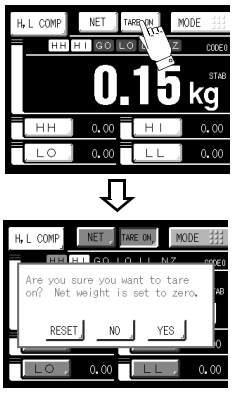
Set the unit of the load to be displayed.
The display value (calibration value) is not affected by changing the unit.

Alternatives : [NONE] [kg] [t] [g] [N] [lb]

## 4-6. Tare Subtraction

TARE ON * It operates it with the net weight (NET) displayed.

The net weight is zeroed by this function. The gross weight value is not changed by this operation.




Alternatives : [RESET] [NO] [YES]

YES : Perform the tare subtraction.

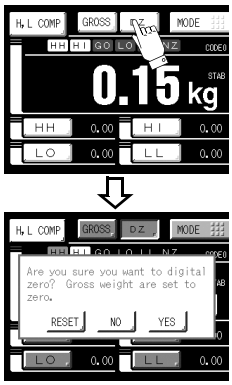
NO : Go back to the previous screen without executing tare subtraction.

RESET : Reset the tare subtraction.

# 4-7. Digital Zero

| DZ | * It operates it with the gross weight (GROSS) displayed. |
|---|---|

The gross weight value is zeroed by this function.




Alternatives : [RESET] [NO] [YES]

YES : Perform the digital zero.

NO : Go back to the previous screen without executing digital zero.

RESET : Reset the digital zero.

## 4-7-1. DZ regulation value

MODE → Once → [CALIBRATION] → Once → [DZ REGULATION VAL]

By setting the DZ regulation value, the alarm “ZALM” is displayed when operation is performed with any gross weight value exceeding the range.

Setting range : 0000 to 9999

The displayed “ZALM” can be invalidated by the following method.

DZ reset ..... Press the RESET key to reset the digital zero.

DZ re-execution ..... Perform digital zero again within the regulation value range.

（See "4-7. Digital Zero" on page 19.）

# 5. COMPARISON SETTING

## ■ Comparison mode setting

Select the comparison mode.

Alternatives : ［HI － LO COMP］ ［DIS. － O/U］ ［DIS. － H/L］

### Explanation of each alternative

HI/LO limit comparison (HI － LO COMP)

The net or gross weight is compared with the set values.

Final discharge – overweight/underweight comparison (DIS. － O/U)

This function is for accurate discharge of the weight value. Overweight/underweight judgment is made by comparing with the net weight.

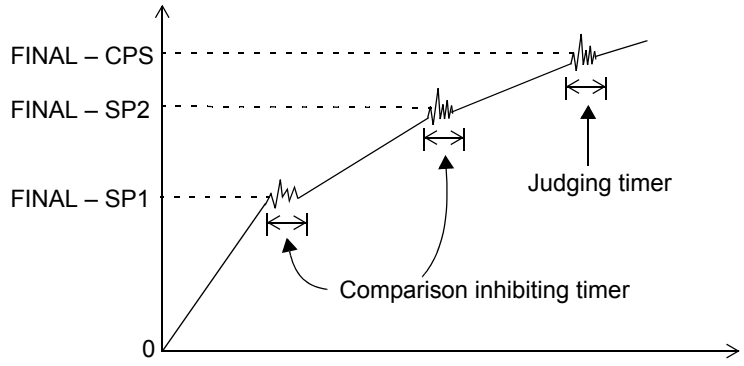
Final discharge – HI/LO limit comparison (DIS. － H/L)

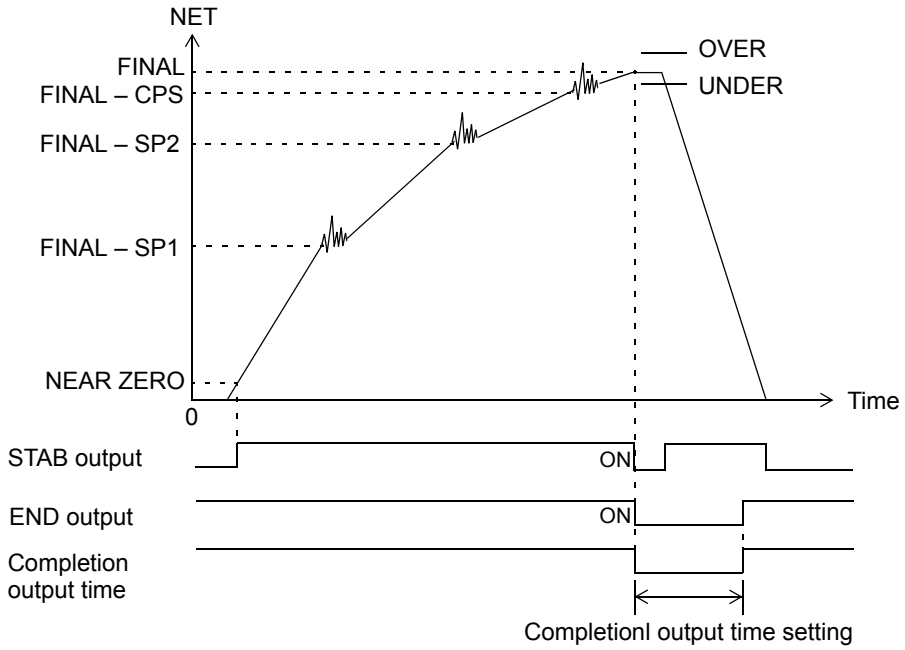
This function is for accurate discharge of the weight value. Comparisons are made with the net weight. High/low limit comparisons are made with the net or gross weight.

## ■ Comparison inhibiting time/ Judging time/ Completion output time

Valid in the discharge mode. Comparisons are not made for a fixed time by this function to prevent inappropriate operation of control and judgment due to mechanical vibrations related to opening and closing of valves. The length of the completion signal to be output when weighing is completed can also be set.

| | | |
|---|---|---|
| COMP.INH.TIME | Setting range : | 0.00 to 9.99（sec.） |
| JUDGING TIME | Setting range : | 0.00 to 9.99（sec.） |
| COMPLETE OUT T. | Setting range : | 0.00 to 9.99（sec.） |






## ■ Availability of fall compensation/ Fall compensating coefficient/ Average count of fall compensation

Variations in fall, which is a major cause of errors in weighing, are automatically compensated by this function for accurate weighing.

| | | |
|---|---|---|
| AFFC | Alternatives : | [OFF] [ON] |
| CPS.COEFFICIENT | Alternatives : | [1/1] [3/4] [2/4] [1/4] |
| AVG.CNT OF AFFC | Setting range : | 1 to 9（times） |

### Principle of automatic fall compensation

Differences (D) between the value set at the final weight and actually weighed value are recorded by the predetermined number of times (preset number of times) (A) to calculate a mean value, which is multiplied by the compensating coefficient (C), and the value is added to or subtracted from the preset fall value.

Value to be added to or subtracted from the preset fall value.

$$\frac{(D_1 + D_2 + D_3 \cdots\cdots D_A)}{A} \times C$$

In order to minimize the errors, the values of D ($D_1$, $D_2$, $D_3$, ... $D_A$) can also be regulated.

### Setting of automatic fall parameters

| | |
|---|---|
| AFFC | Select whether or not to use the automatic fall compensating function. |
| AFFC REGULATION VAL | Set the regulation value to prevent the compensation value from becoming extremely large (or small). (Each code) |
| AVG.CNT OF AFFC | Set the number of times of recording the weighed value to calculate a mean value. |
| CPS.COEFFICIENT | Set to prevent variations in compensation value through multiplication by a coefficient of 1 or less. |

Example）

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

| Times | Actual Weighing | 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 = 0.003 | → CPS Value |
| | | | | 0.532 |

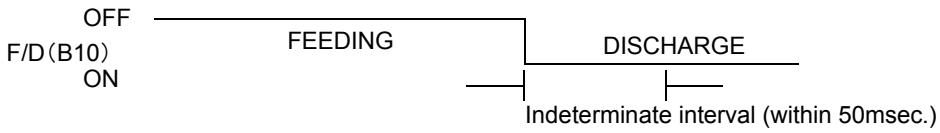
Setting CPS coefficient

CPS coefficient can be selected from 1/4, 2/4, 3/4, or 1.

You can get more accurate CPS value by selecting 1 when each weight value is approximate same in each measuring or by selecting 1/4 to 2/4 when each weight value fluctuates in each measuring.

## ■ Discharge control mode

Valid in the discharge mode. Select FEEDING or DISCHARGE.
By selecting EXTERNAL, switching is carried out between FEEDING and DISCHARGE according to the level of the input terminal "F/D."




Alternatives : [FEEDING] [DISCHARGE] [EXTERNAL]

## ■ Completion signal output mode

Valid in the discharge mode. Select the method of outputting the completion signal.

Alternatives : [JUDGING TIME] [JUD. or STABLE] [JUD. & STABLE]

### Explanation of each alternative

JUDGING TIME The signal is ON only for the duration of the completion output time after the judging time has elapsed.

JUD. or STABLE The signal is ON only for the duration of the completion output time after the weight value has become stable or the judging time has elapsed.

JUD. + STABLE The signal is ON only for the duration of the completion output time after the weight value has become stable and the judging time has elapsed.

## ■ Overweight/underweight comparison mode

Valid when "DIS.-O/U" is selected by COMP MODE SEL.
Select the method of overweight/underweight comparison.

Alternatives : [REGULARLY] [COMP.SIG.] [EXT.IN] [COMP.SIG&H]

### Explanation of each alternative

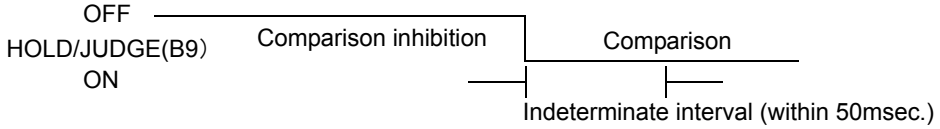
[REGULARLY] Comparisons are made regularly.

[COMP.SIG.] Comparisons are made when the completion signal is ON.

[EXT.IN] Comparisons are made when the external judgment input is ON.

[COMP.SIG&H] Comparisons are made when the completion signal is ON, and the weight value is held.

* If [EXT.IN] is selected, comparisons are made according to the level of input terminal "HOLD/JUDGE".




* In the sequence mode (page 39), this setting is ignored, but comparisons are made when the completion signal is ON, and the weight value is held.

## ■ HI/LO limit comparison selection

Valid when “HI － LO COMP” or “DIS. － H/L” is selected by COMP MODE SEL.
Select the weight value for HI-HI limit, HI limit, LO limit, and LO － LO limit comparisons.
By selecting [COMP OFF], all comparisons are turned OFF.

Alternatives : ［GROSS］ ［NET］ ［COMP OFF］

## ■ Near zero comparison selection/ Preset near zero value

Valid in all comparison modes.
After selecting the weight value for comparisons, if the weight value ≦ preset near zero value, the status display “NZ” lights, and the “NZ” output turns ON.
By selecting [COMP OFF], the “NZ” output is turned OFF.

NEAR ZERO COMP. : ［GROSS］ ［NET］ ［COMP OFF］ ［ABS GROSS］
［ABS NET］
NEAR ZERO : 00000 to 99999

| NEAR ZERO COMP. | Operation near zero |
|---|---|
| [GROSS] | ON when gross ≦ near zero setting |
| [NET] | ON when net ≦ near zero setting |
| [COMP OFF] | Always OFF |
| [ABS GROSS] | ON when \| gross \| ≦ near zero setting |
| [ABS NET] | ON when \| net \| ≦ near zero setting |

## ■ Tare setting selection/ Preset tare value

Valid in all comparison modes.
By turning [PRESET TARE WGT.1] ON, the net changes according to the following expression:

Net = Gross － Preset tare value

(However, if tare subtraction is input, the net weight becomes 0.)

PRESET TARE WGT.1 : ［OFF］ ［ON］
PRESET TARE WGT.2 : 00000 to 99999

# 6. HOW TO SET THE FUNCTIONS

### ☐ Code No. selection

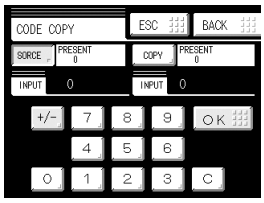
Press the ▼/▲ key on the each code setting screen, and specify the code No. you want to set.

Setting range : [0 to 7] [ALL]

When each item is set with the code No. specified as "ALL," the same set value enters into all of code 0 to 7 on the set item. This function is convenient when there is any item you want to set all code in common.

### ☐ Code copy

Code can be copied. Press the COPY key on the each code setting screen. Set source and copy.




Setting range : Source : (0 to 7)
Copy : (0 to 7)

## ■ For HI/LO limit comparison (when "HI-LO comp" is selected by comp mode sel.)

| Setting item | Input range |
|---|---|
| [HH] | ± 00000 to ± 99999 |
| [HI] | ± 00000 to ± 99999 |
| [LO] | ± 00000 to ± 99999 |
| [LL] | ± 00000 to ± 99999 |

When the weight value > HI-HI limit, the status display "HH" lights, and the signal output "HH/SP1" turns ON.

When the weight value > HI limit, the status display "HI" lights, and the signal output "HI/OVER" turns ON. *1

When the LO limit < weight value < HI limit, the status display "GO" lights, and the signal output "GO/SP2" turns ON. *1

When the weight value < LO limit, the status display "LO" lights, and the signal output "LO/ UNDER" turns ON. *1

When the weight value < LO-LO limit, the status display "LL" lights, and the signal output "LL/SP3" turns ON.

Select the weight value from net or gross.

*1: Output when the HI/LO limit comparison output is in the "NORMAL" mode.
For the "COMPARATOR" mode, see page 30.

## ■ For final discharge – over weight/under weight comparison (when “DIS.-O/U” is selected by comp mode sel.)

| Setting item | Input range |
|---|---|
| [FINAL] | 00000 to 99999 |
| [SP1] | 00000 to 99999 |
| [SP2] | 00000 to 99999 |
| [CPS] | 0000 to 9999 |
| [AFFC] | 00000 to 99999 |
| [OVER] | 000 to 999 |
| [UNDER] | 000 to 999 |

When the net ≧ final weight – SP1, the status display “SP1” lights, and the signal output “HH/SP1” turns ON. *2

When the net ≧ final weight – SP2, the status display “SP2” lights, and the signal output “GO/SP2 turns ON. *2

When the net ≧ final weight – CPS, the status display “SP3” lights, and the signal output “LL/SP3” turns ON. *2

When the net ＞ final weight + over weight, the status display “OVER” lights, and the signal output “HI/OVER” turns ON.

When the net ＜ final weight – under weight, the status display “UNDER” lights, and the signal output “LO/UNDER” turns ON.

The fall regulation value “AFFC” relates to the automatic fall compensating function.

*2: Output in the simple comparison mode. For the sequence mode, see page 39.

## ■ For final discharge – HI/LO limit comparison (when “DIS.-H/L” is selected by comp mode sel.)

| Setting item | Input range |
|---|---|
| [FINAL] | 00000 to 99999 |
| [SP1] | 00000 to 99999 |
| [SP2] | 00000 to 99999 |
| [CPS] | 0000 to 9999 |
| [AFFC] | 00000 to 99999 |
| [HI] | ± 00000 to ± 99999 |
| [LO] | ± 00000 to ± 99999 |

When the net ≧ final weight – SP1, the status display “SP1” lights, and the signal output “HH/SP1” turns ON.

