



F600AT

WEIGHING CONTROLLER

OPERATION MANUAL

01AUG2020REV.3.03

UNIPULSE

INTRODUCTION



Thank you very much for purchasing our Weighing Controller F600AT.

For good performance, and proper and safe use of the F600AT, 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

BE SURE TO READ FOR SAFETY

Installation, maintenance and inspection of the F600AT should be performed by personnel having technical knowledge of electricity.

In order to have an F600AT used safely, notes I 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 to safety. Please use F600AT 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.

**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 F600AT becomes faulty or malfunctions, provide a safety circuit outside the F600AT.
- Before using the F600AT as described below, make sure to consult with our sales personnel.
 - Use in environments not described in the operation manual.
 - Use greatly impacting human lives and assets, such as medical devices, transport devices entertainment devices, and safety devices.

Warning on installation

- Do not modify the F600AT. 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.
- The attached AC cable is designed for domestic use in Japan, and its rating is 125V AC, 7A. For use at voltages exceeding the rating and for overseas use, have a separate AC cable prepared.
- 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 blocks.
 - 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 blocks, and do not to connect bare wires as they are.
- Be sure to install the attached terminal block cover after wiring to the power input terminals. Otherwise, electric shocks may result.
- Before applying power, carefully check the wiring, etc.



WARNING

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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 F600AT, 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.

Type: CR2477/HFK (old type: CR2477-1HF) made by Panasonic
 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 F600AT as it is incorporated in a control panel, etc.
- Do not install in the following environments:
 - Locations where temperature or humidity exceeds specifications;
 - Locations subjected to drastic temperature fluctuations or icing and condensing;
 - Outdoors or locations above 2,000m;
 - Locations exposed to direct sunlight;
 - Locations subject to dust accumulation;
 - Locations with poor ventilation;
 - Locations with a lot of salt and metal powder;
 - Locations where the main unit is subject to direct vibration and shock.
- 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.
- Install the F600AT as far away from devices generating high frequency, high voltage, large current, surge, etc., as possible. Also, carry out wiring separately from their power lines. Do not carry out parallel wiring and common wiring.
- Do not use it, broken down.



CAUTION

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

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.
- The temporary overvoltage applied to the power should not exceed 1500V.

Caution during startup and maintenance

- For turning on/off the power, be sure to keep intervals of 5 seconds or more.
- After power-on, make sure to warm up the F600AT for at least 30 minutes or more before use.
- If the F600AT 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 F600AT. 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 F600AT 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 F600AT 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.
- Remove the lithium batteries used in the F600AT and make sure to dispose them according to classification of waste collection.

PRODUCT COMPLIANT TO ROHS2 DIRECTIVE

The parts and attachments (including the instruction manual, packaging box, etc.) used for this unit are compliant with the RoHS2 Directive, restricting the use of hazardous substances with regard to adverse effects on the environment and human body.

RoHS2 Directive

It is based on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE). The Directive restricts the use of specific substances in electrical and electronic equipments that could harm environment and human body. The substances are lead, mercury, cadmium, hexavalent chromium, PBB (polybrominated biphenyls), PBDE (polybrominated diphenyl ethers), DEHP (bis(2-ethylhexyl) phthalate), BBP (benzyl butyl phthalate), DBP (dibutyl phthalate), and DIBP (diisobutyl phthalate).

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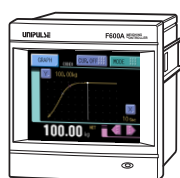
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1. OUTLINE

1-1. Contents of the Package

The packaging box contains the following.

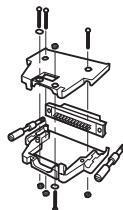
Be sure to check them before use.



F600AT body1



operation manual1



External input/output connector1set
 [Connector : FCN-361J024-AU]
 [Cover : FCN-360C024-B]

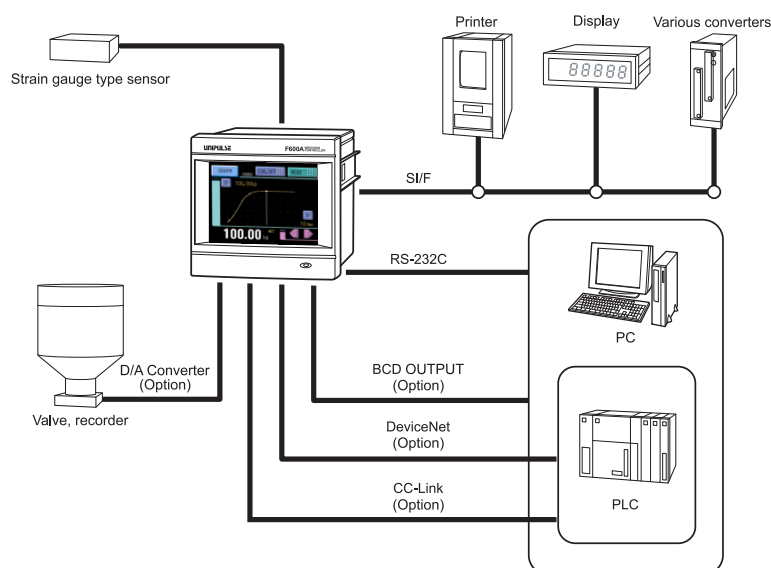


AC power cable1
 (Only at AC spec.)



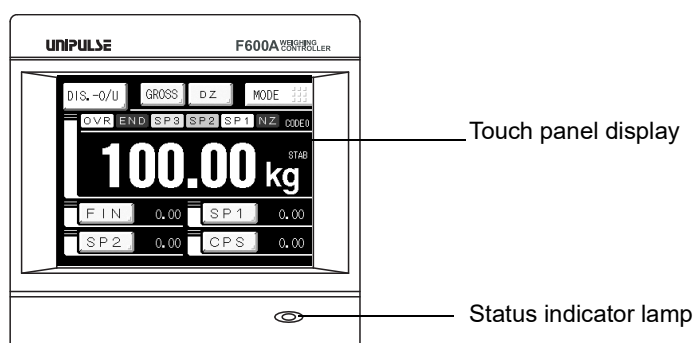
Jumper wire2

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 F600AT. During measurement, a comparison display, hold display and graph display can be selected according to the function in use.



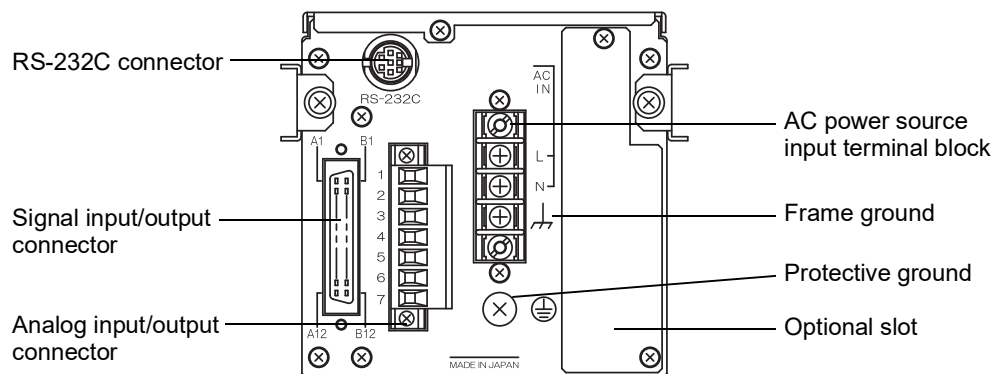
■ Status indicator lamp

Lamp indication	Status
Green lighting	Steady state
Red lighting	Writing into internal NOVRAM. Do not turn off the power of the F600AT.
Yellow blink	Voltage drop of the internal memory backup battery. 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 "9. SYSTEM" on page 34 for details.

1-3-2. Rear Panel



*DC spec.
(Designated when it is shipped)

Red (plus)

Black (minus)

DC power source
input terminal block



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 block

- 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.)

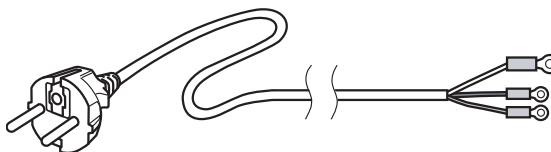
Connect DC power source. Voltage input is DC24V ($\pm 15\%$).



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.

CA325AC3P-CEE7/7-B2 : CEE7/7 Plug cable (2m)



■ Analog input/output connector

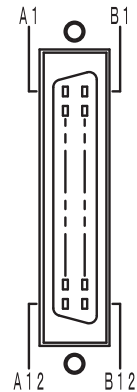
Pin No.	Signal (6-wire)	Signal (4-wire)
1	+SIG	+SIG
2	-SIG	-SIG
3	+EXC	+EXC (Connect 3 to 4)
4	+S	
5	-EXC	-EXC (Connect 5 to 6)
6	-S	
7	SHIELD	SHIELD

Compatible connector : ETB42-07P

(Connector optional type: CN80)

■ 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



Compatible connector : FCN-361J024-AU

Connector cover: FCN-360C024-B

(Connector & cover optional type: CN50)

■ Frame ground

Please ground the frame ground terminal to prevent failures due to static electricity.

(The frame and the frame ground terminal are conducted.)

It may be better to remove depending on the environment of the installation location.

■ Protective ground

Be sure to ground the protective ground terminal to prevent electric shocks.

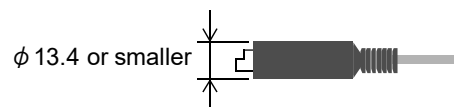
■ RS-232C connector

RS-232C connector to transmit/receive measurement data and status information, etc.

The compatible connector is HOSIDEN-manufactured TCP8080-015267 or equivalent (*).