When the net≧final weight – SP2, the status display “SP2” lights, and the signal output “GO/SP2 turns ON.

When the net ≧ final weight – CPS, the status display “SP3” lights, and the signal output “LL/SP3” turns ON.

When the weight value ＞ HI limit, the signal output “HI/OVER” turns ON.

When the weight value ＜ LO limit, the signal output “LO/UNDER” turns ON.

# 7. OPERATION SETTING

## ■ Digital filter

The A/D-converted data is moved and averaged to suppress the instability of the indicated value by this characteristic. The number of moving averages is selectable in the range of 0 - 256. With an increasing number, the instability of the indicated value can be suppressed, but the response to input deteriorates.

Alternatives : ［OFF］［2 times］［4 times］［8 times］［16 times］［32 times］［64 times］［128 times］［256 times］

## ■ Analog filter

The input signal from the strain gauge sensor is filtered to cancel unnecessary noise components by this low-pass filter.
The cutoff frequency is selectable in the range of 2Hz - 8Hz. With an increasing cutoff frequency, the response accelerates, but noise components may also be displayed.

Alternatives : ［2Hz］［4Hz］［6Hz］［8Hz］

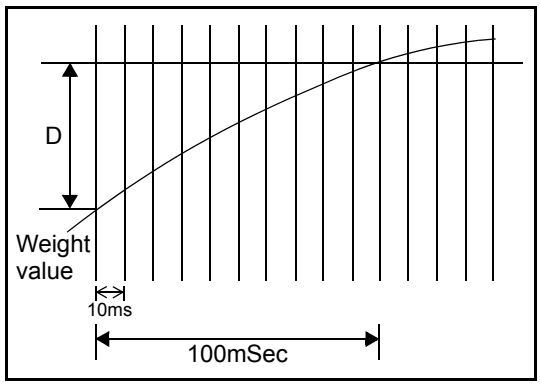
## ■ Motion detect period/ Motion detect range

Set the parameter to detect stability.
When the width of change in weight value falls below the preset range × minimum scale division, and the state continues for the preset time or more, the weight value is regarded as stable, and the stable status turns ON.

MD (PERIOD) : 0.0 to 9.9（sec.）
MD(RANGE) : 00 to 99（CNT）

"D" in the right picture and the range are compared at each time of A/D conversion, and when the preset range × minimum scale division is exceeded, the stable status is turned OFF.
"STAB" is displayed at the upper part of the unit display section.
The output signal "STAB" turns ON at stable-time.

* "D" is the difference between the present weight value and the prior weight value 100ms.




## ■ Display frequency

Set the frequency of rewriting the display.
The frequency can be set in the range of 1 to 10 times/sec. The internal operation speed does not change.

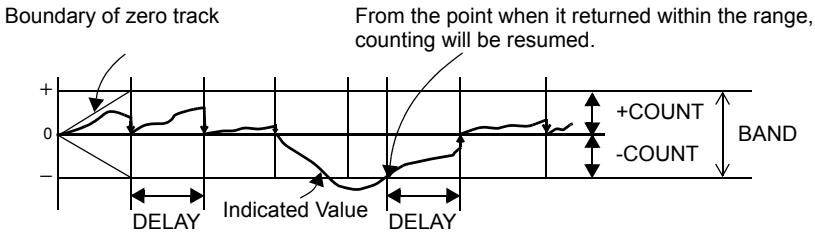
Setting range : 1 to 10（times）

## ■ Zero tracking period/ Zero tracking range

Slow changes in zero point due to drifting are automatically tracked and compensated by this function.

ZT (PERIOD)：0.0 to 9.9（sec.）
ZT (RANGE)： 00 to 99（CNT）

- Zero tracking automatically takes the zero point at the preset intervals when the amount of movement of the zero point is less than the preset range × minimum scale division.
- The period (tracking delay) can be set in the range of 0.1 to 9.9 sec., and the range (tracking band) can be set in the range of 00 to 99. If the set value is 02, two scale divisions will result. Also, if the period is set at 0.0 sec. and the range at 00, zero tracking does not function.




**Notice**

Since zero tracking should function from the zero point of gross, it does not function if the indicated value has already exceeded the tracking band. Take the zero point again by digital zero or zero calibration.

## ■ Contrast adjustment

Adjust the contrast of the touch panel display.

Adjust with the Brightly / Darkly key.

CONTRAST： ［Brightly］←→［Darkly］

## ■ Indicate color

The indicated value display color can be changed.
By setting Comp.(Comparison Result), the indicated value display color changes following the comparison status.

Alternatives： ［Yellow］ ［Green］ ［Blue］ ［Comp.］

【When Comparison mode is “HI-LO COMP”】

| | |
|---|---|
| OK | Green |
| HI, LO | Yellow |
| HH, LL | Red |

【When Comparison mode is “DIS.-O/U”】

| | |
|---|---|
| Normal | Blue |
| OVER, UNDER | Red |

【When Comparison mode is “DIS.-H/L”】

| | |
|---|---|
| Normal | Blue |
| HI, LO | Red |

## ■ Backlight lighting time

When no key is operated for the preset time (min.), the backlight is turned OFF by this function. The backlight is turned ON by panel touch.
This function does not work when 00 is set. (Always lighting)

Setting range： 0 to 99（min.）

## ■ Display table selection

Select the display of set values at the bottom of the weight display screen from three combinations. The combinations vary with comparison modes.

Alternatives： ［F, SP1-3］ ［F, SP3, H, L］ ［F, SP3, T, Z］
（* When “DIS.-H/L” is selected）

### Explanation of combination in each comparison mode

【For HI/LO limit comparison (when “HI-LO COMP” is selected)】

- ・HH, H, L, LL （HI-HI limit, HI limit, LO limit, LO-LO limit）
- ・H, L, T, Z （HI limit, LO limit, Preset TARE, NEAR ZERO）
- ・HH, LL, T, Z （HI-HI limit, LO-LO limit, Preset TARE, NEAR ZERO）

【For final discharge – overweight/underweight comparison (when “DIS.-O/U” is selected)】

- ・F, SP1-3 （FINAL weight, SP1, SP2, SPS）
- ・F, SP3, O, U （FINAL weight, SPS, Overweight, Under weight）
- ・F, SP3, T, Z （FINAL weight, SPS, Preset TARE, NEAR ZERO）

【For final discharge – high/low limit comparison (when “DIS.-H/L” is selected)】

- ・F, SP1-3 （FINAL weight, SP1, SP2, SPS）
- ・F, SP3, H, L （FINAL weight, SPS, HI limit, LO limit）
- ・F, SP3, T, Z （FINAL weight, SPS, Preset TARE, NEAR ZERO）

Abbreviations

| | | | |
|---|---|---|---|
| HH..... HI-HI limit | H.....HI limit | L .....LO limit | LL .....LO-LO limit |
| T ..... Preset TARE | Z ..... NEAR ZERO | O.....Over weight | U .....Under weight |
| F .....FINAL weight | SP1 .....SP1 | SP2 ..... SP2 | SP3.....SPS |

## ■ HI/LO limit output selection

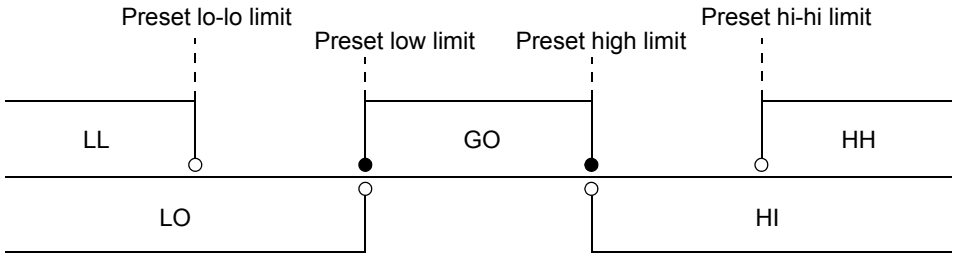
Select the method of comparison output in the HI/LO limit comparison mode.

Alternatives : ［NORMAL］ ［COMPARATOR］

### ☐ Explanation of each alternative

［NORMAL］

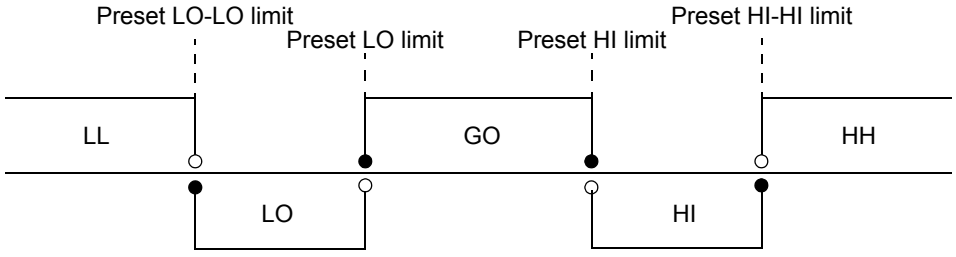
| Signal name | Condition |
|---|---|
| HH | ON when the preset HI-HI limit ＜ weight value |
| HI | ON when the preset high limit ＜ weight value |
| GO | ON when HH, HI, LO and LL are all OFF |
| LO | ON when the weight value ＜ preset low limit |
| LL | ON when the weight value ＜ preset LO-LO limit |




● ……This value is included.
○ ……This value is not included.

［COMPARATOR］

| Signal name | Condition |
|---|---|
| HH | ON when the preset HI-HI limit ＜ weight value |
| HI | ON when the preset HI limit ＜ weight value ≦ preset HI-HI limit |
| GO | ON when the preset LO limit ≦ weight value ≦ preset HI limit |
| LO | ON when the preset LO-LO limit ≦ weight value ＜ preset LO limit |
| LL | ON when the weight value ＜ preset LO-LO limit |




● ……This value is included.
○ ……This value is not included.

## ■ LOCK1/LOCK2

This function protects set values and calibration from being changed by mistake.

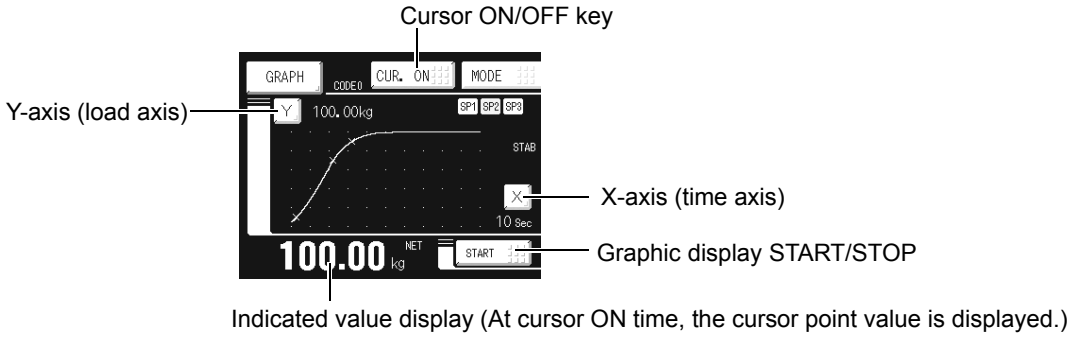
LOCK1 : ［OFF］ ［ON］
LOCK2 : ［OFF］ ［ON］

※Please refer to "21. SETTING ITEM LIST" on page 62 for the setting that LOCK is done by LOCK1 and LOCK2.

# 8. GRAPH SETTING

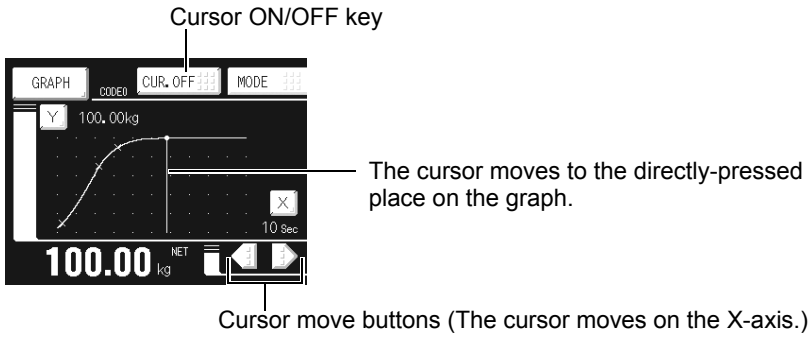
## ☐ Graphic display screen

Graph is updated while operating on the ordinary display screen (a comparison, a hold, graph).




When the cursor display is on and when the setting screen is open, the graph is not upgraded.

## ☐ Cursor display screen

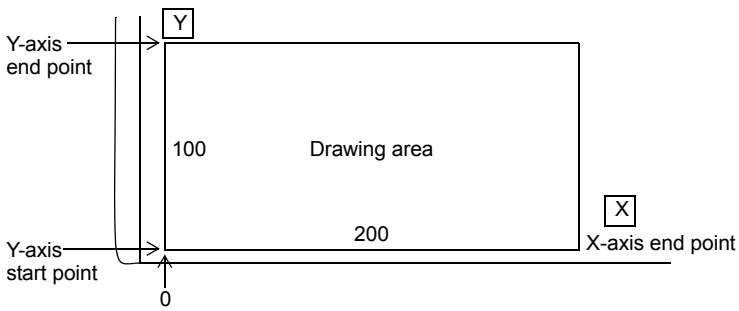



## ☐ X-axis

"X-axis" is time axis setting. One screen is drawn between the instant of inputting the start and the instant of the time set by the X-axis end point.
The number of drawing points is 200, and drawing is performed with the representative value at each of the set time divided by the number of drawing points.

## ☐ Y-axis

"Y-axis" is load axis setting. Drawing is performed from the value set by the Y-axis start point to the value set by the Y-axis end point. (The number of drawing points is 100.)



## ■ Graphic mode

Select the method of drawing.

Alternatives : ［CONTINUITY］ ［SINGLE］ ［LEVEL］

### ☐ Explanation of each alternative

［CONTINUITY］ Drawing is started by the START key, and drawing is repeated until the STOP key is input.

［SINGLE］ Drawing is started by the START key, and only one screen is drawn.

［LEVEL］ Drawing is started when the drawing weight exceeds the trigger level, or the START key, and only one screen is drawn.

In drawing in the discharge mode, an " × " mark is drawn when the net weight exceeds the following:

［Final weight – SP1］ ［Final weight – SP2］ ［Final weight - CPS］

## ■ Trigger level

Set the graph drawing start level (trigger level) if [LEVEL] has been selected by graphic mode selection.

Setting range : 00000 to 99999

## ■ X-axis (time) end point

Set the time to display one screen.The setting range is from 2 sec. to 98 sec. (at intervals of 2 sec.) The X-axis (time) end point can also be set from the graph screen.

Setting range : 2 to 98（sec.）

## ■ Y-axis (load) start point

Set the graph drawing start point.（± 00000 to ± 99999）

Setting range : ± 00000 to ± 99999

## ■ Y-axis (load) end point

Set the graph drawing end point.The Y-axis (load) end point can also be set from the graph screen.
Note) The start point should be smaller than the end point.

Setting range : ± 00000 to ± 99999

## ■ Drawing weight selection

Select the weight for drawing.

Alternatives : ［GROSS］ ［NET］

# 9. SYSTEM

## ■ Initialization

All the set values of each setting item are initialized to their factory defaults.
Select the setting item you want to initialize.

Alternatives : ［CODE］ ［COMP.］ ［OPR.］ ［CAL.］ ［etc.］

* If LOCK1/LOCK2 of setting item which you intend to initialize is ON, the initialization cannot be executed.

## ■ Password

This setting is for maintenance and inspection. Do not operate.

## ■ Language

The display language is selectable between Japanese and English.

JPN : JAPANESE
ENG : ENGLISH

## ■ 〔GROSS/NET〕key

Set OFF/ON of the key operation of GROSS/NET key.

Alternatives : ［OFF］ ［ON］

## ■ 〔DZ〕key

Set OFF/ON of the key operation of DZ key.

Alternatives : ［OFF］ ［ON］

## ■ 〔TARE〕key

Set OFF/ON of the key operation of TARE ON key.

Alternatives : ［OFF］ ［ON］

## ■ 〔Cursor ON/OFF〕key

Set OFF/ON of the key operation of CUR. ON / CUR. OFF key.

Alternatives : ［OFF］ ［ON］

## ■ 〔START/STOP〕key

Set OFF/ON of the key operation of START / STOP key.

Alternatives : ［OFF］ ［ON］

## ■ B4 terminal function selection

Selection of the KEY_LOCK terminal function from the CODE2 terminal function by the B4 Function Selection setting makes the following effective.

KEY_LOCK : When the terminal is short-circuited, all key operations are disabled.


When KEY_LOCK terminal function is selected, measurement code that can be specified from the outside can be specified by CODE0 terminal,CODE1 terminal.
It is limited to CODE number 0 to 3.

# 10. SEQUENCE SETTING

Operation is performed by following the sequence that weighing is started by inputting the ON edge to the start signal (external input/output connector pin B11) of the F600A, and weighing is finished by the completion signal.
This is valid only in the discharge mode.

Please refer to "11. TIMING CHART" on page 37 for each operation timing.

## ■ Control mode

Select sequence mode or simple comparison mode.

Alternatives : ［SIMPLE COMP.］ ［SEQUENCE］

## ■ Adjust feeding/ Adjust feeding time

The setting is valid in the sequence mode.

ADJUST FEEDING : ［OFF］ ［ON］
ADJ.FEEDING TIME : 0.00 to 9.99（sec.）

### What is “Adjust feeding”?

If the Net ＜ Final weight – Under weight at the completion signal ON timing (when the judging time has elapsed after the SP3 signal is turned OFF in the example on P.39), the completion signal is not turned ON, but the SP3 signal is turned ON for the adjust feeding time.
Adjust feeding is valid only in the “Final discharge – Over weight/Under weight comparison mode”.)

## ■ Near zero confirmation at start time

The setting is valid in the sequence mode.

Alternatives : ［OFF］ ［ON］

With the near zero confirmation at start time setting “ON,” When the start signal is input, if the near zero signal is OFF, the feeding gate signal is not turned ON, but a sequence error results. (Sequence error 4)

## ■ Weight confirmation at start time

The setting is valid in the sequence mode.

Alternatives : ［OFF］ ［ON］

When the start signal is input, if

(1) the net ≧ final weight – SP1, or

(2) the final weight – CPS≦0,

the feeding gate signal (SP1, SP2, or SP3) is not turned ON, but a sequence error results. (Sequence error 5)

((1) is applicable only when the “weight confirmation at start time” setting is ON.)

## ■ AZ times

The setting is valid in the sequence mode.

Setting range : 00 to 99 times

When the start signal is input, tare subtraction is performed at intervals of these times.

## ■ Judging times

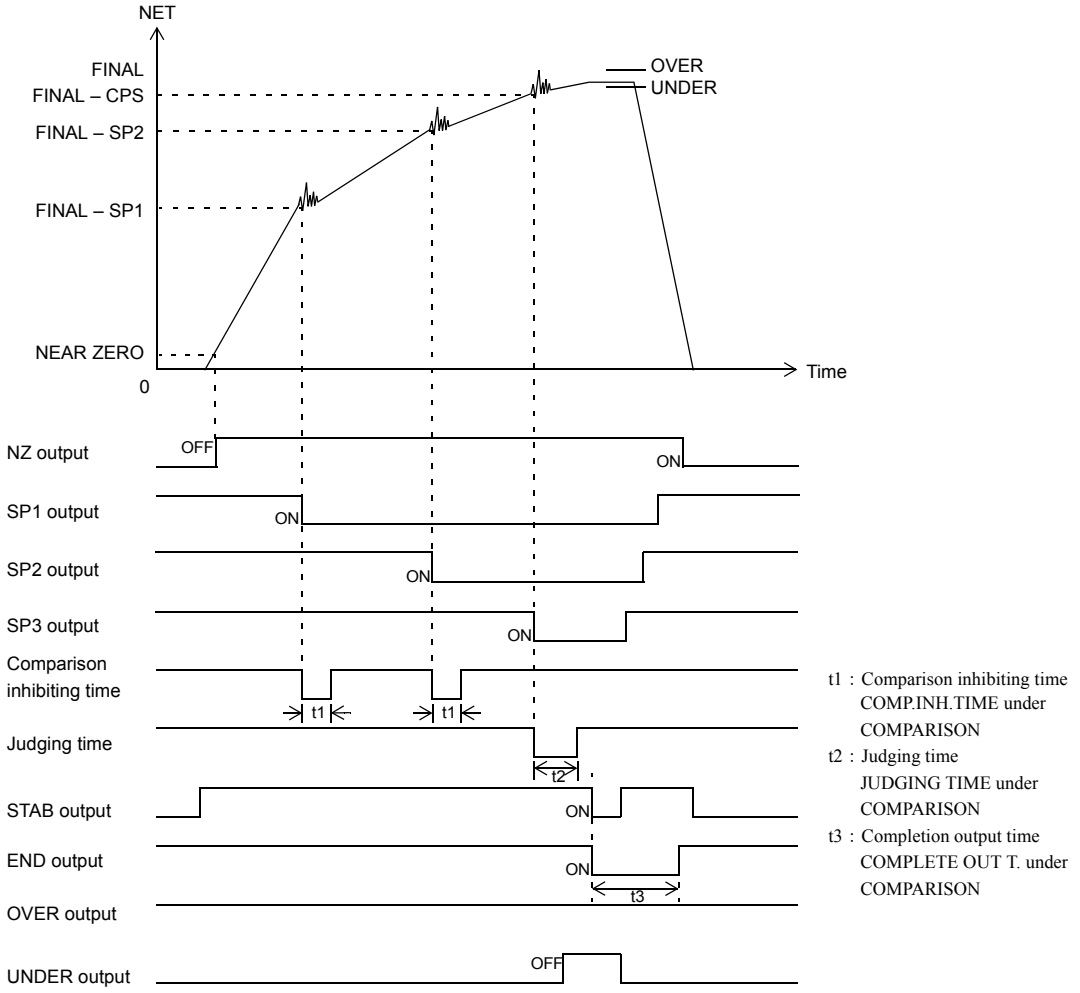
The setting is valid in the sequence mode.

Setting range : 00 to 99 times

When the completion signal is turned ON, Over weight/Under weight comparisons are made at intervals of these times.

# 11.TIMING CHART

## 11-1. Feed Weighing (In The Simple Comparison Mode)



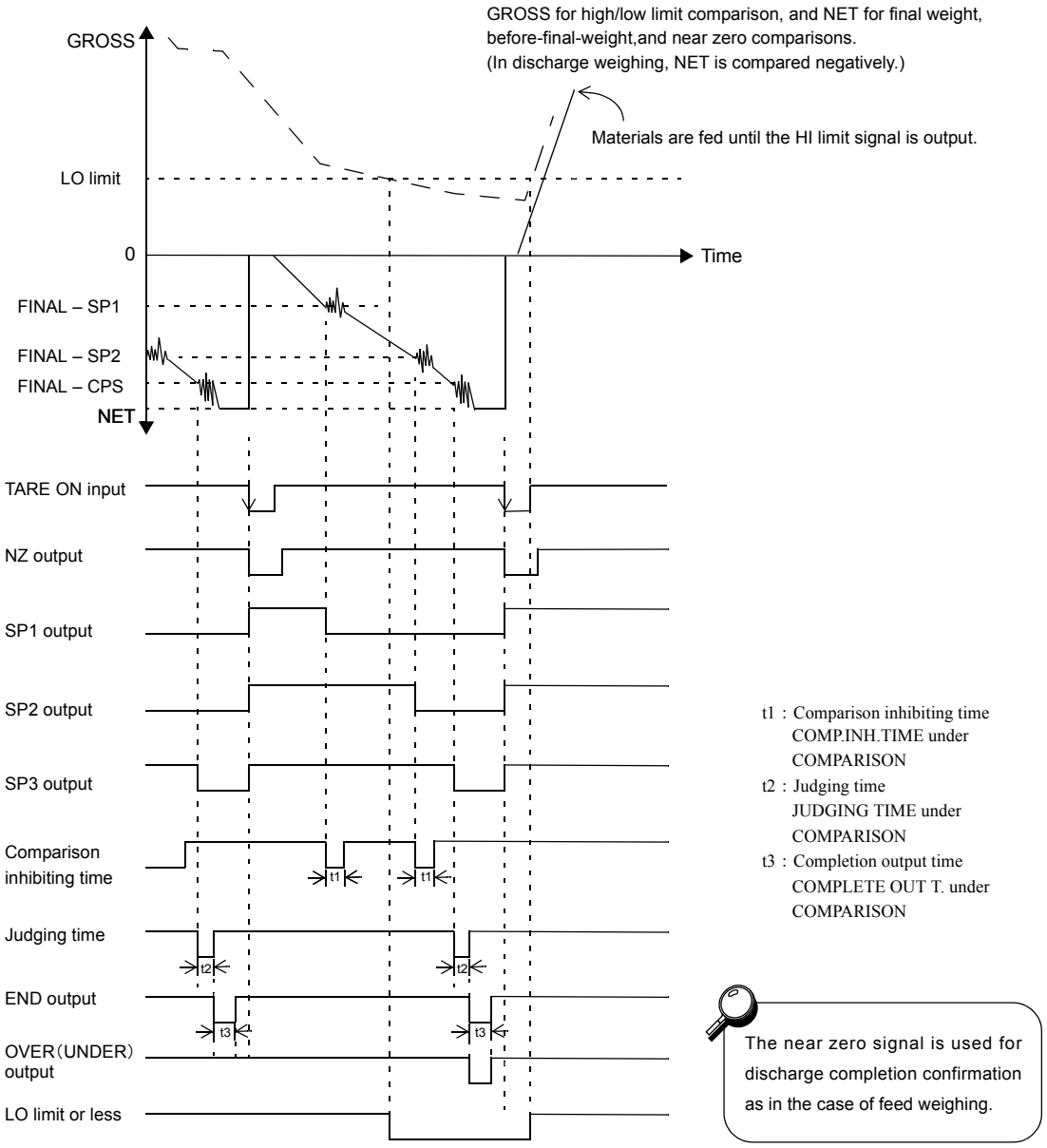

The overweight/underweight comparison timing depends on the OVER/UNDER COMP. setting under COMPARISON. (It is set at “REGULARLY” in the illustration.)
The END signal output timing depends on the COMPLETE SIG.OUT setting under COMPARISON.

### Conditional expression

- NZ output ON when the weight value ≦ preset near zero value
- SP1 output ON when the net ≧ preset final weight value – preset SP1 value
- SP2 output ON when the net ≧ preset final weight value – preset SP2 value
- SP3 output ON when the net ≧ preset final weight value – preset CPS value
- UNDER output ON when the net < preset final weight value – preset underweight value
- OVER output ON when the net > preset final weight value + preset overweight value

Select the weight value for near zero comparison from GROSS or NET under COMPARISON setting menu.

## 11-2. Discharge Weighing (In The Simple Comparison Mode)




The overweight/underweight comparison timing depends on the OVER/UNDER COMP. setting under COMPARISON. (It is set at "COMPLETE SIGNAL ON" in the illustration.)
The completion signal output timing depends on the COMPLETE SIG. OUT setting under COMPARISON.

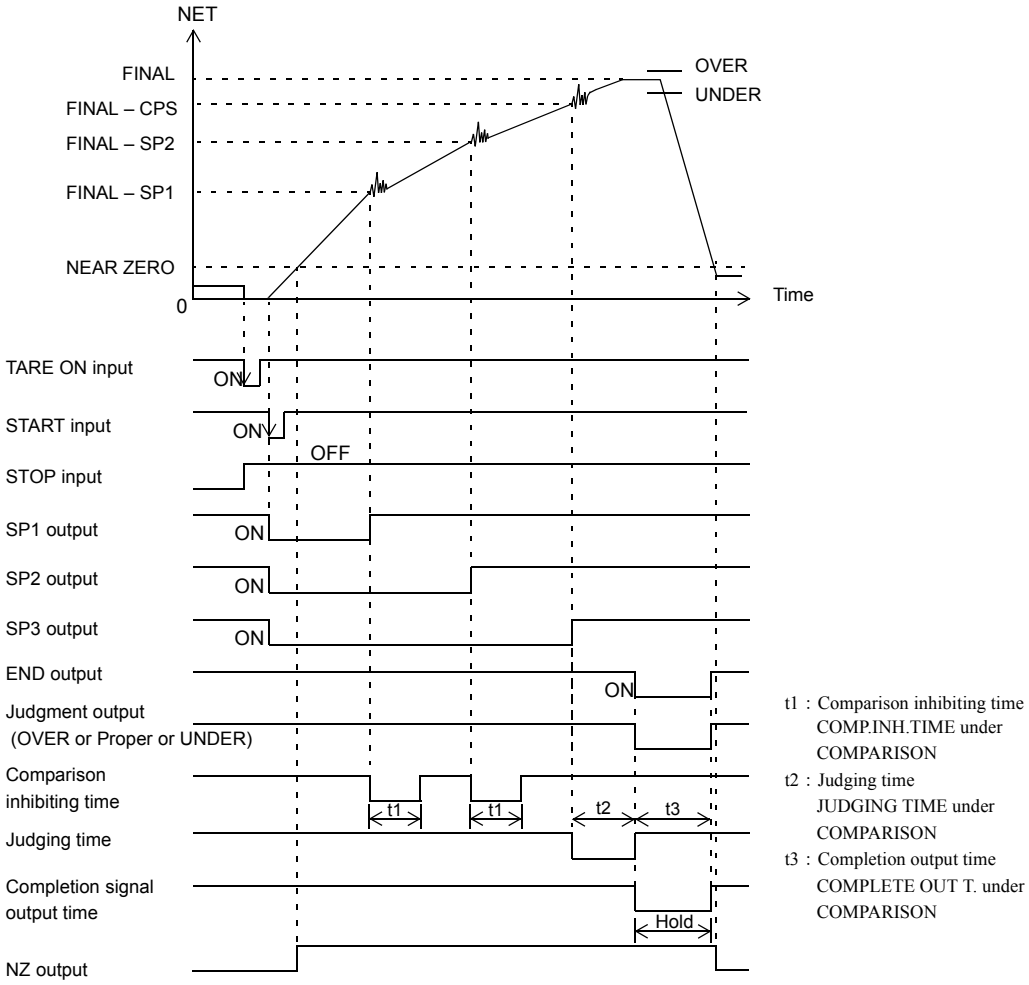
### Conditional expression

- NZ output ON when the weight value ≦ preset near zero value
- SP1 output ON when the net ≧ preset final weight value – preset SP1 value
- SP2 output ON when the net ≧ preset final weight value – preset SP2 value
- SP3 output ON when the net ≧ preset final weight value – preset CPS value
- UNDER output ON when the net < preset final weight value – preset underweight value
- OVER output ON when the net > preset final weight value + preset overweight value

Select the weight value for near zero comparison from GROSS or NET under COMPARISON setting menu.