Optionally available RS-232C cable (cross) [CA81-232X] is connectable.

(*) Note, however, that the external diameter of connector must be smaller than $\phi 13.4$.



■ Option slot

Any one of the following optional boards can be mounted.

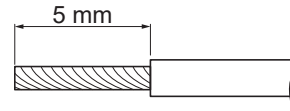
- BCD data output
- D/A converter (voltage or current output)
- CC-Link interface
- DeviceNet interface

2. CONNECTION

2-1. Analog Input/Output Terminals Connection

How to connect

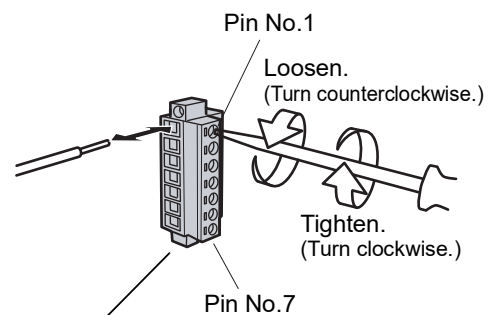
1. Strip 5mm of the covering of the wire to be connected. The size of connectable wires is from 0.21 to 3.31mm² (AWG12 to 24).



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.)



Compatible connector : ETB42-07P

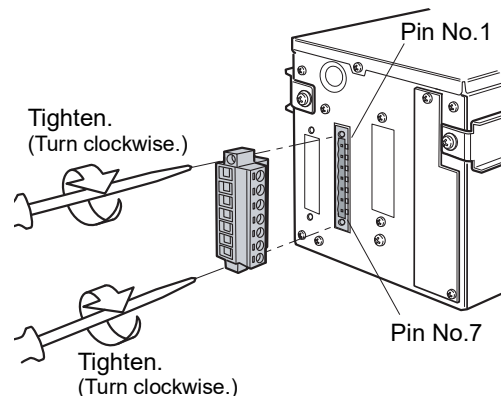
4. Insert the wire into the connection hole so as not to let the tip spread out.

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 F600AT body, and tighten the screws (two).

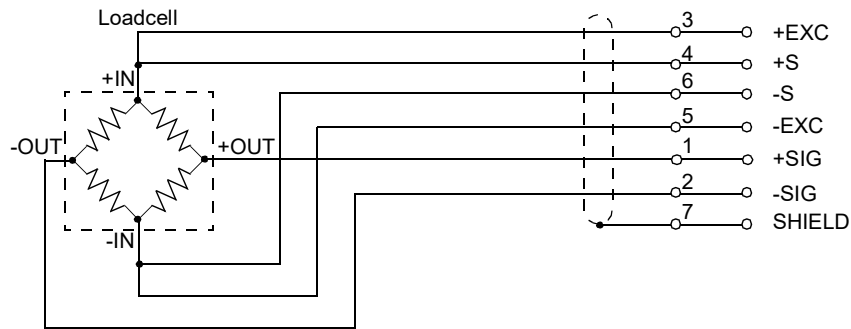


2-2. Loadcell Connection

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

■ 6-wire connection

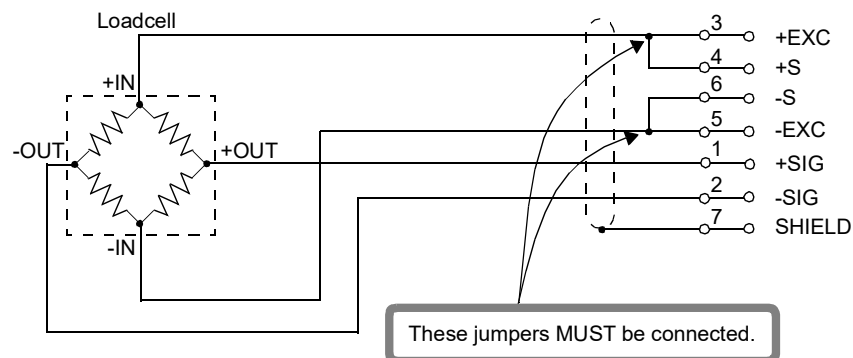
The loadcell input of the F600AT is a 6-wire (remote sense) connection. 6-wire shielded loadcell cable should be used and kept separate from AC or other noise generating wire.



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.

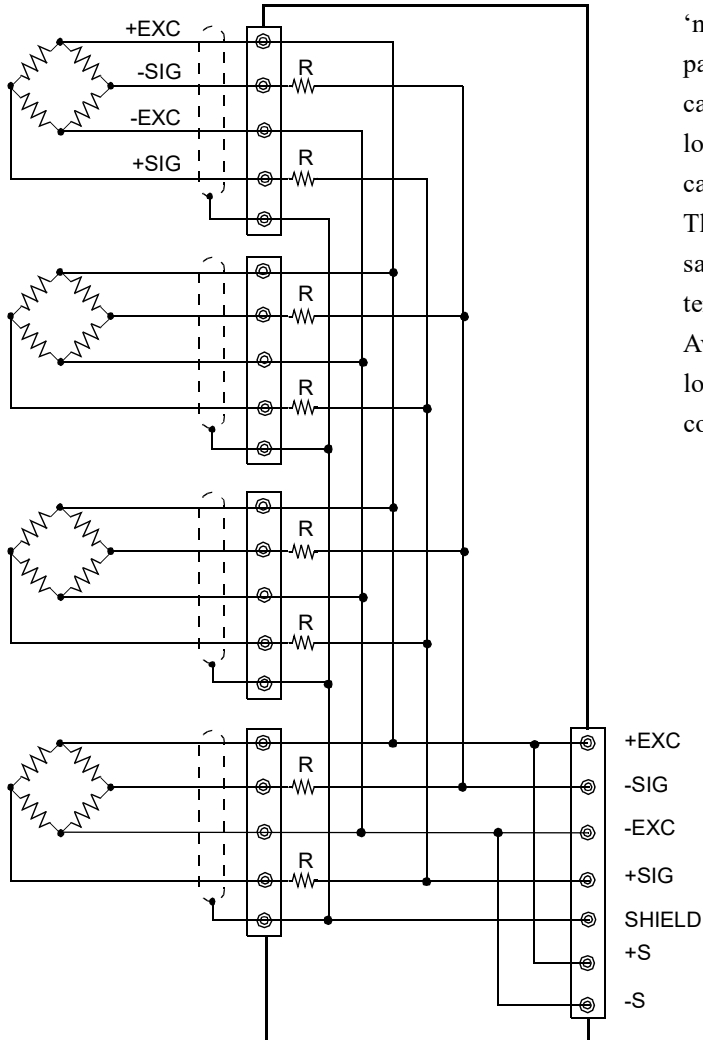


Notice

The loadcell excitation voltage of the F600AT 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

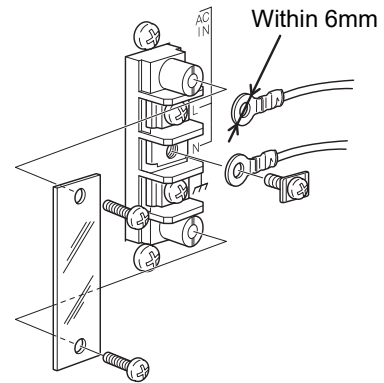
Cable colors of sensors may differ from one manufacturer to another (it may even differ from one model to another for some products). Refer to the sensor manual (or data sheet) and check signal names and colors in order to connect the cables correctly.

2-5. Power Input Terminal Connection

Connect an AC input cord. The input power source is free in the range of 100 to 240V AC (-15%, +10%). The frequency is 50/60Hz.

Make connections to the terminal block with a solderless terminal within 6mm in diameter as shown in the illustration so as not to let the tip of the cable spread out.

1. Make sure that no power is applied.
2. Remove the screws (two), and remove the terminal block cover.
3. Remove the two screws("L" and "N") at the terminal block.
4. Align the solderless terminals with the screw holes, and then tighten the screws.
5. Install the terminal block cover, and fix it with the screws (two).

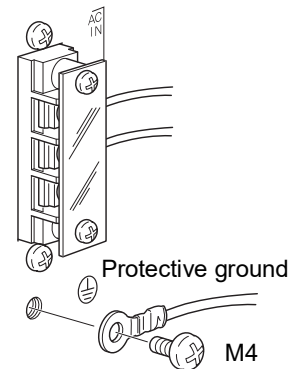


2-6. Protective Ground Connection

The grounding terminal is for prevention of electric shocks.

Use an approx. 0.75mm² thick wire, and be sure to ground.

1. Make sure that no power is applied.
2. Remove the screws(M4) at the protective ground.
3. Align the solderless terminals(M4) with the screw holes, and then tighten the screws.



WARNING

- Connect with no power applied because it may cause an electric shock.
- The attached AC cable is designed for domestic use in Japan, and its rating is 125V AC, 7A. For use at voltages exceeding the rating and for overseas use, have a separate AC cable prepared.
- Since the F600AT has no power switch, install a breaker.
- Be sure to ground the protective ground terminal to prevent electric shocks.
Do not use other screws than that attached to the main body.