# 11-3. Sequence Control

## 11-3-1. Normal sequence




The completion signal output timing depends on the COMPLETE SIG.OUT setting under COMPARISON.

The overweight/underweight comparison timing is such that the OVER/UNDER COMP. setting under COMPARISON is ignored, but comparisons are made when the completion output is ON, and the weight value is held.

### Conditional expression

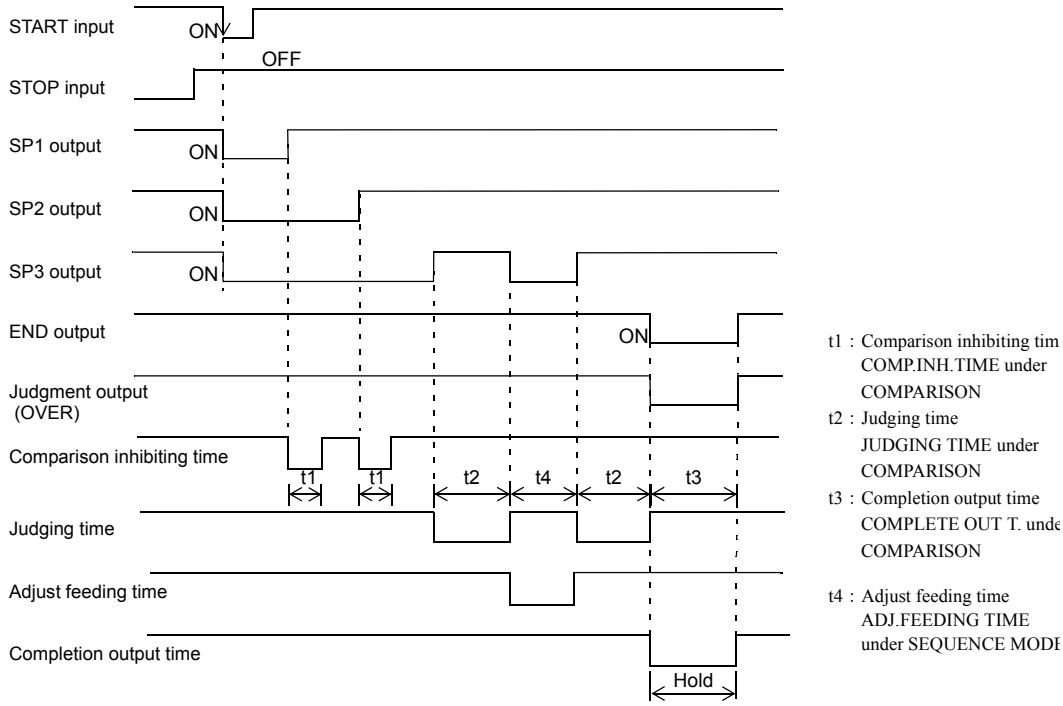
- NZ output ON when the weight value ≦ preset near zero value

* The large/medium/small feeding gate signal is turned ON at the ON edge (OFF → ON) of the START signal.

- SP1 output OFF when the net weight ≧ preset final weight value – preset SP1 value
- SP2 output OFF when the net weight ≧ preset final weight value - preset SP2 value
- SP3 output OFF when the net weight ≧ preset final weight value – preset CPS value
- UNDER output ON when the net weight < preset final weight value – preset underweight value
- OVER output ON when the net weight > preset final weight value + preset overweight value

Select the weight value for near zero comparison from GROSS or NET by NEAR ZERO COMP. under COMPARISON. The sequence mode is valid only in the final discharge mode.

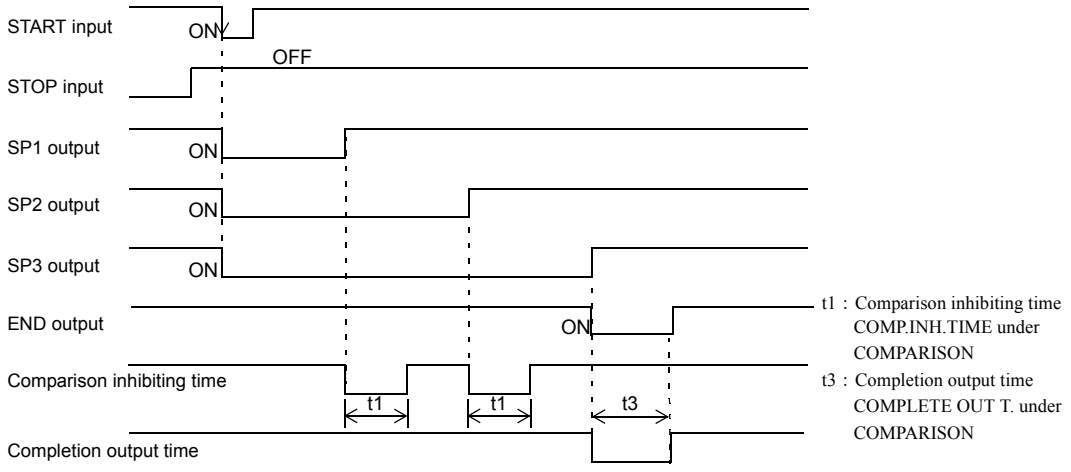
## 11-3-2. Sequence when the adjust feeding is ON




The completion signal output timing depends on the COMPLETE SIG.OUT setting under COMPARISON.

The overweight/underweight comparison timing is such that the OVER/UNDER COMP. setting under COMPARISON is ignored, but comparisons are made when the completion output is ON, and the weight value is held.

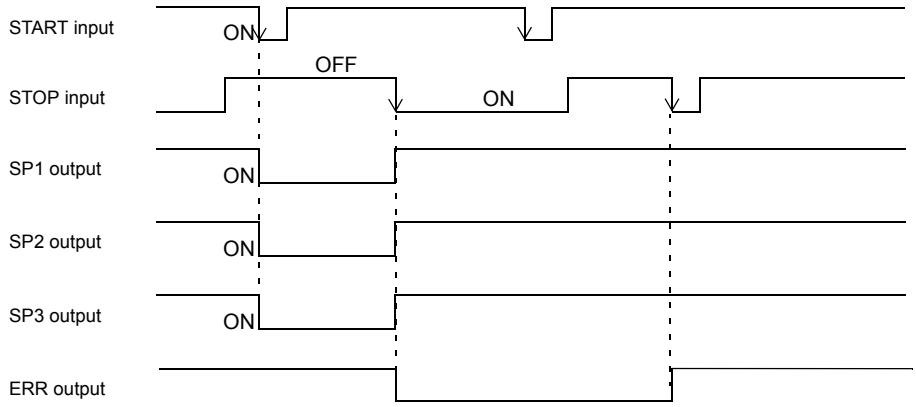
## 11-3-3. Sequence with no judgment




When the number of JUDGING TIMES under SEQUENCE MODE is 00, overweight/underweight judgment is not made.

The END signal output timing is such that the COMPLETE SIG.OUT setting is ignored, but it is output at the OFF edge (ON → OFF) of the final weight signal (SP3 signal).

## 11-3-4. About the stop signal



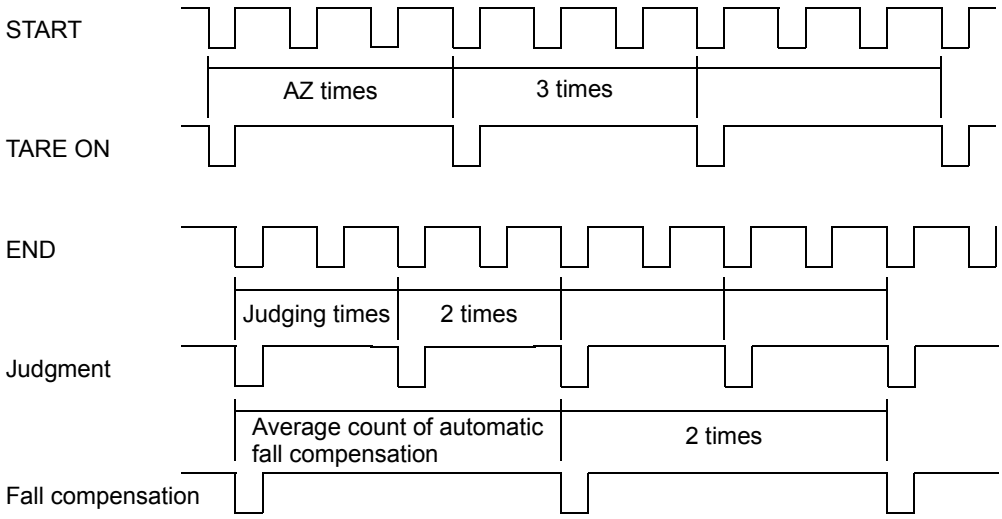

When the STOP signal is turned ON, all the signals of the SP1 output, SP2 output and SP3 output are turned OFF.

If the START signal is turned ON when the STOP signal is ON, a sequence error will result.

For resetting the sequence error, input the stop signal again.

## 11-3-5. Relationship between AZ times, judging times, and automatic fall compensation

**【Example: AZ times=3, JUDGING times=2, AVG.CNT of AFFC=2】**




When the number of AZ times is set at 01, tare subtraction is performed at each time when weighing is started.

When the number of AZ times is set at 02 to 99, tare subtraction is performed at the intervals of these times.

When the number of AZ times is set at 00, the AZ function is turned OFF.

When the number of judging times is set at 01, judgment is made at each time when weighing is finished.

When the number of judging times is set at 02 to 99, judgment is made at the intervals of these times.

When the number of judging times is set at 00, overweight/underweight comparisons are not made.

Since weighed values for automatic fall compensation are sampled at the time of judgment, the automatic fall compensation does not function when no judgment is made.

# 12. EXTERNAL INPUT/OUTPUT SIGNALS

## ■ External input signals

（1）CODE0 to CODE2 ＜ Level input ＞（B2, B3, B4）

Input signals to specify codes for weighing externally.

| CODE2 | CODE1 | CODE0 | Selected CODE |
|---|---|---|---|
| Open | Open | Open | 0 |
| Open | Open | Shorted | 1 |
| Open | Shorted | Open | 2 |
| Open | Shorted | Shorted | 3 |
| Shorted | Open | Open | 4 |
| Shorted | Open | Shorted | 5 |
| Shorted | Shorted | Open | 6 |
| Shorted | Shorted | Shorted | 7 |

※ CODE2 is also usable as a Key LOCK terminal.（See " ■ B4 terminal function selection" on page 34.）

（2）G/N（GROSS/NET）switching ＜ Edge input ＞（B5）

The weight value of the main unit and indicator is switched.

The ON edge (OFF → ON) of the external input will result in gross display (GROSS).

The OFF edge (ON → OFF) of the external input will result in net display (NET).

（3）D/Z（Digital zero）＜ Edge input ＞（B6）

The ON edge (OFF → ON) of the external input will zero the gross weight.

However, the range that can be zeroed is within the DZ regulation value. Out of this range, zero will not result, but “ZALM” will light.

（4）TARE ON（ Tare subtraction）＜ Edge input ＞（B7）

The ON edge (OFF → ON) of the external input will result in immediate tare subtraction to zero the net weight.

（5）TARE OFF（Tare subtraction reset）＜ Edge input ＞（B8）

The ON edge (OFF → ON) of the external input will reset the above tare subtraction. However, the tare setting is not cancelled.

（6）HOLD（ Hold）＜ Level input ＞（B9）

As long as the external input is ON, the weight value and comparison are held.

* “HOLD” lights during holding.

*This input terminal can be set to judgment input. It cannot be used for holding in the sequence mode and when over/under comparison is made by external judgment.

（7）JUDGE（Judgment） ＜ Level input ＞（B9）

This is valid when over/under comparison is set to external judgment input. （See page 23.）

* This input terminal can be set to HOLD.

（8）F/D（Charge/Discharge） ＜ Level input ＞（B10）

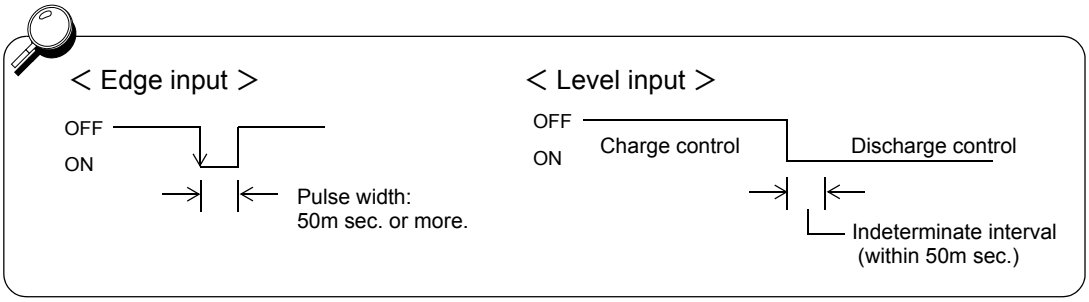
This is valid when charge/discharge selection is external.

OFF will result in charge control, and ON will result in discharge control.（See page 23.）

（9）START（Start） ＜ Edge input ＞

（10）STOP（Stop） ＜ Edge input, Level input ＞

These are valid when the control is in the sequence mode.
（See page 41.）




## ■ External output signal

（1）HH/SP1（Comparison output）（A2）

（2）HI/OVER（Comparison output）（A3）

（3）GO/SP2（Comparison output）（A4）

（4）LO/UNDER（Comparison output）（A5）

（5）LL/SP3（Comparison output）（A6）

Varies depending on the comparison mode.
（See page 25.）

（6）END（Completion）（A7）

This indicates measurement completion output, which is valid only in the “carving-out” mode.

（7）NZ（Near zero）（A8）

This is near zero comparison output.（See page 24.）

（8）STAB（Stable）（A9）

This turns ON when a stable.（See page 27.）

（9）ERR（Weight error or sequence error）（A10）

This turns ON when a weight error or sequence error occurs.

# 13. AUTOMATIC PRINT

The F600A can output an automatic print command to the printer or indicator connected to the SI/F. The automatic print output timing varies depending on the setting.

## 13-1. In HI/LO Limit Comparison

The command is output at the ON edge of the stable status when the near zero signal is OFF. If the automatic print is output, it can next be output after the near zero signal is once turned ON.

## 13-2. In The Discharge Mode; Simple Comparison Mode

The command is output at each ON edge of the completion signal. The value of the number of judging times is ignored.

## 13-3. In The Discharge Mode; Sequence Mode

The command is output at the ON edge of the completion signal at the intervals of judging times. When the number of judging times is 0, the automatic print is not output.

# 14. RS-232C INTERFACE

The RS-232C is an interface to read the indicated value and status of the F600A and to write parameters into the F600A.
This interface is convenient to process controls, totals, records, etc., by connecting the F600A to a computer, process controller, sequencer or the like.

## 14-1. Communication Specifications

### ☐ Specifications

| | | |
|---|---|---|
| Signal level: | Based on RS-232C | |
| Transmitting distance: | Approx.15m | |
| Transmitting method: | Asynchronous, Full duplex | |
| Transmitting speed: | 1200, 2400, 4800, 9600, 19200bps selectable | |
| Bit configuration: | Start bit | 1bit |
| | Character length | 7 or 8 bit selectable |
| | Stop bit | 1 or 2 bit selectable |
| | Parity | None, odd or even selectable |
| | Terminator | CR, CR+LF selectable |
| Code: | ASCII | |

## 14-2. RS-232C Interface Setting

Set the RS-232C communication conditions of the F600A.