2-7. SI/F Connection

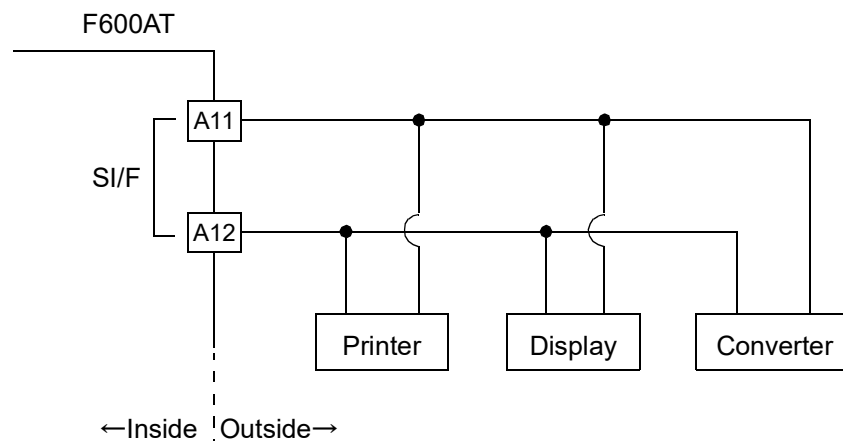
The 2-wire serial interface has connective ability for coupling a UNIPULSE printer, external display, etc. The interface is nonpolarized and up to three external instruments may be connected.

A two-core parallel cable or a cabtyre cable (Wire with covering thickened for construction) may be used for connection.

When a two-core parallel cable or a cabtyre cable is used, the transmitting distance is approximately 30m. When a two-core shielded twisted pair cable is used, the transmitting distance is approximately 300m.

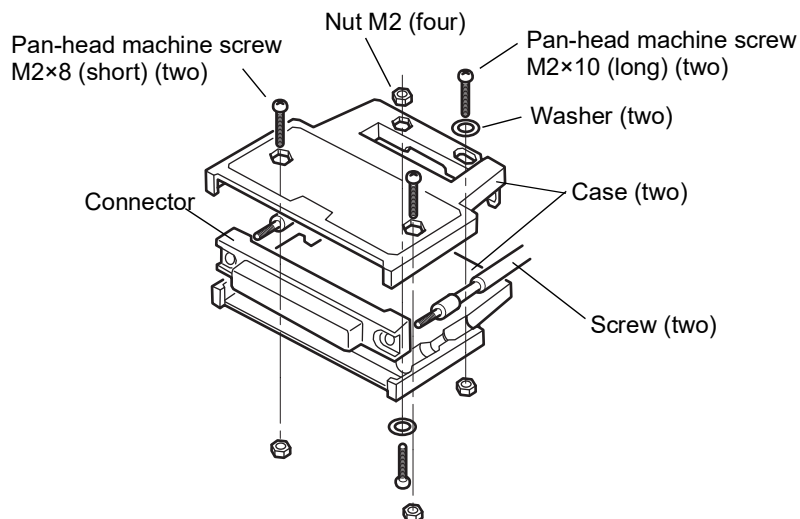
Do not parallel it with AC lines and high-voltage lines. It may cause of malfunction.

Please refer to "13. AUTOMATIC PRINT" on page 45 for print.



2-8. External I/O Connection

2-8-1. How to assemble the connector



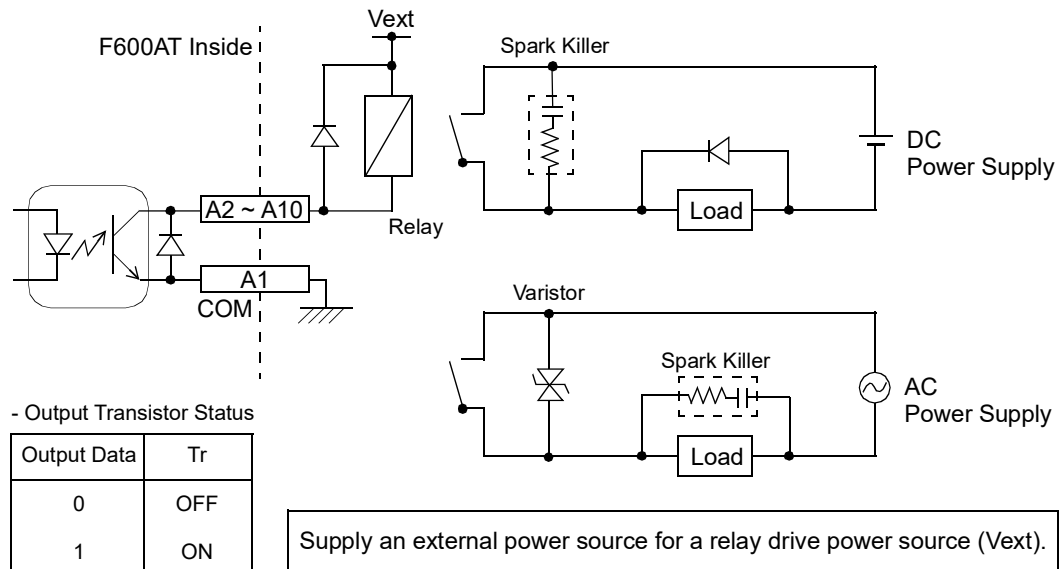
- 1) Set the connector and screws (two) into the grooves of the case (one side).
- 2) Cover with the other case, and fit the cases.
- 3) Tighten the M2×8 pan-head machine screws (two).
Tighten the M2×10 pan-head machine screws (two).
Be aware that washers should be set to the M2×10 pan-head machine screws (two).

2-8-2. External output connection

The external output circuit is operated through an open collector.

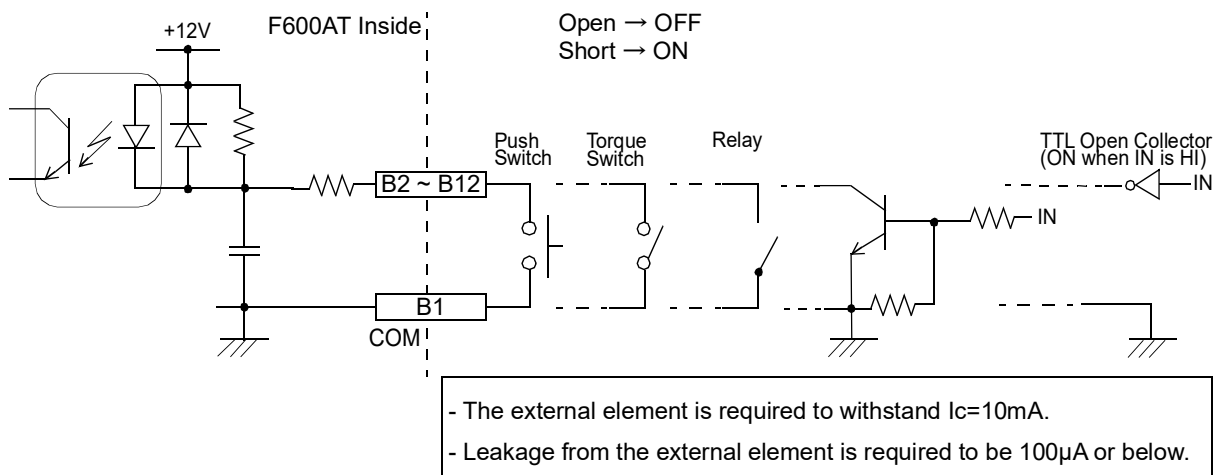
The open collector output capacity is 50mA and the withstand voltage is up to 30V.

- Equivalent circuit



2-8-3. 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).

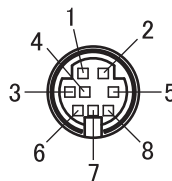


2-8-4. RS-232C interface connection

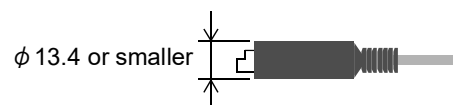
This connector connects the RS-232C.

The compatible connector is HOSIDEN-manufactured TCP8080-015267 or equivalent (*).

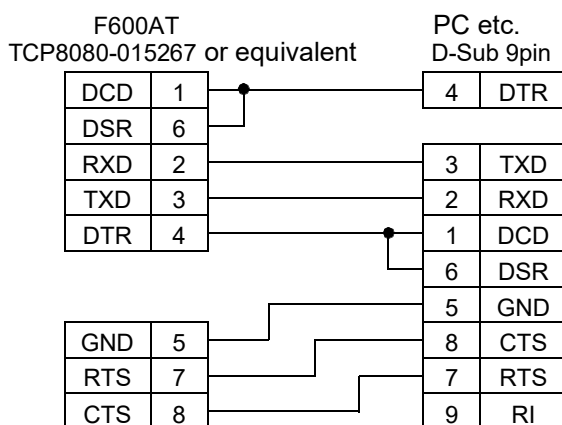
Pin No.	Signal name
1	D C D
2	R X D
3	T X D
4	D T R
5	G N D
6	D S R
7	R T S
8	C T S
Case	F.G.



(*) Note, however, that the external diameter of connector must be smaller than $\phi 13.4$.



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.