### ■ Communication mode

Alternatives : ［HAND SH.］ ［CONTINUITY］ ［AT PRINT］

**HAND SH.**
Communications are carried out according to the commands from the host computer.
Reading of weight values, status and set values, writing of set values, and instructions of operations can be performed.

**CONTINUITY**
The displayed weight value and status are transmitted continuously.

**AT PRINT**
The displayed weight value and status are transmitted at the print timing.
For the print timing, see "13 AUTOMATIC PRINT" on page 44.

### ■ Baud rate

Alternatives : ［1200bps］［2400bps］［4800bps］［9600bps］［19200bps］

### ■ Character length

Alternatives : ［7bit］ ［8bit］

### ■ Parity bit

Alternatives : ［NONE］ ［ODD］ ［EVEN］

### ■ Stop bit

Alternatives : ［1bit］ ［2bit］

### ■ Terminator

Alternatives : ［CR］ ［CR+LF］

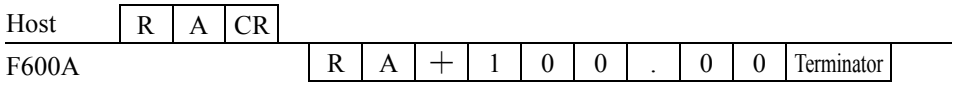
### ■ Flow control

Alternatives : ［OFF］ ［RTS/CTS］

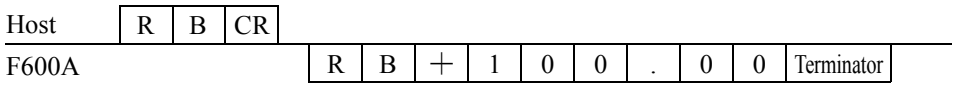
## 14-3. Communication Format

### 14-3-1. Handshake

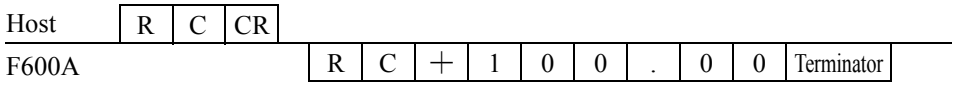
**・Gross read (sign, 5-digit weight, decimal place)**



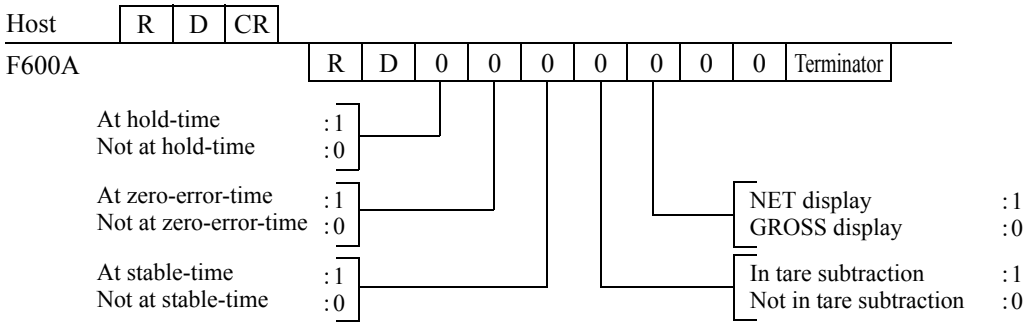

**・Net read (sign, 5-digit weight, decimal place)**



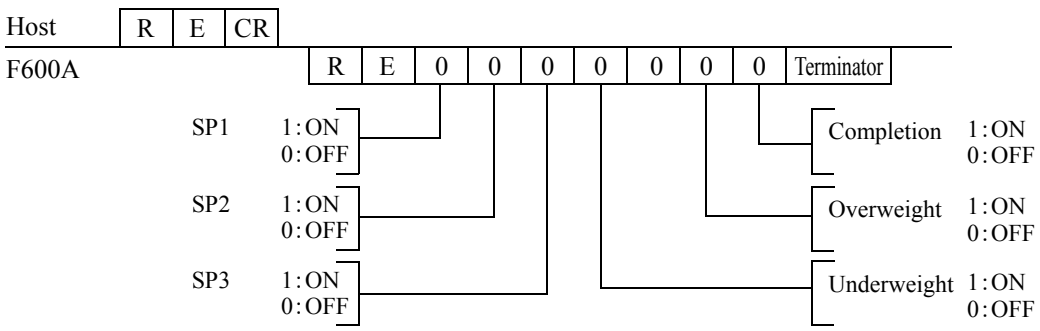

**・Tare read (sign, 5-digit weight, decimal place)**



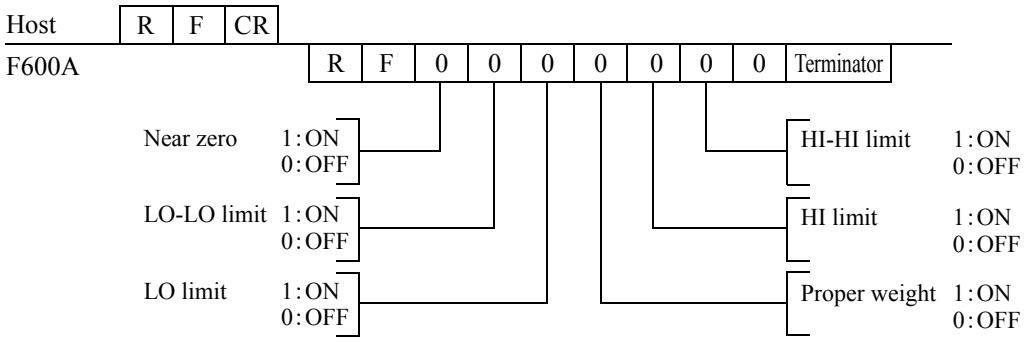

**・Status read (7-digit)**



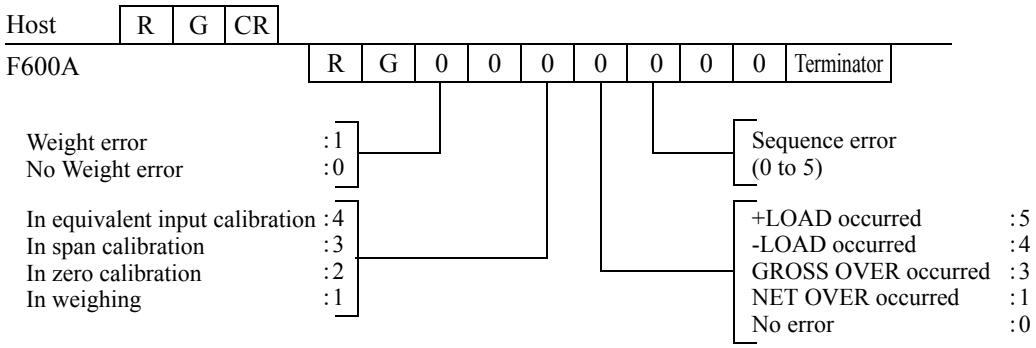

**・Status read (7-digit)**



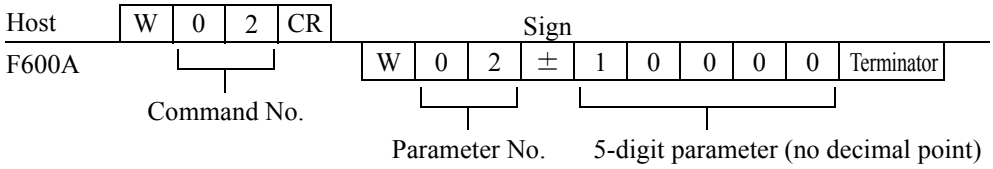
**・Status read (7-digit)**



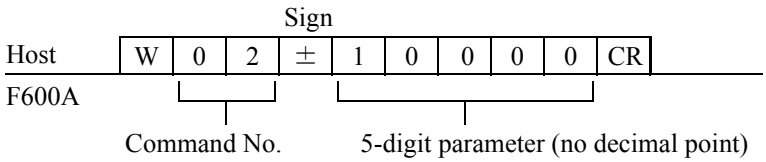

**・Status read (7-digit)**




**・Parameter read (example: High limit)**

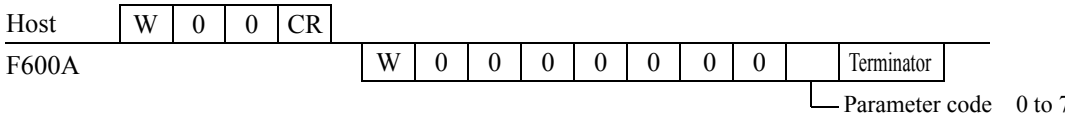



**・Parameter write (example: High limit)**

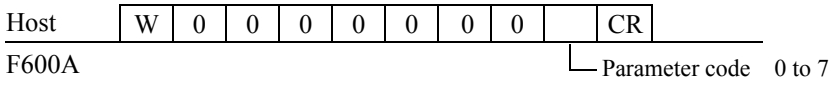



※ Please refer to "21 SETTING ITEM LIST" on page 62 for command No. and the number of set digits.

**・Parameter code read**



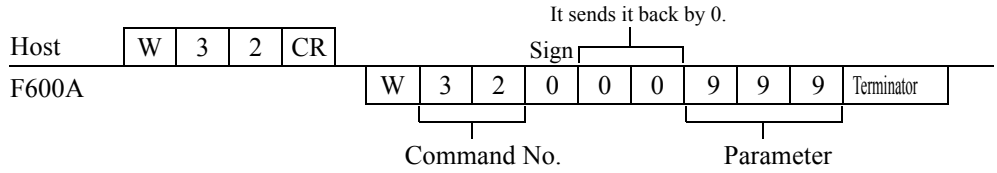

**・Parameter code write**



・Please refer to "21 SETTING ITEM LIST" on page 62 for command No. of parameter read(write) and parameter digit.

・When the digit is less than five digits, it treats by "0".

Example) Comparison prohibition time read




## ・Command

| | | | |
|---|---|---|---|
| ZERO CALIBRATION | C A CR | SPAN CALIBRATION | C B CR |
| GROSS SELECTION | C C CR | NET SELECTION | C D CR |
| TARE SUBTRACTION | C E CR | TARE RESET | C F CR |
| DIGITAL ZERO | C G CR | DIGITAL ZERO RESET | C H CR |
| PRINT INSTRUCTION | C I CR | EQUIV. CALIBRATION | C L CR |

* A print instruction is given to the equipment connected to SI/F as desired.

* See below.

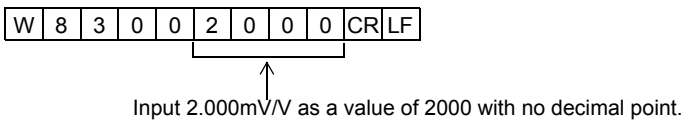
How to use the CL command (equivalent input calibration execution)

1) Correct values should previously be set to “equivalent input calibration” and “weight value”. Therefore, check the rated output and rated capacity of the load cell as in the case of equivalent input calibration by the touch panel.

   Example) It is assumed that the rated output and the rated capacity of the load cell are 2.000mV/V and 100.00kg, respectively.

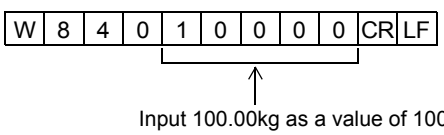
2) Set the rated input by using the command W83 (equivalent input calibration).

   Example) For 100.00kg (assuming that the decimal point is positioned as 0.00), input as follows:




3) Set the rated capacity by using the command W84 (weight value).

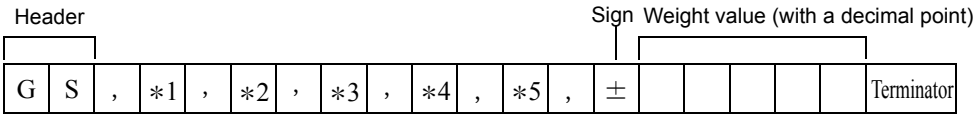
   Example) For 100.00kg (assuming that the decimal point is positioned as 0.00), input as follows:




4) Give the equivalent input calibration execution command (CL). This allows slope calculation from the currently registered “weight value” and “equivalent input calibration” value.

## 14-3-2. Continuous transmission/ Transmission at print-time

The formats of continuous transmission and transmission at print-time are common.
Parameters cannot be read or written.




### Header

When the gross weight is displayed, the header becomes “GS”, and the gross weight is transmitted.
When the net weight is displayed, the header becomes “NT”, and the net weight is transmitted.

*1 H ..... In holding
O ..... Weight error
S ..... Stable
M..... Unstable

*2 T..... Zero tracking ON
A ..... Zero tracking OFF

*3 For HI/LO limit comparison and final weight (DIS.-H/L)
F ..... Comparison OFF
G ..... HI and LO OFF
N ..... HI and LO ON
H ..... HI ON
L..... LO ON

For final weight (DIS.-O/U)
G ..... OVER and UNDER OFF
V ..... OVER ON
U ..... UNDER ON

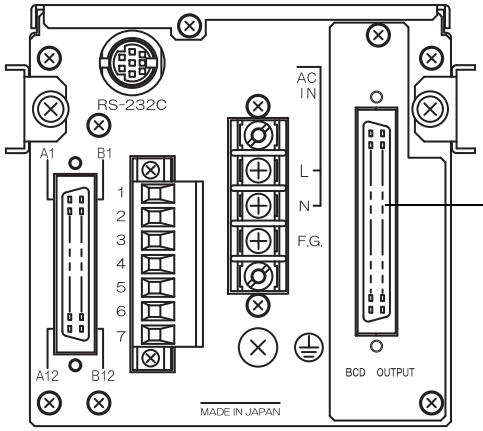
*4 For HI/LO limit comparison
F ..... Comparison OFF
G ..... HH and LL OFF
N ..... HH and LL ON
H ..... HH ON
L..... LL ON

For final discharge mode
E..... Completion ON
3 ..... SP3 ON
2 ..... SP2 ON
1 ..... SP1 ON
G ..... Completion, SP1, SP2, and SP3 OFF

*5 N ..... Near zero OFF
Z..... Near zero ON

# 15. BCD DATA OUTPUT (OPTION)

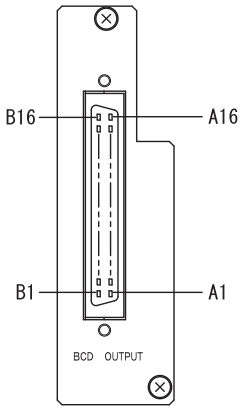
The BCD data output is an interface to extract the indicated value of the F600A as BCD data. This interface is convenient to process controls, totals, records, etc., by connecting the F600A to a computer, process controller, sequencer or the like.
The I/O and internal circuits are electrically insulated by photocoupler.