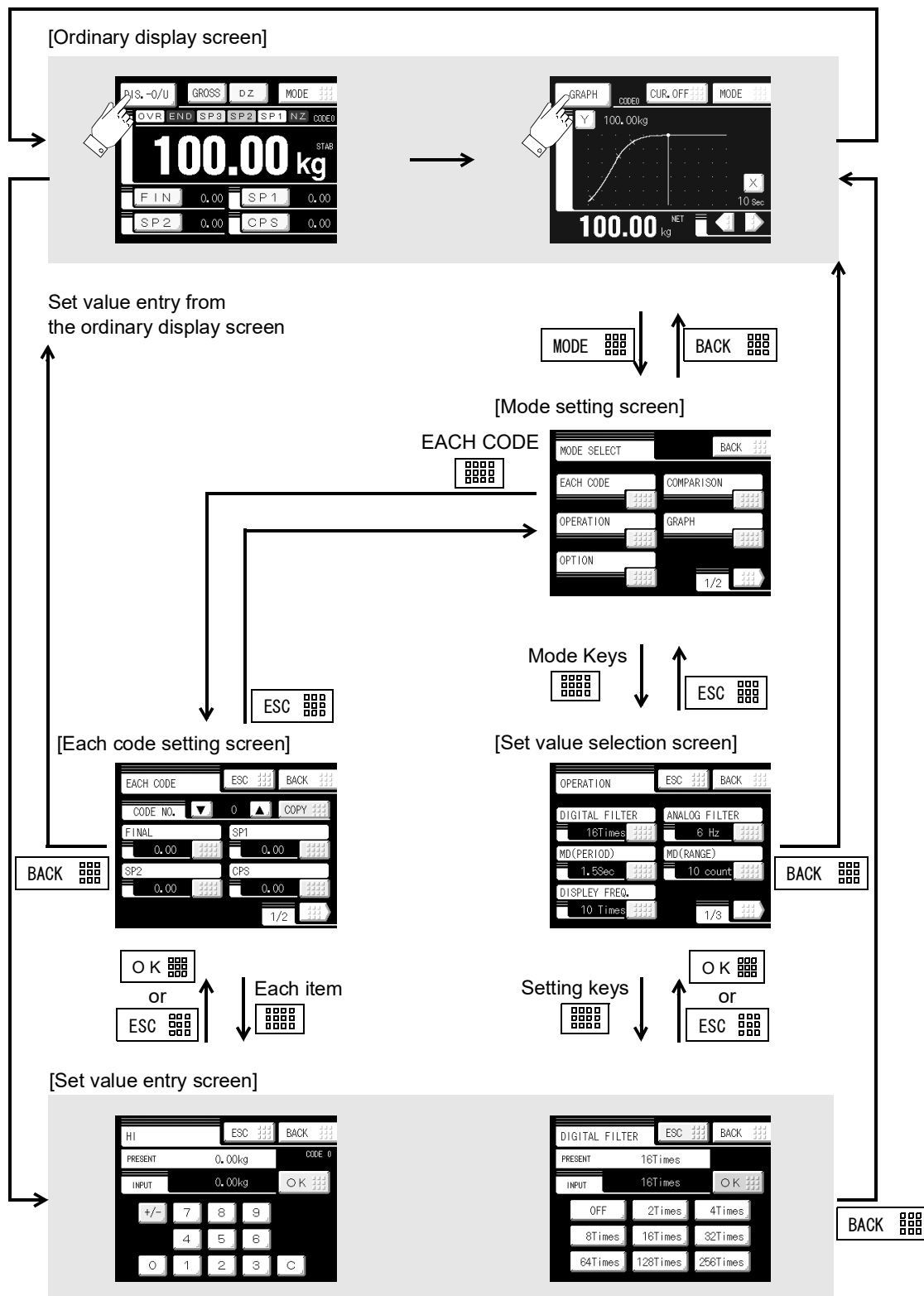
Cabling diagram
CA81-232X (optional)

* 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. F600AT Screen Configuration




3-2. About a Setting Call

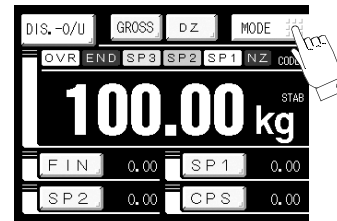
Example) LOCK2 (Calibration Protection)

This call can be made by the following procedure.

Operation

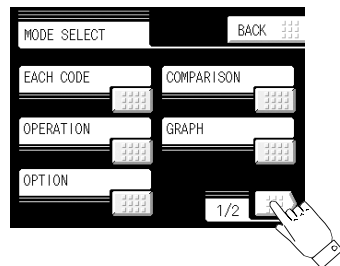
1) Press the **MODE**  key on the ordinary display screen.


Setting call

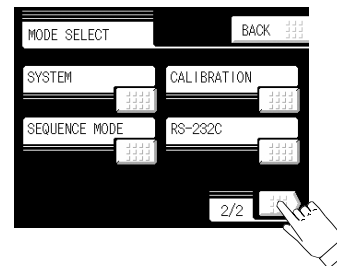


2) The mode setting screen appears. Select the mode.

Operation setting



Can be changed
by  key.

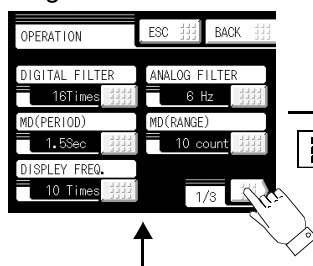


Modes are as follows:

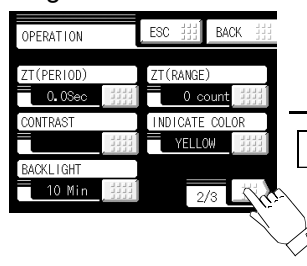
- | | | |
|---------------|-----------------|-------------|
| - EACH CODE | - COMPARISON | - OPERATION |
| - GRAPH | - OPTION | - SYSTEM |
| - CALIBRATION | - SEQUENCE MODE | - RS-232C |