## 15-1. Connector Pin Assignment

32 pin

| No. | | Signal | No. | | Signal |
|---|---|---|---|---|---|
| A1 | * | COM | B1 | * | COM |
| A2 | OUT | 1 | B2 | OUT | 1000 |
| A3 | OUT | 2 | B3 | OUT | 2000 |
| A4 | OUT | 4 | B4 | OUT | 4000 |
| A5 | OUT | 8 | B5 | OUT | 8000 |
| A6 | OUT | 10 | B6 | OUT | 10000 |
| A7 | OUT | 20 | B7 | OUT | 20000 |
| A8 | OUT | 40 | B8 | OUT | 40000 |
| A9 | OUT | 80 | B9 | OUT | 80000 |
| A10 | OUT | 100 | B10 | OUT | Minus (Polarity) |
| A11 | OUT | 200 | B11 | OUT | OVER |
| A12 | OUT | 400 | B12 | OUT | STAB |
| A13 | OUT | 800 | B13 | OUT | STROBE |
| A14 | IN | BCD Data Hold | B14 | IN | Logic Switching |
| A15 | IN | NC | B15 | IN | NC |
| A16 | - | | B16 | - | |

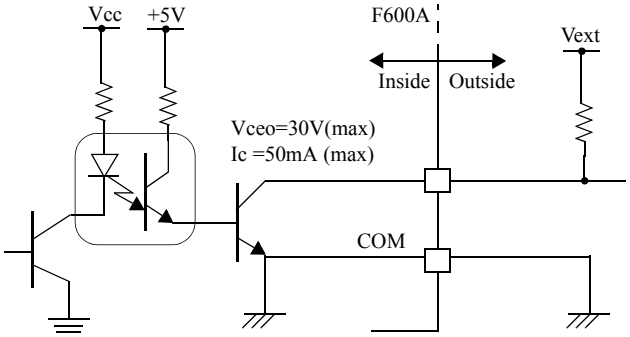



Compatible connector: FCN-361J032-AU (manufactured by FUJITSU COMPONENT or equivalent)
Connector cover: FCN-360C032-B (manufactured by FUJITSU COMPONENT or equivalent)

## 15-2. Equivalent Circuit

### ・Output

The signal output circuit is operated through a TTL open collector.




- Internal transistor status

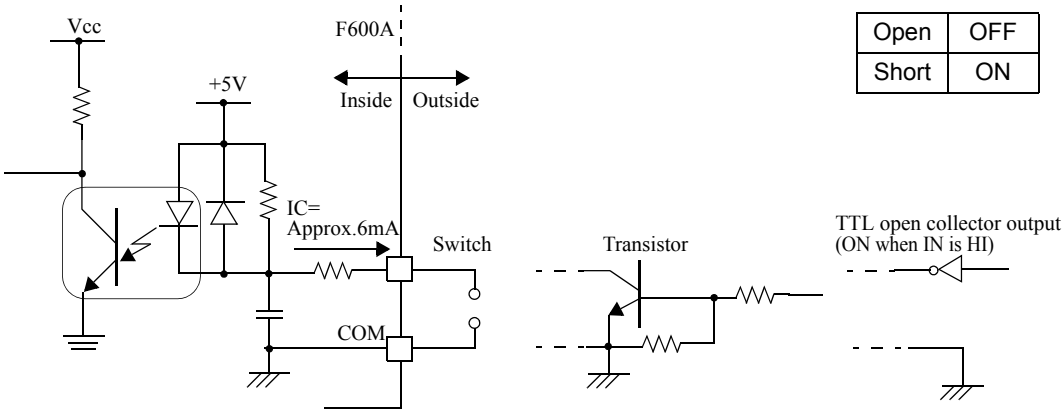
| Output data | Negative | Positive |
|---|---|---|
| 0 | OFF | ON |
| 1 | ON | OFF |

Through logic switching (B14)

- Output pin level

| Output data | Negative | Positive |
|---|---|---|
| 0 | H | L |
| 1 | L | H |

### ・Input




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

**Notice**

- Do not apply external voltage to the signal input circuit.
- The external element is required to withstand Ic=10mA.
- Leakage from the external element is required to be 30 $\mu$A or below.

## 15-3. Signal Input

### Logic Switching (B14)

The output signal logic is switched. (The strobe signal logic is also switched.)
If open, negative logic will result, and if shorted with COM, positive logic will result.

### BCD data hold (A14)

BCD data is held when shorted with COM.
No strobe pulse is output.

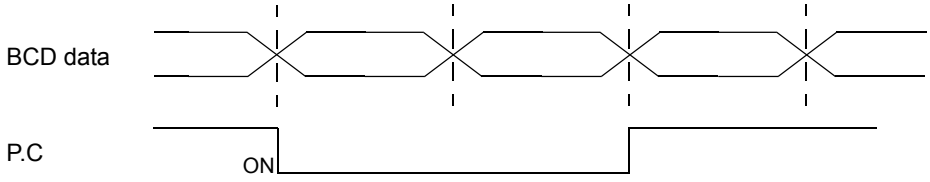
## 15-4. Signal Output Timing

### ・P.C

Note: P.C should also be acquired in synchronization with the strobe signal as in the case of the data signal.（See page 52.）

● HI/LO limit output

ON at stable-time, OFF at unstable-time.

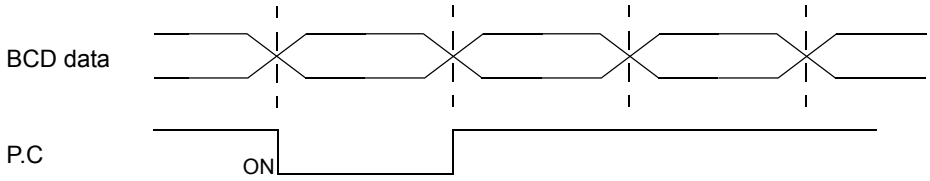



● In the discharge control mode; simple comparison mode

The signal is output at each ON edge of the completion signal. The value of the number of judging times is ignored.

● In the discharge control mode; sequence mode

The signal is output at the ON edge of the completion signal at the intervals of judging times.



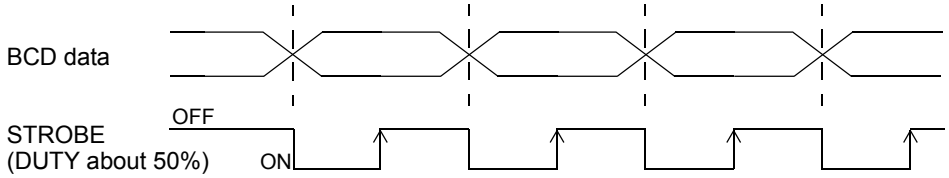

### ・OVER

The signal is output with +ADC OVER (+LOAD) or -ADC OVER (-LOAD) overflow (NET OVER or GROSS OVER).

### ・STROBE

Strobe pulses are output in synchronization with BCD data. For reading the data, use the pulse rising edge(ON → OFF). The BCD data update rate can be changed by setting.

Note: The logic on the software varies depending on the equipment on the receiving side.
(0 → 1, 0 → 1)




If the update rate is changed, the strobe pulse width is also changed proportionally.

## 15-5. BCD Data Output Setting

### ■ Data output rate

Alternatives : ［100 times］［50 times］［20 times］［10 times］［5 times］［2 times］

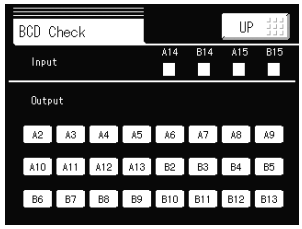
### ■ Output weight

Alternatives : ［INDICATE］［GROSS］［NET］

Select the weight value for BCD output. If “INDICATE” is selected, the weight indicated by the indicator is output.

## 15-6. Self Check

The BCD input/output status can be checked from bit to bit.
Each input turns green when its ON state is recognized.
Each output turns on when the corresponding button is pressed.



# 16. D/A CONVERTER (OPTION)

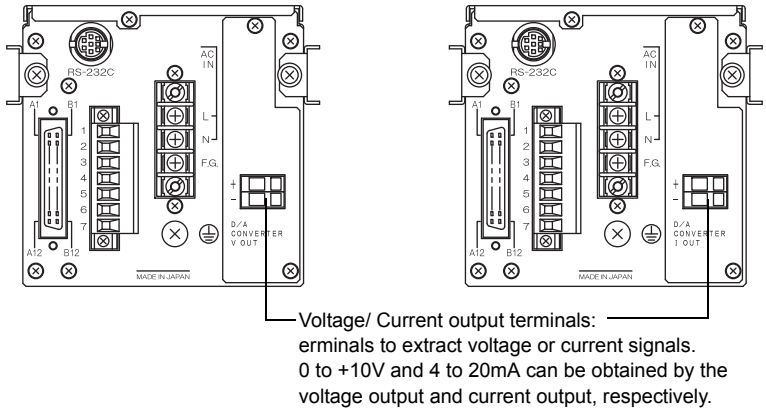
D/A converter is provided for obtaining analog output synchronized with the indicated value of the F600A.

The analog output ranges are 0 to +10V output or 4 to 20mA constant-current output.

By using the D/A zero setting and D/A full scale setting functions, analog output can be obtained between zero (0V, 4mA) and full scale (+10V, 20mA) with respect to the predetermined digital value.

The output circuit and the main unit circuit are isolated. The resolution is 1/10000 to 0 to +10V, and the conversion rate is 2000 times/sec. The output has an overrange of approx. ± 10%FS.

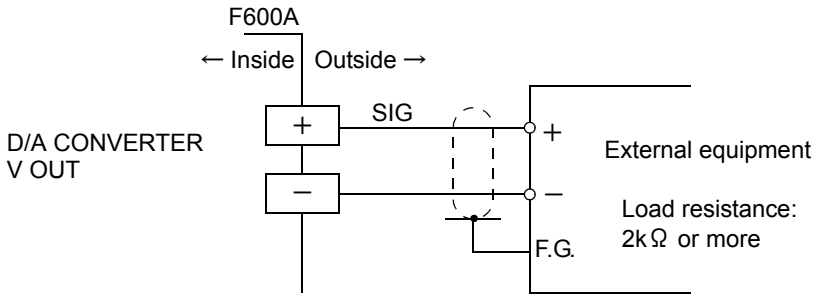
* Either voltage output or current output can be mounted.




### ・Taking voltage output signals

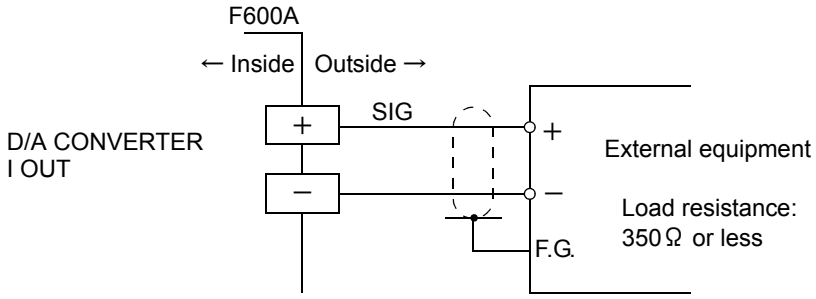
Connect external equipment (2kΩ or more load resistance) to + and - of the F600A.

For connection, see "Connection of the D/A Converter Options" page 55.




### ・Taking current output signals

Connect external equipment (350Ω or less load resistance) to + and - of the F600A.



**· Resolution**

The D/A converter has a resolution of 1/10000 to 0 to 10V (4 to 20mA).

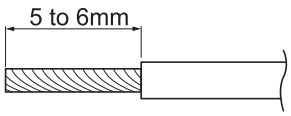
Notice

- The D/A converter is optional.
- Do not apply external voltage because it will break.
- Do not short-circuit the voltage output because a failure will occur. Also, connecting a capacitive load may cause oscillation.

## 16-1. Connection of the D/A Converter Options

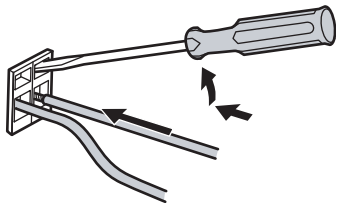
The terminal block for the D/A converter options is the cage clamp type. Connect according to the following procedures.
As for wire materials, use parallel 2-core cables, cabtyre cables, or the like.
Connect to the cage clamp type terminal block by using the attached miniscrewdriver.

1) Strip the casing 0.2in (6mm) on the cable to be connected. Twist the bare wire to fit the terminal hole.



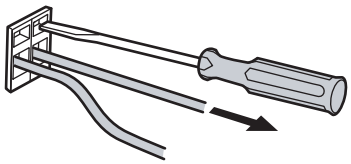

2) Insert the supplied screwdriver into the upper hole and lift upward.

3) Insert the twisted wires into the lower hole.



4) Pull the screwdriver out from the upper hole.

5) Make sure cable is clamped securely and does not come out with a slight tug.



Notice

- Cable can be from 24 to 14AWG (0.2 to 2.5mm$^2$).
- It is not necessary to solder the cable wires or to fix a solderless terminal.
- If several cables to be inserted to the same hole, twist those cable wires together and insert.

## 16-2. D/A Converter Setting

### ■ D/A output mode

Alternatives : ［GROSS］ ［NET］ ［ZERO SCALE］ ［FULL SCALE］

#### Explanation of each item

GROSS: Output is ganged with the gross.

NET: Output is ganged with the net.

ZERO SCALE: The output is fixed at zero output (0V or 4mA).

FULL SCALE: The output is fixed at full scale (10V or 20mA).

### ■ Zero output

Set the indicated value for outputting 4mA (0V).

Setting range : 0 ～ 99999

### ■ Full scale output

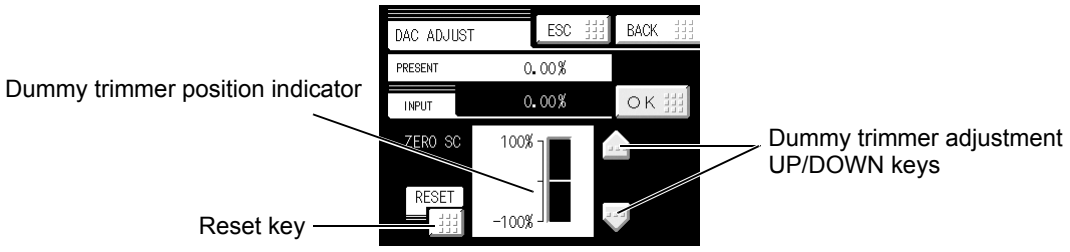
Set the indicated value for outputting 20mA (10V).

Setting range : 0 ～ 99999 (However, the preset zero output value should be smaller than the preset full scale value.)

#### How to adjust

Adjust the output with the dummy trimmer that appears on the adjustment screen after selecting each fixed output in the D/A output mode setting and pressing the [OK] key.

While monitoring the output value, finely adjust the output with the dummy trimmer the UP/DOWN keys, and press the [OK] key to confirm, so that the trimmer position is entered.




* Pressing the dummy trimmer the UP/DOWN keys continuously performs continuous operation.

* The trimmer adjusting ranges are as follows: voltage; ± 1.0V, and current; ± 1.6mA.

* The reset key resets the dummy trimmer position to the trimmer center point (0%).

# 17. ERROR MESSAGE

### “+LOAD” or “-LOAD”

Voltage exceeding the ADC input range is input.
Check to see if the output voltage of the loadcell exceeds the range, and check the cables for breaks.
This message is also displayed when wiring is incorrect or nothing is connected.

### “NET OVER”

The net weight value exceeds the “NET OVER” set value. Check the “NET OVER” set value.

### “GROSS OVER”

The gross weight exceeds the “GROSS OVER” set value. Check the “GROSS OVER” set value.

### “GRAPH ERR”

［Cause］
The set value of the “Y-axis (load) start point” is larger than the set value of the “Y-axis (load) end point”.

［Remedy］
Set again so that the “Y-axis (load) start point” becomes smaller than the “Y-axis (load) end point”.

### “LOCK IS ON”

［Cause］
Key operation is locked.