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

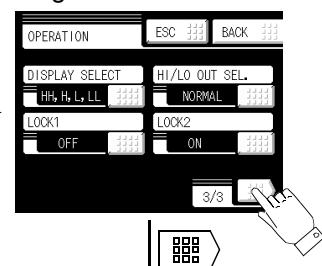
Page 1



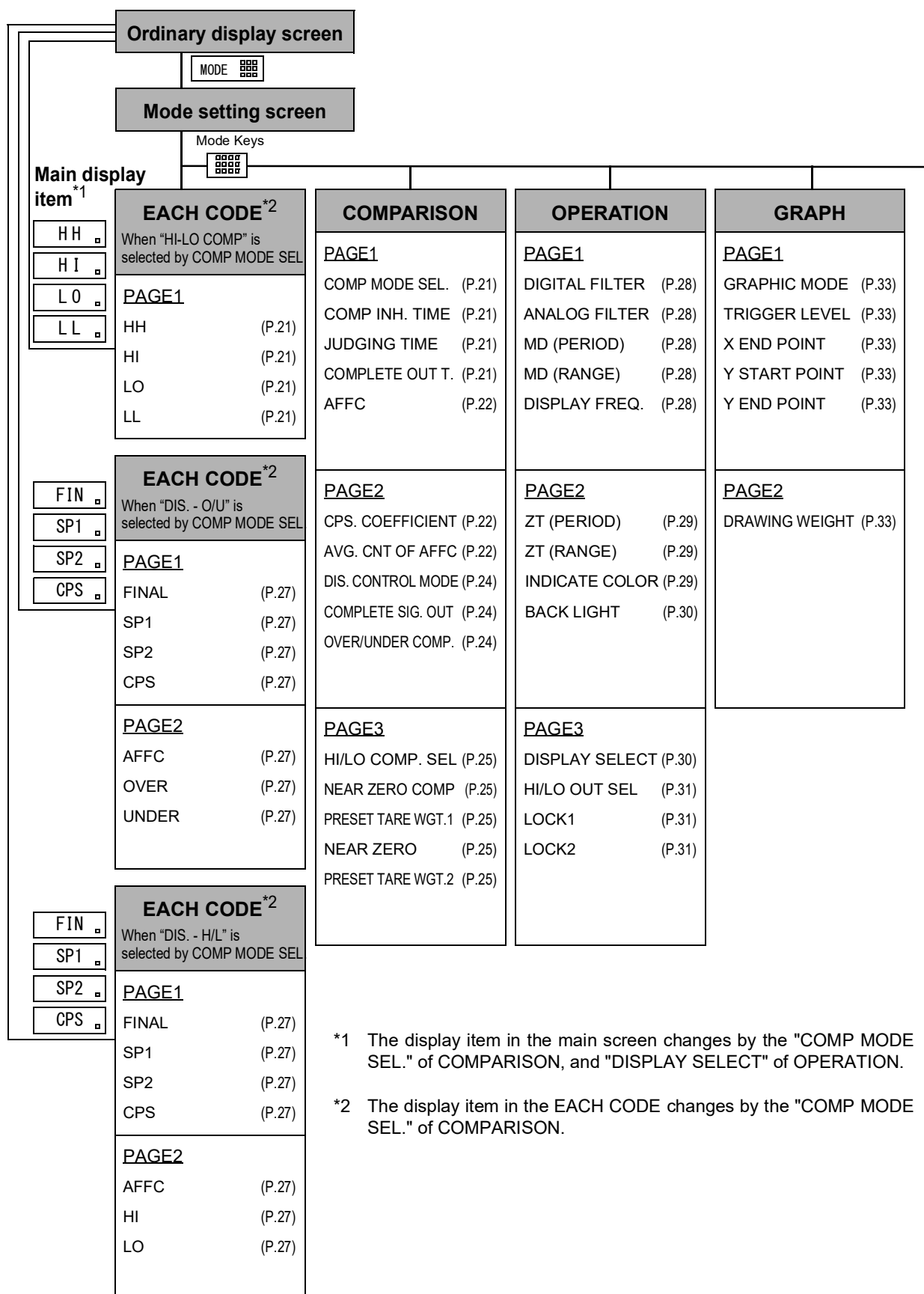
Page 2

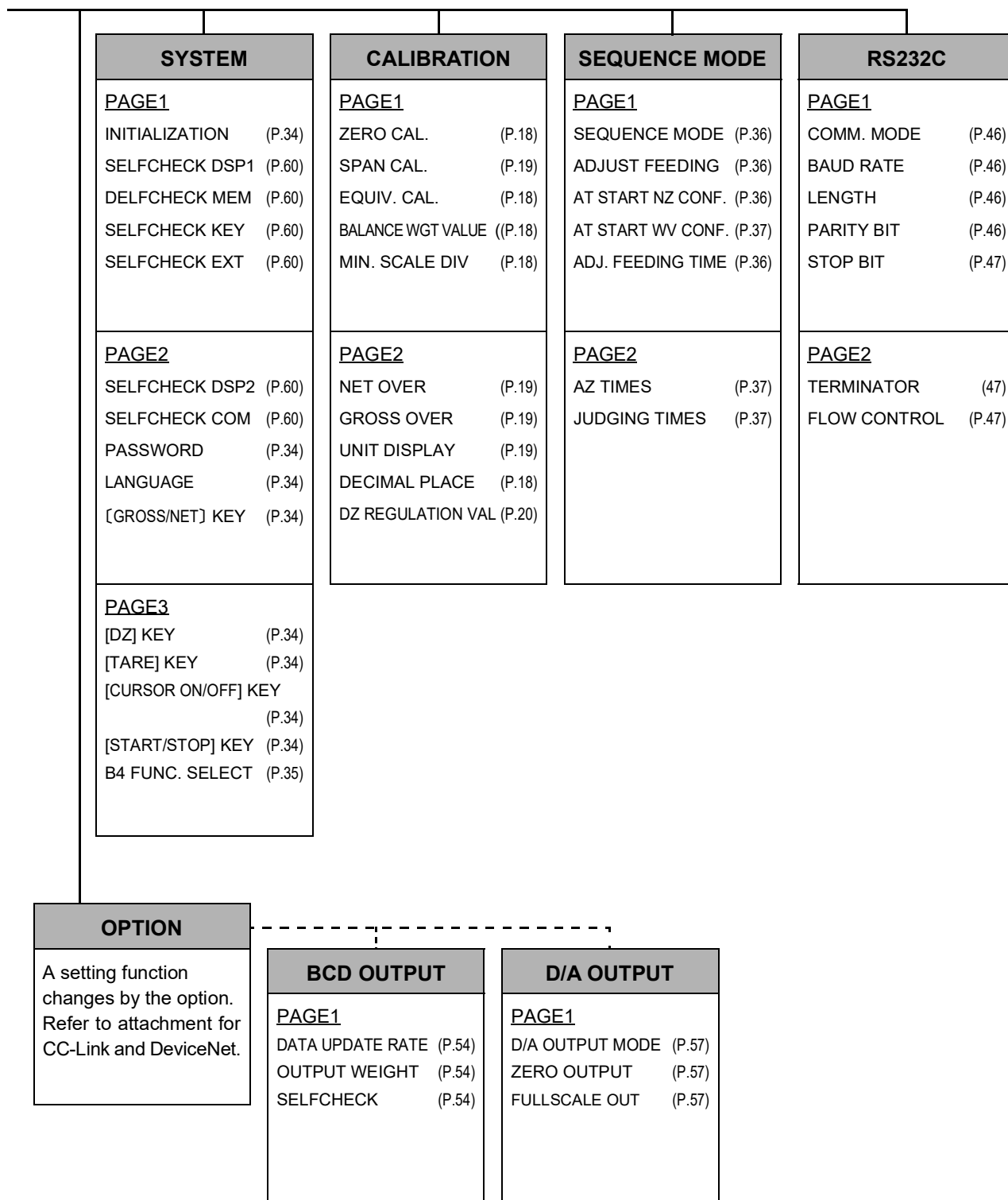


Page 3



3-3. Setting Modes Tree



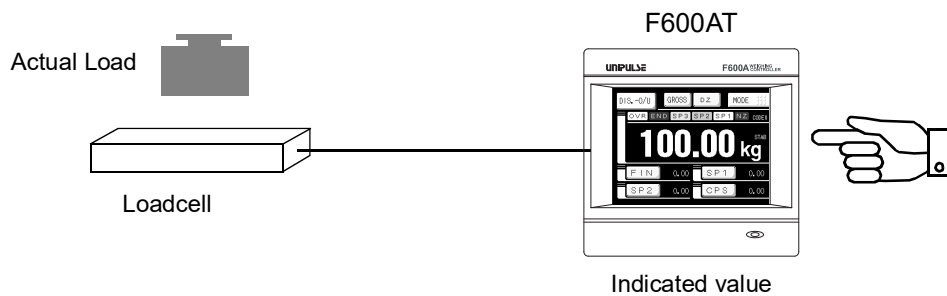


4. CALIBRATION

Calibration is performed for matching the F600AT to a loadcell. The following two types of calibration are available for the F600AT.

◇ 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.



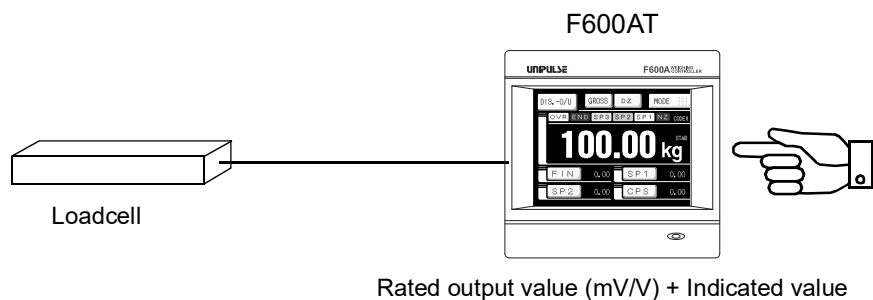
◇ Equivalent input calibration

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:

$$\text{In case of the load} \quad \frac{2.001\text{mV/V} - 100.0\text{kg}}{\text{Rated Output} \quad \text{capacity}}$$

as indicated for a load.



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

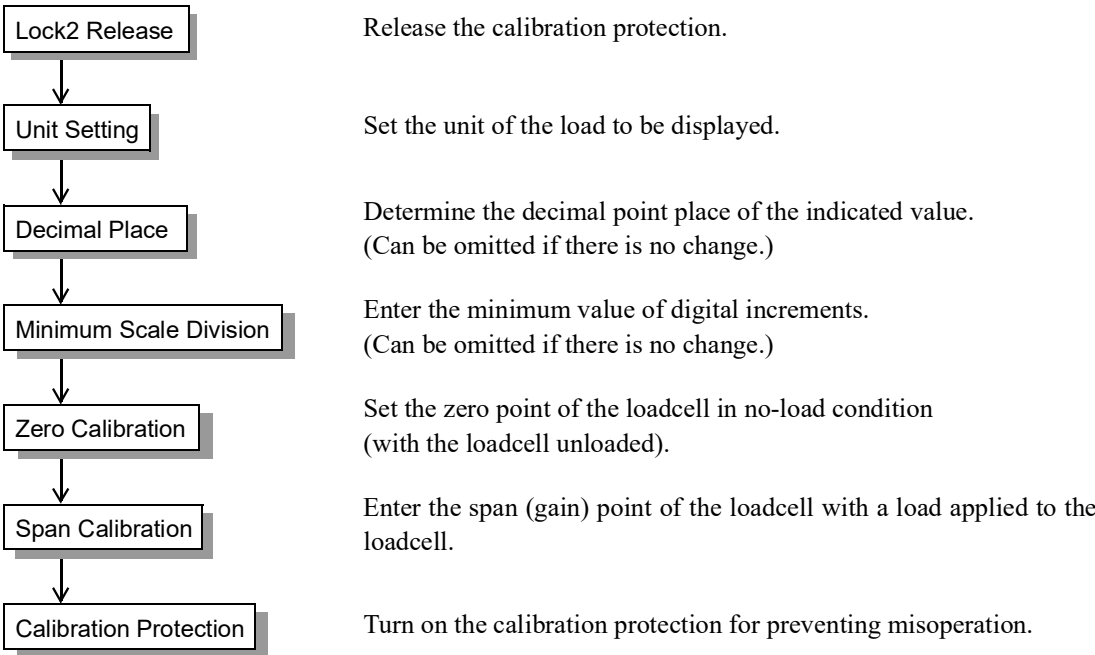
voltage (in mV/V)

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 F600AT.

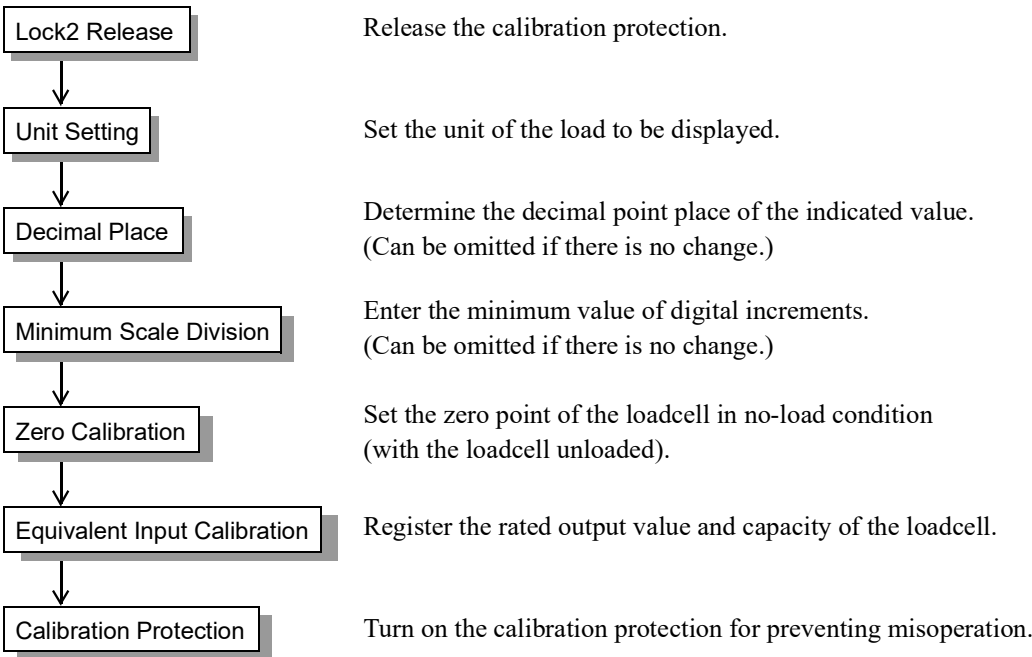
4-1. Span Calibration Procedure

Follow the steps below to perform span calibration.