［Remedy］
Please make the key operation "ON" referring to following instructions.
" ■ LOCK1/LOCK2" on page 30, " ■ 〔GROSS/NET〕 key" on page 33, " ■ 〔DZ〕 key" on page 33, " ■ 〔TARE〕key" on page 33, " ■ 〔Cursor ON/OFF〕key" on page 33, " ■ 〔START/STOP〕 key" on page 33.
Moreover, please turn OFF external KEY_LOCK input when KEY_LOCK of B4 Function Selection is set.

### “SEQ. ERR 1”

［Cause］
The stop signal is ON when the weighing start signal is turned ON.

［Remedy］
Turn the stop signal OFF.

### “SEQ. ERR 2”

［Cause］
The stop signal is turned ON during weighing in sequence control.

### “SEQ. ERR 4”

[Cause]

The near zero signal is OFF when weighing is started.
(On condition that it is set to confirm the near zero signal when weighing is started.)

[Remedy]

First, check the preset near zero value and near zero comparison target.
Next, check to see if:

1. A start was made in spite of incomplete discharge.
2. The start ON timing was too early.
3. Discharged items are jammed.

### “SEQ. ERR 5”

[Cause]

1. The SP1 output is ON when weighing is started.
   (On condition that it is set to confirm the weight value when weighing is started.)

2. Final weight – CPS ≦ 0.

[Remedy]

First, check the preset SP1 value, preset fall value, and preset final weight value.
Next, check to see if:

1. A start was made in spite of incomplete discharge.
2. The start ON timing was too early.
3. Discharged items are jammed.
4. Another code was selected.

**How to reset the sequence error**

The sequence error is reset by inputting the stop signal (OFF → ON).

# 18. SELF-CHECK

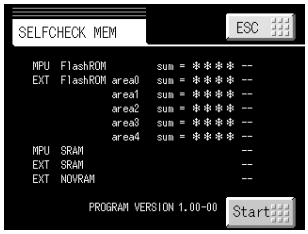
Self-check is performed when the setting is called.

## ■ Self-check DSP1

Check the display to see that it is free from color and display defects, etc. The screen changes from red, green, blue, horizontal stripes, to vertical stripes. Touching the screen restores the previous screen.

## ■ Self-check MEM

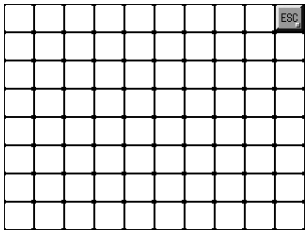
Check the memory to see that it is free from defects. The result is displayed in a moment after the Start key at the lower right of the screen is pressed. Or, check the version here.




## ■ Self-check KEY

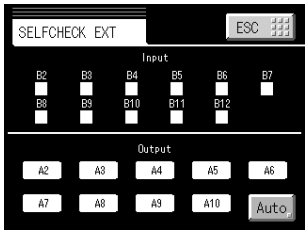
Check the touch panel to see that it is free from unrecognized parts.

One touched square turns yellow. Pressing the ESC key at the upper right of the screen restores the previous screen




## ■ Self-check EXT

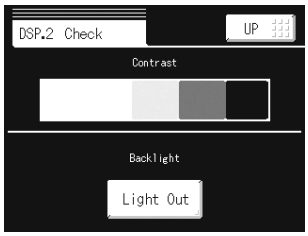
Check the operations of the external input/output signals.
Each output turns on when the corresponding key is pressed.
Each input turns green when its ON state is recognized.




## ■ Self-check DSP2

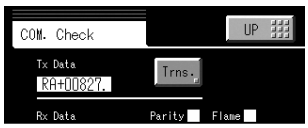
Check the contrast, backlight, and status indicator lamp. Check the contrast by pressing the five buttons from white to black.

The backlight goes out when the Light Out key is pressed, and after that, it recovers when the screen is touched.
The status indicator lamp lights in green and orange alternately.

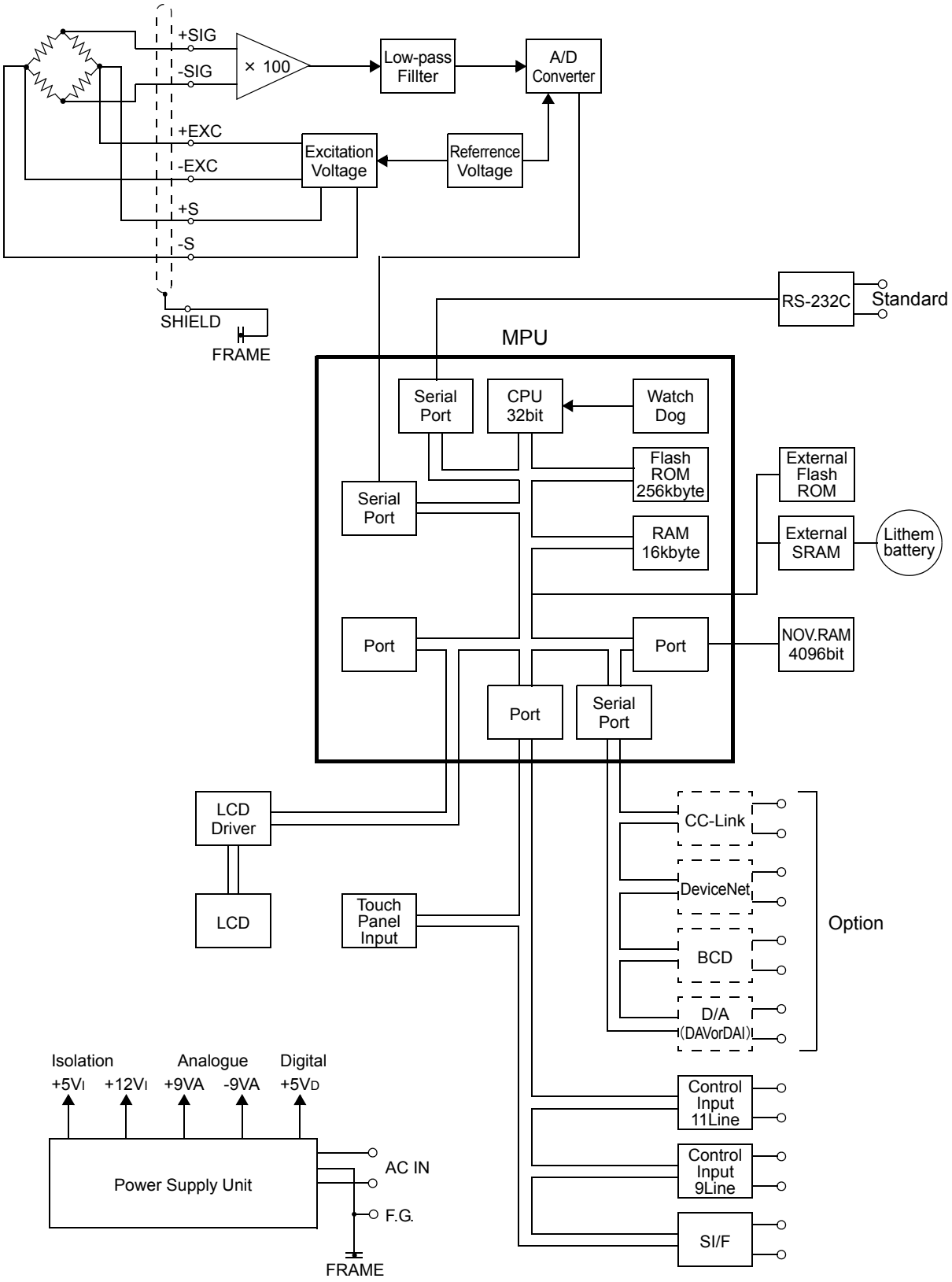



## ■ Self-check COM

The data displayed under "Transmit data" is sent by pressing the Trns. key.
Under "Receive data", externally transmitted data is displayed.

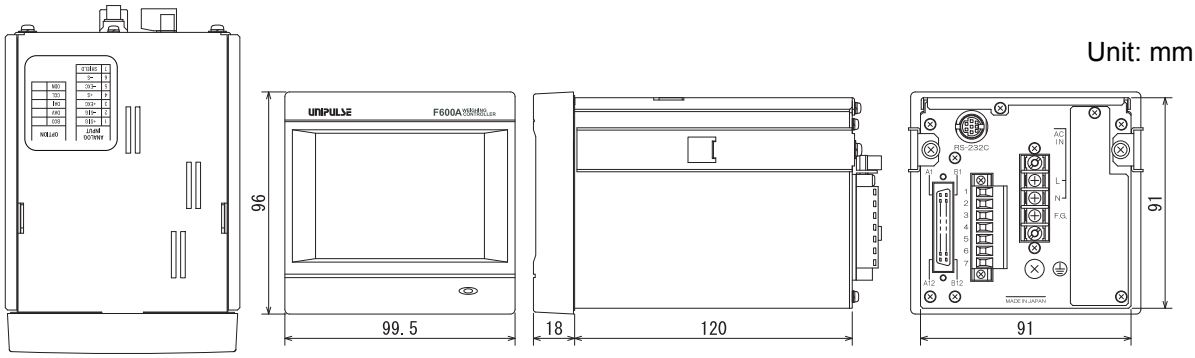


# 19. BLOCK DIAGRAM



# 20. DIMENSIONS

Unit: mm

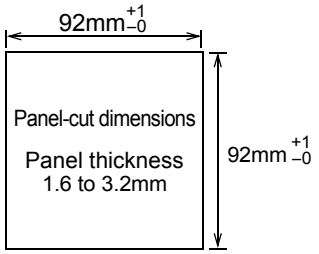



< Top > < Front > < Side > < Rear >

## 20-1. INSTALLATION IN A PANEL

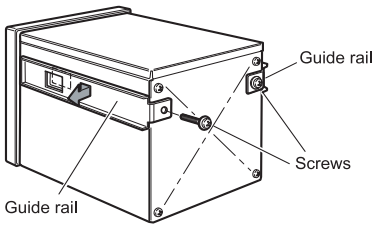
To install the F600A into a control panel, use the following procedure.

1. Make a hole in the panel according to the panel-cut dimensions.

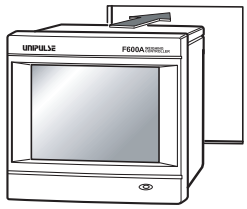



2. Remove the screws (two), and remove the guide rails from both sides.

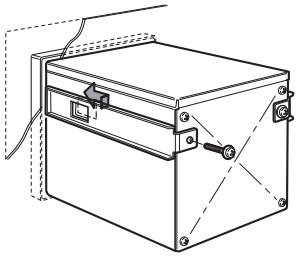
   * Do not use other screws than those installed to the F600A body




3. Fit in the F600A from the front of the panel.



4. Install from the rear the guide rails having been removed from both sides in Step 2, and fix them with the screws (two).



# 21. SETTING ITEM LIST

※ L1: Setting that LOCK is controlled by LOCK1
※ L2: Setting that LOCK is controlled by LOCK2
※ S: Saved in SRAM (Lithium-battery-backed-up)
※ N: Saved in NOV.RAM (Saved in non-volatile memory)

EACH CODE (Comparison mode: HI-LO COMP)

| PAGE | | Parameter | Initial value | L1 | L2 | S | N | Alternatives・Setting range | Communication Command No. |
|---|---|---|---|---|---|---|---|---|---|
| | | CODE | 0 | | | ○ | | 0 ～ 7 | 00(R/W) |
| 1 | 1 | HH | 000.00 | ○ | | ○ | | ± 00000 ～± 99999 | 01(R/W) |
| | 2 | HI | 000.00 | ○ | | ○ | | ± 00000 ～± 99999 | 02(R/W) |
| | 3 | LO | 000.00 | ○ | | ○ | | ± 00000 ～± 99999 | 03(R/W) |
| | 4 | LL | 000.00 | ○ | | ○ | | ± 00000 ～± 99999 | 04(R/W) |

EACH CODE (Comparison mode: DIS.-O/U)

| PAGE | | Parameter | Initial value | L1 | L2 | S | N | Alternatives・Setting range | Communication Command No. |
|---|---|---|---|---|---|---|---|---|---|
| | | CODE | 0 | | | ○ | | 0 ～ 7 | 00(R/W) |
| 1 | 1 | FINAL | 000.00 | ○ | | ○ | | 00000 ～ 99999 | 11(R/W) |
| | 2 | SP1 | 000.00 | ○ | | ○ | | 00000 ～ 99999 | 12(R/W) |
| | 3 | SP2 | 000.00 | ○ | | ○ | | 00000 ～ 99999 | 13(R/W) |
| | 4 | CPS | 00.00 | ○ | | ○ | | 0000 ～ 9999 | 14(R/W) |
| 2 | 5 | AFFC | 098.00 | | ○ | ○ | | 00000 ～ 99999 | 15(R/W) |
| | 6 | OVER | 0.00 | ○ | | ○ | | 000 ～ 999 | 16(R/W) |
| | 7 | UNDER | 0.00 | ○ | | ○ | | 000 ～ 999 | 17(R/W) |

EACH CODE (Comparison mode: DIS.-H/L)

| PAGE | | Parameter | Initial value | L1 | L2 | S | N | Alternatives・Setting range | Communication Command No. |
|---|---|---|---|---|---|---|---|---|---|
| | | CODE | 0 | | | ○ | | 0 ～ 7 | 00(R/W) |
| 1 | 1 | FINAL | 000.00 | ○ | | ○ | | 00000 ～ 99999 | 11(R/W) |
| | 2 | SP1 | 000.00 | ○ | | ○ | | 00000 ～ 99999 | 12(R/W) |
| | 3 | SP2 | 000.00 | ○ | | ○ | | 00000 ～ 99999 | 13(R/W) |
| | 4 | CPS | 00.00 | ○ | | ○ | | 0000 ～ 9999 | 14(R/W) |
| 2 | 5 | AFFC | 098.00 | | ○ | ○ | | 00000 ～ 99999 | 15(R/W) |
| | 6 | HI | 000.00 | ○ | | ○ | | ± 00000 ～± 99999 | 02(R/W) |
| | 7 | LO | 000.00 | ○ | | ○ | | ± 00000 ～± 99999 | 03(R/W) |

## COMPARISON

| PAGE | | Parameter | Initial value | L1 | L2 | S | N | Alternatives・Setting range | Communication Command No. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | COMP MODE SEL. | HI-LO COMP | | ○ | | ○ | 0:［HI-LO COMP］1:［DIS.-O/U］<br>2:［DIS.-H/L］ | 31(R/W) |
| | 2 | COMP. INH. TIME | 0.50sec. | | ○ | | ○ | 0.00 ～ 9.99 | 32(R/W) |
| | 3 | JUDGING TIME | 1.50sec. | | ○ | | ○ | 0.00 ～ 9.99 | 33(R/W) |
| | 4 | COMPLETE OUT T. | 3.00sec. | | ○ | | ○ | 0.00 ～ 9.99 | 34(R/W) |
| | 5 | AFFC | ON | | ○ | | ○ | 0:［OFF］ 1:［ON］ | 35(R/W) |
| 2 | 6 | CPS. COFFICIENT | 1/1 | | ○ | | ○ | 0:［1/1］1:［3/4］2:［2/4］3:［1/4］ | 36(R/W) |
| | 7 | AVG. CNT OF AFFC | 4times | | ○ | | ○ | 1 ～ 9 | 37(R/W) |
| | 8 | DIS. CONTROL MODE | FEEDING | | ○ | | ○ | 0:［FEEDING］1:［DISCHARGE］<br>2:［EXTERNAL］ | 38(R/W) |
| | 9 | COMPLETE SIG. OUT | JUDGING TIME | | ○ | | ○ | 0:［JUDGING TIME］1:［JUD.or STABLE］<br>2:［JUD.& STABLE］ | 39(R/W) |
| | 10 | OVER/UNDER COMP. | REGULARLY | | ○ | | ○ | 0:［REGULARLY］1:［COMP. SIG.］<br>2:［EXT. IN］3:［COMP. SIG&H］ | 3A(R/W) |
| 3 | 11 | HI/LO COMP. SEL | GROSS | | ○ | | ○ | 0:［GROSS］1:［NET］2:［COMP OFF］ | 3B(R/W) |
| | 12 | NEAR ZERO COMP. | GROSS | | ○ | | ○ | 0:［GROSS］1:［NET］<br>2:［COMP OFF］3:［ABS GROSS］<br>4:［ABS NET］ | 3C(R/W) |
| | 13 | PRESET TARE WGT.1 | ON | | ○ | | ○ | 0:［OFF］1:［ON］ | 3D(R/W) |
| | 14 | NEAR ZERO | 000.00 | ○ | | ○ | | 00000 ～ 99999 | 3E(R/W) |
| | 15 | PRESET TARE WGT.2 | 000.00 | ○ | | ○ | | 00000 ～ 99999 | 3F(R/W) |