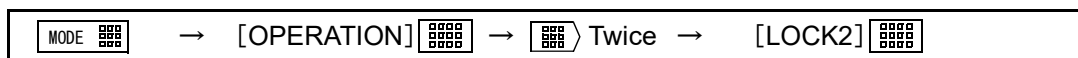
4-2. Equivalent Input Calibration Procedure

Follow the steps below to perform equivalent input calibration.



4-3. Calibration Setting

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



Set values relating to calibration are locked so as not to be changed by misoperation.

Cancel the lock before performing calibration.

Alternatives: [OFF] [ON]

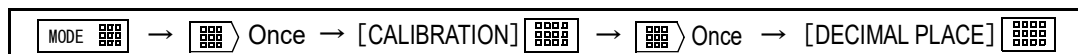
4-3-2. Minimum scale division (Can be omitted if there is no change)



Set the minimum scale division of the indicated value.

Setting range: 001 to 100

4-3-3. 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



Set the zero point in no-load condition.

4-3-5. Equivalent input calibration



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



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



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

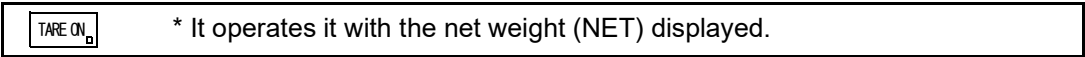


Set the unit of the load to be displayed.

The display value (calibration value) is not affected by changing the unit.

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

4-6. Tare Subtraction

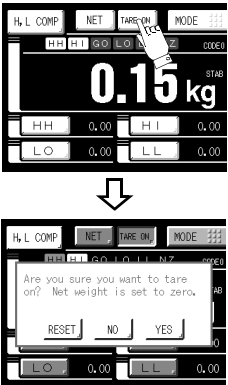


* It operates it with the net weight (NET) displayed.

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.

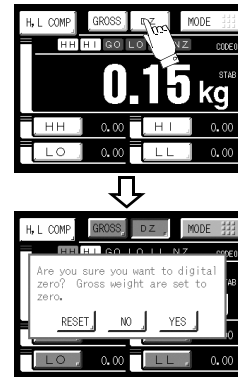
The gross weight value is zeroed by this function.

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.

(Refer to "4-7. Digital Zero" on page 20.)

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.

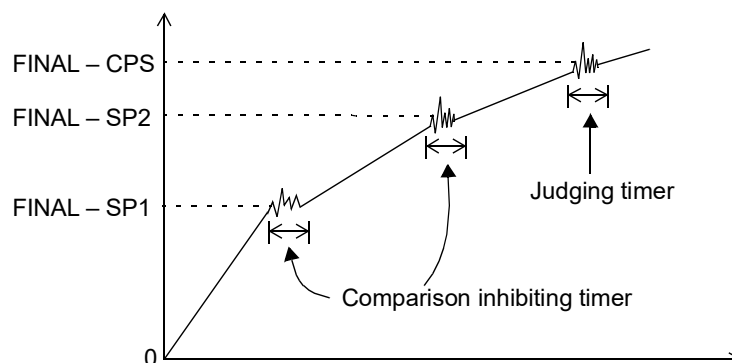
■ Comparison inhibiting time/ Judging time/ Completion output time

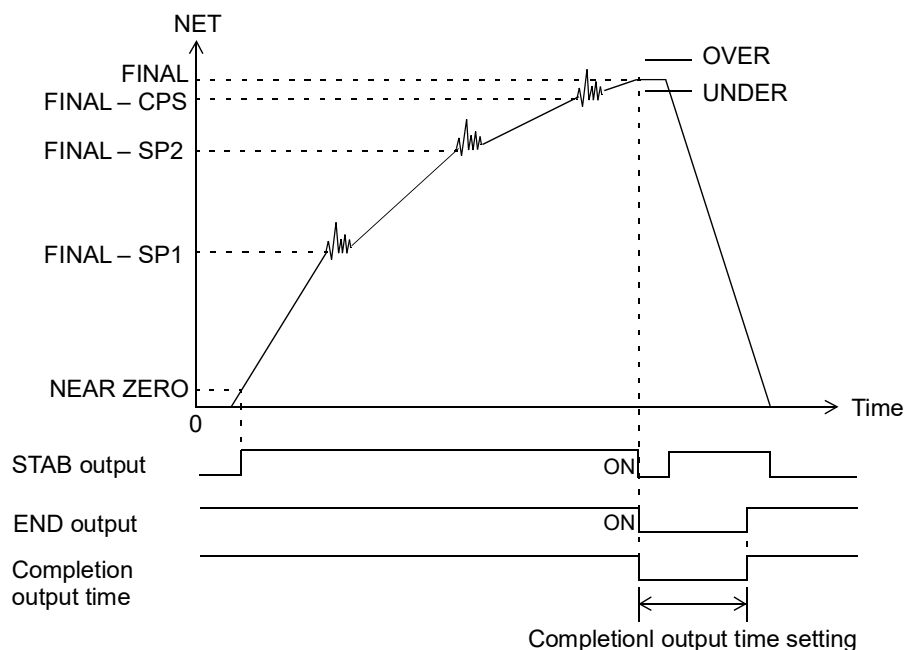
Valid in the discharge mode. Comparisons are not made for a fixed time by this function to prevent inappropriate operation of control and judgment due to mechanical vibrations related to opening and closing of valves. The length of the completion signal to be output when weighing is completed can also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

$$\left[\frac{(D_1 + D_2 + D_3 + \dots + D_A)}{A} \times C \right]$$

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

In order to minimize the errors, the values of D ($D_1, D_2, D_3, \dots, D_A$) 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
		$+0.240/4 = 0.060$		
		$0.060 \times 2/4 = 0.030$		→ 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
		$+0.040/4 = 0.010$		
		$0.010 \times 2/4 = 0.005$		→ 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
		$-0.020/4 = -0.005$		
		$-0.005 \times 2/4 = 0.003$		→ CPS Value
				0.532

**Setting CPS coefficient**

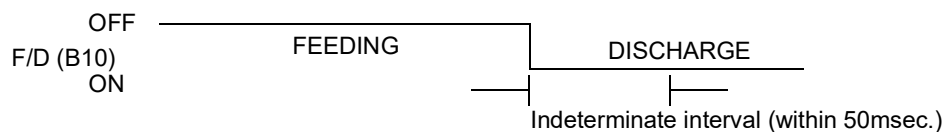
CPS coefficient can be selected from 1/4, 2/4, 3/4, or 1.

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.

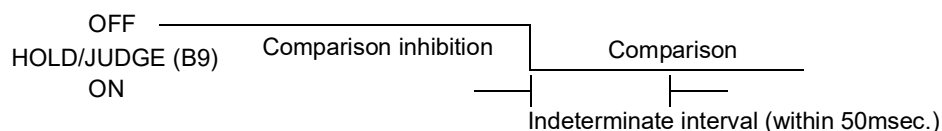
Select the method of overweight/underweight comparison.

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 40), 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 \leq 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 \leq near zero setting
[NET]	ON when net \leq near zero setting
[COMP OFF]	Always OFF
[ABS GROSS]	ON when gross \leq near zero setting
[ABS NET]	ON when net \leq 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:



$$\text{Net} = \text{Gross} - \text{Preset tare value}$$

(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.

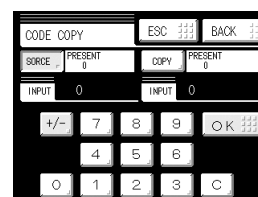
Setting range: [0 to 7] [ALL]

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  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, refer to page 31.

■ **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
[AFC]	00000 to 99999
[OVER]	000 to 999
[UNDER]	000 to 999

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

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

When the net \geq 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 “AFC” relates to the automatic fall compensating function.

*2: Output in the simple comparison mode. For the sequence mode, refer to page 40.

■ **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
[AFC]	00000 to 99999
[HI]	± 00000 to ± 99999
[LO]	± 00000 to ± 99999

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

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

When the net \geq 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 \times 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.)

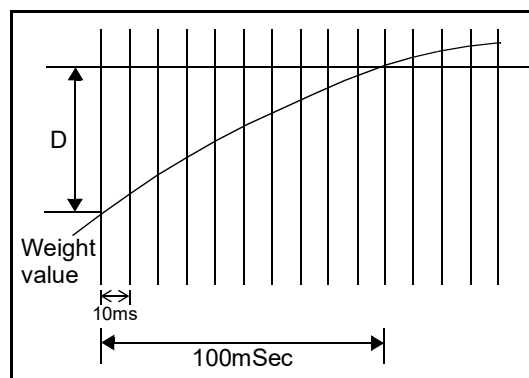
MD(RANGE): 00 to 99 (CNT)

"D" in the right picture and the range are compared at each time of A/D conversion, and when the preset range \times 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

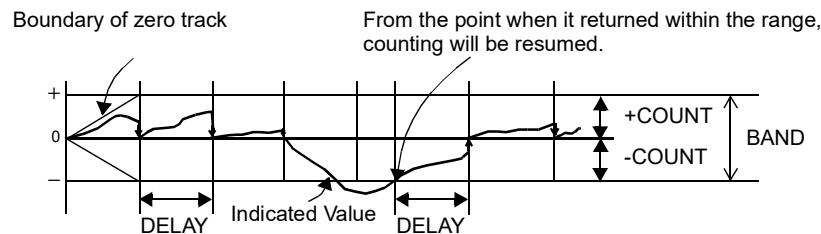
Slow changes in zero point due to drifting are automatically tracked and compensated by this function.

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.

■ 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/ Backlight bright-and-dark time

This function changes the brightness of the backlight when touch screen has not been used for certain period of time.

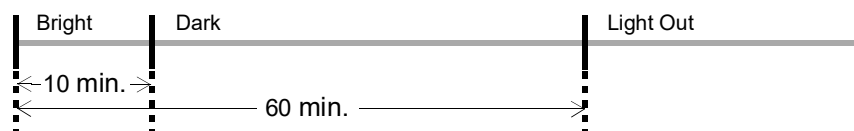
The ON time (lighting time of the backlight) and the Low time (bright→dark switching time of the backlight) are set up.

When you use it in the state which a display is always in sight, set the ON time to 0 minutes.

When you want the backlight always bright, set 0 minutes for both the ON time and the Low time.

The backlight is turned bright by touching the panel when the backlight is turned off or it is dark.

Ex.) Set 60 minutes to ON time, 10 minutes to Low time.)



Setting range: 0 to 99 (min.) (with both time)

■ 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	LLO limit	LLLO-LO limit
TPreset TARE	Z NEAR ZERO	OOver weight	UUnder weight
F FINAL weight	SP1SP1	SP2SP2	SP3.....SPS

■ HI/LO limit output selection

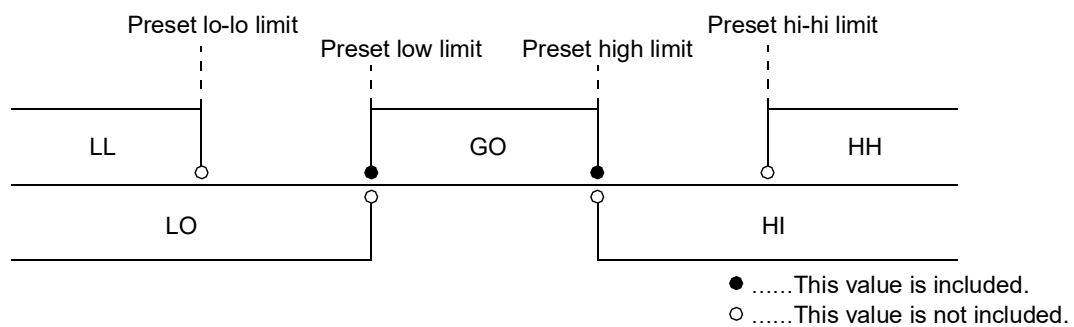
Select the method of comparison output in the HI/LO limit comparison mode.

Alternatives: [NORMAL] [COMPARATOR]

□ Explanation of each alternative

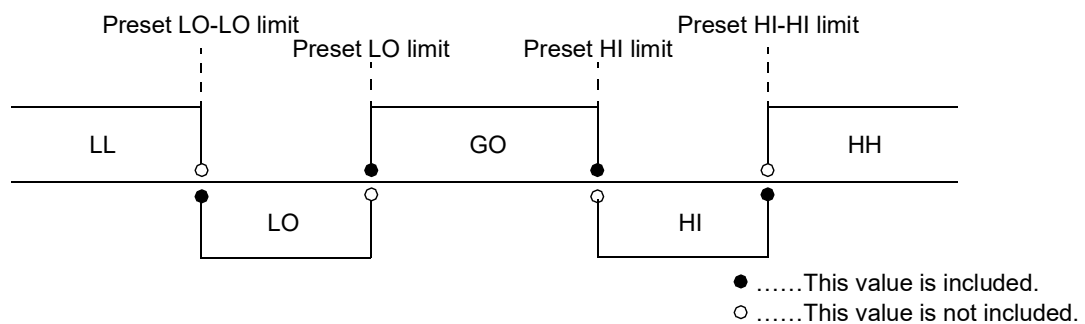
[NORMAL]

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



[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



■ LOCK1/LOCK2

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

LOCK1: [OFF] [ON]

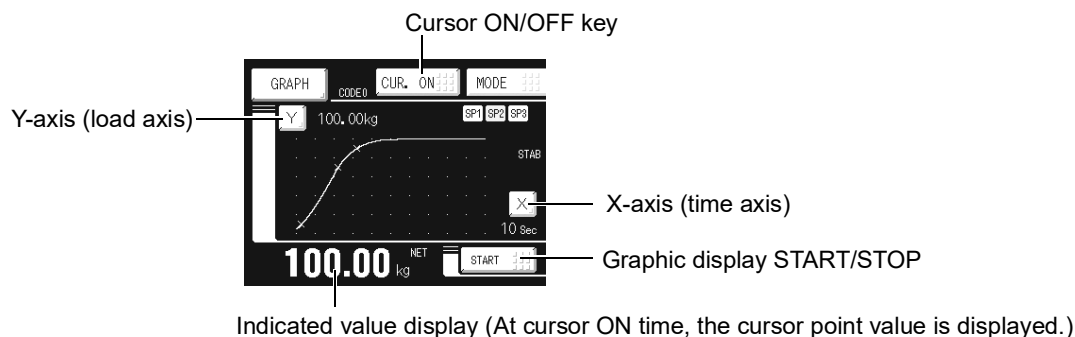
LOCK2: [OFF] [ON]

* Please refer to "21. SETTING ITEM LIST" on page 65 for the setting that LOCK is done by LOCK1 and LOCK2.

8. GRAPH SETTING

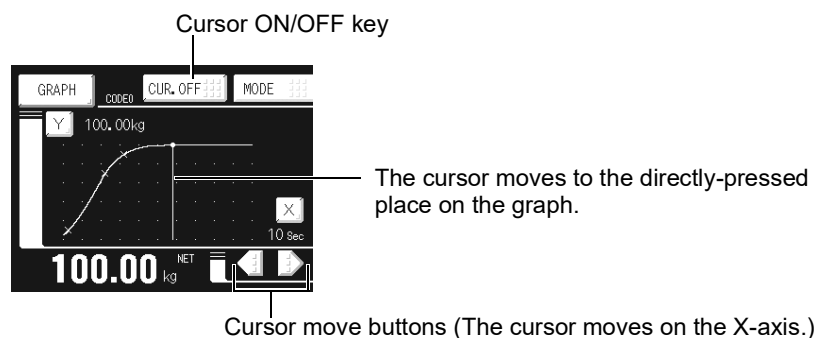
□ Graphic display screen

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



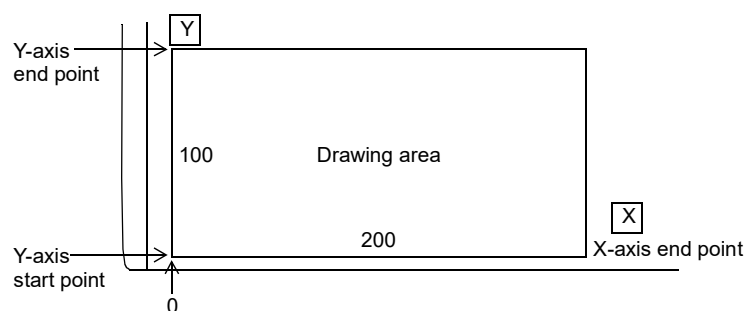
□ X-axis

“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  key, and drawing is repeated until the  key is input.

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

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



In drawing in the discharge mode, an “x” 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 / key.


Alternatives: [OFF] [ON]

■ [DZ] key

Set OFF/ON of the key operation of  key.



Alternatives: [OFF] [ON]

■ [TARE] key

Set OFF/ON of the key operation of  key.

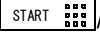

Alternatives: [OFF] [ON]

■ [Cursor ON/OFF] key

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

Alternatives: [OFF] [ON]

■ [START/STOP] key

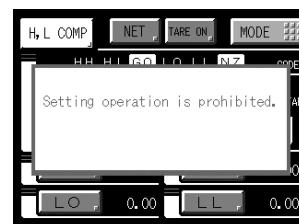
Set OFF/ON of the key operation of / key.

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 F600AT, and weighing is finished by the completion signal.

This is valid only in the discharge mode.

Please refer to "11. TIMING CHART" on page 38 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.40), 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 \geq final weight – SP1, or
- (2) the final weight – CPS \leq 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.