## OPERATION

| PAGE | | Parameter | Initial value | L1 | L2 | S | N | Alternatives・Setting range | Communication Command No. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | DIGITAL FILTER | 16times | | ○ | | ○ | 0:［OFF］1:［2times］2:［4times］<br>3:［8times］4:［16times］<br>5:［32times］6:［64times］<br>7:［128times］8:［256times］ | 41(R/W) |
| | 2 | ANALOG FILTER | 6Hz | | ○ | | ○ | 0:［2Hz］1:［4Hz］2:［6Hz］3:［8Hz］ | 42(R/W) |
| | 3 | MD (PERIOD) | 1.5sec. | | ○ | | ○ | 0.0 ～ 9.9 | 43(R/W) |
| | 4 | MD (RANGE) | 10CNT | | ○ | | ○ | 00 ～ 99 | 44(R/W) |
| | 5 | DISPLAY FREQ. | 10times | | ○ | | ○ | 01 ～ 10 | 45(R/W) |
| 2 | 6 | ZT (PERIOD) | 0.0sec. | | ○ | | ○ | 0.0 ～ 9.9 | 46(R/W) |
| | 7 | ZT (RANGE) | 00CNT | | ○ | | ○ | 00 ～ 99 | 47(R/W) |
| | 8 | CONTRAST | ----- | | | | ○ | ［Brightly］［Darkly］ | |
| | 9 | INDICATE COLOR | Yellow | | ○ | | ○ | 0:［Yellow］1:［Green］<br>2:［Blue］3:［Comparison］ | 49(R/W) |
| | 10 | BACK LIGHT | 10minutes | | ○ | | ○ | 00 ～ 99 | 4A(R/W) |
| 3 | 11 | DISPLAY SELECT | HH,H,L,LL（*） | | ○ | | ○ | 0:［F, SP1-3］1:［F, SP3, H, L］<br>2:［F, SP3, T, Z］（*） | 4B(R/W) |
| | 12 | HI/LO OUT SEL | NORMAL | | ○ | | ○ | 0:［NORMAL］1:［COMPARATOR］ | 4C(R/W) |
| | 13 | LOCK1 | OFF | | | | ○ | 0:［OFF］1:［ON］ | 4D(R/W) |
| | 14 | LOCK2 | OFF | | | | ○ | 0:［OFF］1:［ON］ | 4E(R/W) |

(*) It changes with comparison modes. （See page 29.）

## GRAPH

| PAGE | | Parameter | Initial value | L1 | L2 | S | N | Alternatives・Setting range | Communication Command No. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | GRAPHIC MODE | CONTINUITY | | ○ | | ○ | 0:［CONTINUITY］1:［SINGLE］<br>2:［LEVEL］ | 51(R/W) |
| | 2 | TRIGGER LEVEL | 001.00 | | ○ | | ○ | 00000 ～ 99999 | 52(R/W) |
| | 3 | X END POINT | 10sec. | | ○ | | ○ | 2 ～ 98 | 53(R/W) |
| | 4 | Y START POINT | 000.00 | | ○ | | ○ | ± 00000 ～± 99999 | 54(R/W) |
| | 5 | Y END POINT | 100.00 | | ○ | | ○ | ± 00000 ～± 99999 | 55(R/W) |
| 2 | 6 | DRAWING WEIGHT | NET | | ○ | | ○ | 0:［GROSS］1:［NET］ | 56(R/W) |

## OPTION (In case of used BCD OUTPUT)

| PAGE | | Parameter | Initial value | L1 | L2 | S | N | Alternatives・Setting range | Communication Command No. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | DATA UPDATE RATE | 100times | | ○ | | ○ | 0:［100times］1:［50times］<br>2:［20times］3:［10times］<br>4:［5times］5:［2times］ | |
| | 2 | OUTPUT WEIGHT | INDICATE | | ○ | | ○ | 0:［INDICATE］1:［GROSS］2:［NET］ | |

## OPTION (In case of used D/A OUTPUT)

| PAGE | | Parameter | Initial value | L1 | L2 | S | N | Alternatives・Setting range | Communication Command No. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | D/A OUTPUT MODE | GROSS | | ○ | | ○ | 0:［GROSS］1:［NET］<br>2:［ZERO SCALE］3:［FULL SCALE］ | |
| | 2 | ZERO OUTPUT | 000.00 | | ○ | | ○ | 00000 ～ 99999 | |
| | 3 | FULLSCALE OUT. | 100.00 | | ○ | | ○ | 00000 ～ 99999 | |

## SYSTEM

| PAGE | | Parameter | Initial value | L1 | L2 | S | N | Alternatives・Setting range | Communication Command No. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | INITIALIZATION | CODE | | | | | | |
| | 2 | SELFCHECK DSP1 | | | | | | ［CODE］［COMP.］［OPR.］<br>［CAL.］［etc.］ | |
| | 3 | SELFCHECK MEM | | | | | | | |
| | 4 | SELFCHECK KEY | | | | | | | |
| | 5 | SELFCHECK EXT | | | | | | | |
| 2 | 6 | SELFCHECK DSP2 | | | | | | | |
| | 7 | SELFCHECK COM | | | | | | | |
| | 8 | PASSWORD | 0000 | | | | | 0000 ～ 9999 | |
| | 9 | LANGUAGE | JPN | | ○ | | ○ | 0:［JPN］1:［ENG］ | 69(R/W) |
| | 10 | [GROSS/NET] KEY | ON | | ○ | | ○ | 0:［OFF］1:［ON］ | 6A(R/W) |
| 3 | 11 | [DZ] KEY | ON | | ○ | | ○ | 0:［OFF］1:［ON］ | 6B(R/W) |
| | 12 | [TARE] KEY | ON | | ○ | | ○ | 0:［OFF］1:［ON］ | 6C(R/W) |
| | 13 | [CURSOR ON/PFF] KEY | ON | | ○ | | ○ | 0:［OFF］1:［ON］ | 6D(R/W) |
| | 14 | [START/STOP] KEY | ON | | ○ | | ○ | 0:［OFF］1:［ON］ | 6E(R/W) |
| | 15 | B4 FUNC. SELECT | CODE2 | | ○ | | ○ | | 6F(R/W) |

## CALIBRATION

| PAGE | | Parameter | Initial value | L1 | L2 | S | N | Alternatives・Setting range | Communication Command No. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | ZERO CAL. | 0 | | ○ | | ○ | ［OK］ | Command |
| | 2 | SPAN CAL. | 100.00 | | ○ | | ○ | 00001 ～ 99999 | Command |
| | 3 | EQUIV. CAL. | 3.000mV/V | | ○ | | ○ | （VOL.）0.001 ～ 3.000mV/V<br>（WEIGHT）00001 ～ 99999 | 83(R/W) |
| | 4 | BALANCE WEIGHT | 100.00 | | ○ | | ○ | 00001 ～ 99999 | 84(R/W) |
| | 5 | MIN. SCALE DIV. | 0.01 | | ○ | | ○ | 001 ～ 100 | 85(R/W) |
| 2 | 6 | NET OVER | 999.99 | | ○ | | ○ | 00000 ～ 99999 | 86(R/W) |
| | 7 | GROSS OVER | 999.99 | | ○ | | ○ | 00000 ～ 99999 | 87(R/W) |
| | 8 | UNIT DISPLAY | kg | | ○ | | ○ | 0: ［NONE］ 1: ［kg］ 2: ［t］ 3: ［g］<br>4: ［N］ 5: ［lb］ | 88(R/W) |
| | 9 | DECIMAL PLACE | 0.00 | | ○ | | ○ | 0: ［NONE］ 1: ［0.0］ 2: ［0.00］<br>3: ［0.000］ | 89(R/W) |
| | 10 | DZ REGULATION VAL | 02.00 | | ○ | | ○ | 0000 ～ 9999 | 8A(R/W) |

## SEQUENCE MODE

| PAGE | | Parameter | Initial value | L1 | L2 | S | N | Alternatives・Setting range | Communication Command No. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | SEQUENCE MODE | SIMPLE COMP. | | ○ | | ○ | 0: ［SIMPLE COMP.］ 1: ［SEQUENCE］ | 91(R/W) |
| | 2 | ADJUST FEEDING | OFF | | ○ | | ○ | 0: ［OFF］ 1: ［ON］ | 92(R/W) |
| | 3 | AT START NZ CONF. | OFF | | ○ | | ○ | 0: ［OFF］ 1: ［ON］ | 93(R/W) |
| | 4 | AT START WV CONF. | OFF | | ○ | | ○ | 0: ［OFF］ 1: ［ON］ | 94(R/W) |
| | 5 | ADJ.FEEDING TIME | 1.00sec. | | ○ | | ○ | 0.00 ～ 9.99 | 95(R/W) |
| 2 | 6 | AZ TIMES | 01times | | ○ | | ○ | 00 ～ 99 | 96(R/W |
| | 7 | JUDGING TIMES | 01times | | ○ | | ○ | 00 ～ 99 | 97(R/W) |

## RS-232C

| PAGE | | Parameter | Initial valueInitial value | L1 | L2 | S | N | Alternatives・Setting range | Communication Command No. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | COMM. MODE | HAND SH. | | ○ | | ○ | 0: ［HAND SH.］ 1: ［CONTINUITY］<br>2: ［AT PRINT］ | D1(R) |
| | 2 | BAUD RATE | 9600BPS | | ○ | | ○ | 0: ［1200］ 1: ［2400］ 2: ［4800］<br>3: ［9600］ 4: ［19200］ | D2(R) |
| | 3 | LENGTH | 8BIT | | ○ | | ○ | 0: ［7bit］ 1: ［8bit］ | D3(R) |
| | 4 | PARITY BIT | ODD | | ○ | | ○ | 0: ［NONE］ 1: ［ODD］ 2: ［EVEN］ | D4(R) |
| | 5 | STOP BIT | 1BIT | | ○ | | ○ | 0: ［1bit］ 1: ［2bit］ | D5(R) |
| 2 | 6 | TERMINATOR | CR+LF | | ○ | | ○ | 0: ［CR］ 1: ［CR+LF］ | D6(R) |
| | 7 | FLOW CONTROL | OFF | | ○ | | ○ | 0: ［OFF］ 1: ［RTS/CTS］ | DA(R) |

# 22. SPECIFICATIONS

## ■ Analog Section

| | | |
|---|---|---|
| Sensor excitation | 10V DC Output current :Within 120mA<br>6-wire (Up to four 350Ω load cells can be connected.) | |
| Signal input range | -0.2 to 3.0mV/V | |
| Zero adjusting range | -0.2 to 3.0mV/V | |
| Accuracy | Nonlinearity | Within 0.02%FS ± 1digit (When 3mV/V is input) |
| | Zero drift | Within 0.25 μ V/ ℃ RTI |
| | Gain drift | Within 25ppm/ ℃ |
| A/Dconverter | Speed | 100times/sec. |
| | Resolution | 24bit (binary) |
| Analog filter | Bessel type low-pass filter (-12dB/oct) | |
| | Cutoff frequency | 2Hz, 4Hz, 6Hz, 8Hz (Selectable by setting) |
| Calibration | Equivalent input calibration and actual load calibration | |

## ■ Display Section

| | | |
|---|---|---|
| Display | STN color LCD module (Display area: 71mm × 53mm)<br>320 × 240 dots | |
| Weight value display | 5-digit<br>Sign: Minus sign display | |
| Minimum scale division | Can be set in the range of 1 to 100. | |
| Decimal point | 8 8. 8. 8. 8 The display position can be set. | |
| Over scale | A/D converter input over: | “LOAD” |
| | A/D converter input minus over : | “-LOAD” |
| | Net weight exceeding the “NET OVER” setting: | “NET OVER” |
| | Gross weight exceeding the “GROSS OVER” setting: | “GROSS OVER” |
| Unit display | NONE, kg, t, g, N, lb is selectable. | |
| Status display | Various states of weight are displayed. | |

## ■ Setting section

| | | |
|---|---|---|
| How to set | Set by touch panel operation (with a key click buzzer).<br>External setting can also be made by RS-232C etc.. | |
| Memory of set values | Initial values | NOV RAM (nonvolatile RAM) |
| | Other values | Lithium-battery-backed-up C-MOS RAM<br>(The memory life is approx. 7 years or more, which varies depending on the operating conditions and storage environment.) |
| Protection of set values | Setting operation can be prohibited to prevent changes by misoperation. (LOCK1, LOCK2) | |

## ■ Communication

RS-232C communications interface

Asynchronous communication method
Baud rate 1200bps to 19200bps

SI/F (2-wire serial interface)

2-wire serial interface for connecting a UNIPULSE-manufactured printer, external display, etc.
Asynchronous communication method
Baud rate 600bps

## ■ Option

| | | |
|---|---|---|
| BCD data output | Open collector output<br>The output rate can be changed. | |
| D/A converter | Voltage output | 0 to 10V |
| | Current output | 4 to 20mA |
| CC-Link | Number of occupied stations | 1, 2 , 4 STAT. |
| | Baud rate | 156k, 625k, 2.5M, 5M, 10Mbps |
| | Station number | 1 to 64 (when one station is occupied)<br>1 to 63 (when two station is occupied)<br>1 to 61 (when four station is occupied) |
| DeviceNet | Baud rate | 125k, 250k, 500kbps |
| | Node address | 0 to 63 |

## ■ External Input/Output

| | |
|---|---|
| External output signal (9 points) | Transistor open collector output. (Emitter = COM terminal)<br>The output turns ON when the transistor turns ON. |
| External input signal (11 points) | ON when shorted with COM terminals by contact (relay, switch, etc.) or non-contact (transistor, TTL open-collector output, etc.) |

## ■ General Performance

| | | |
|---|---|---|
| Required power supply | AC spec. | AC100V to AC240V (+10% -15%)<br>[Free power supply 50/60Hz] |
| | DC spec. | DC24V ( ± 15%)<br>(Depending on the request at the time of order) |
| Power consumption | AC spec. | 20W max |
| | DC spec. | 20W max |
| Operating conditions | Temperature | Operating temperature range: 0 ℃ to +40 ℃<br>Storage temperature range: -20 ℃ to +60 ℃ |
| | Humidity | 80%RH or less (non-condensing) |
| Dimensions | 99.5W × 96H × 138D (mm) (not including projections) | |
| Weight | Approx.1.0kg | |

# M E M O

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