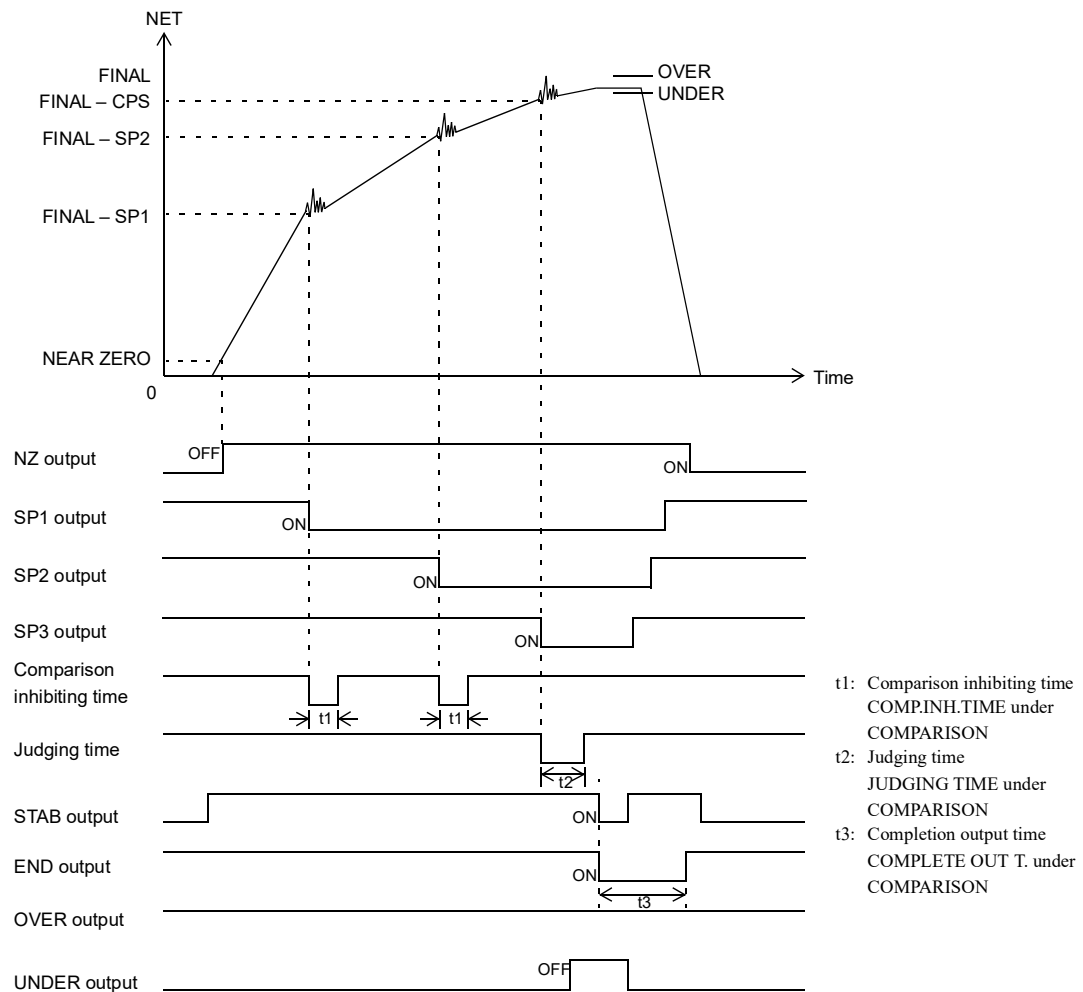
Setting range: 00 to 99 times



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.)

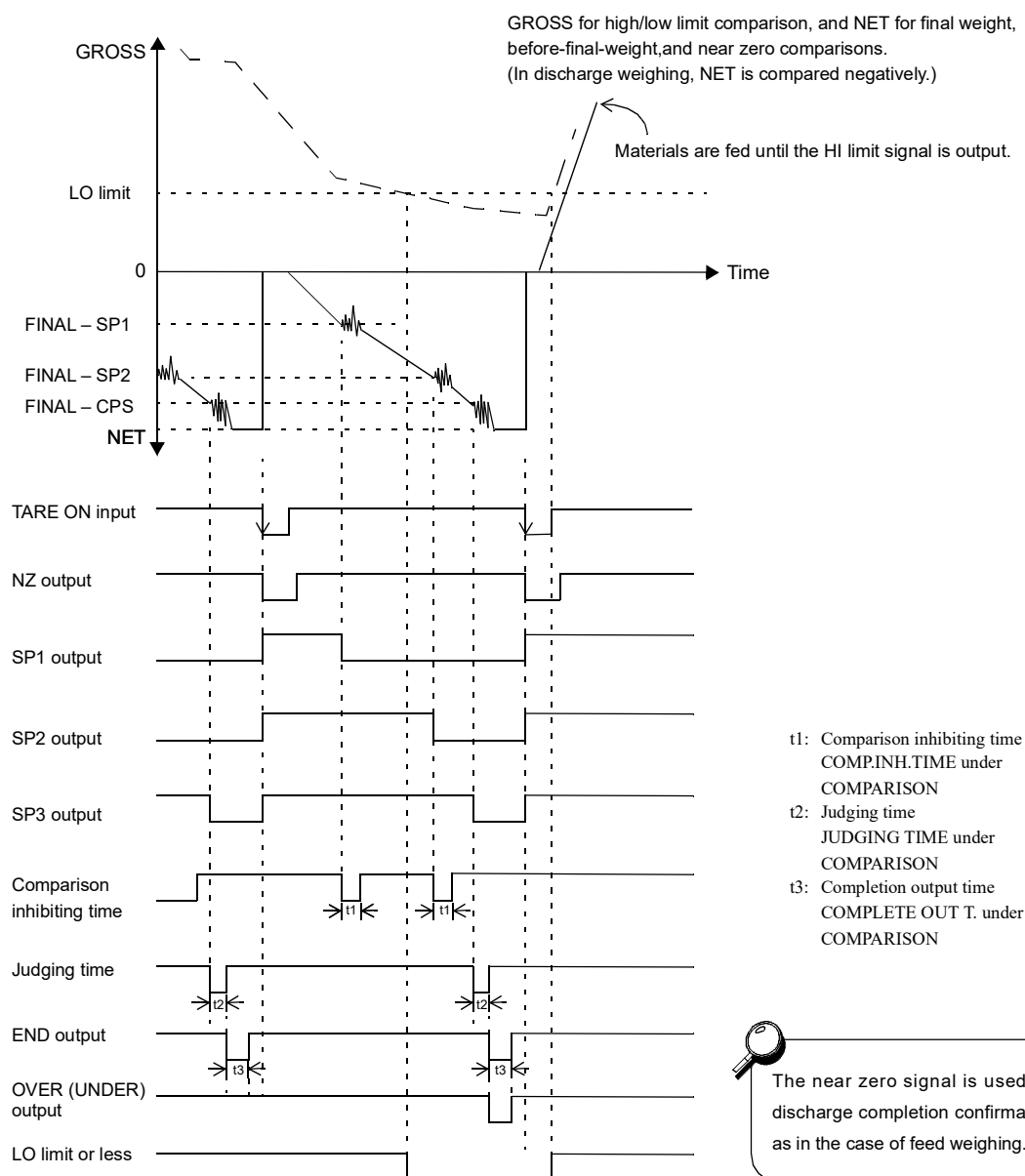
The END signal output timing depends on the COMPLETE SIG.OUT setting under COMPARISON.

Conditional expression

- NZ output ON when the weight value \leq preset near zero value
- SP1 output ON when the net \geq preset final weight value – preset SP1 value
- SP2 output ON when the net \geq preset final weight value – preset SP2 value
- SP3 output ON when the net \geq 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.

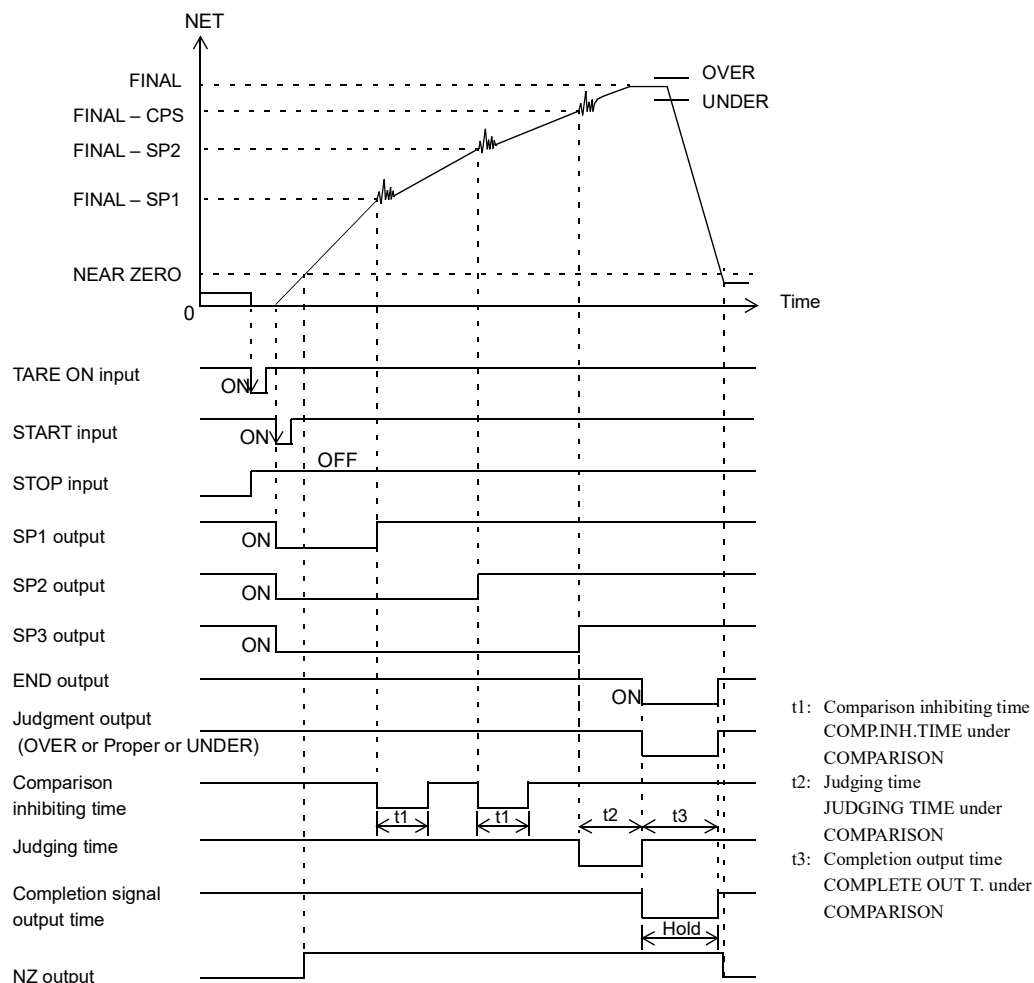
Conditional expression

- NZ output ON when the weight value \leq preset near zero value
- SP1 output ON when the net \geq preset final weight value – preset SP1 value
- SP2 output ON when the net \geq preset final weight value – preset SP2 value
- SP3 output ON when the net \geq 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.

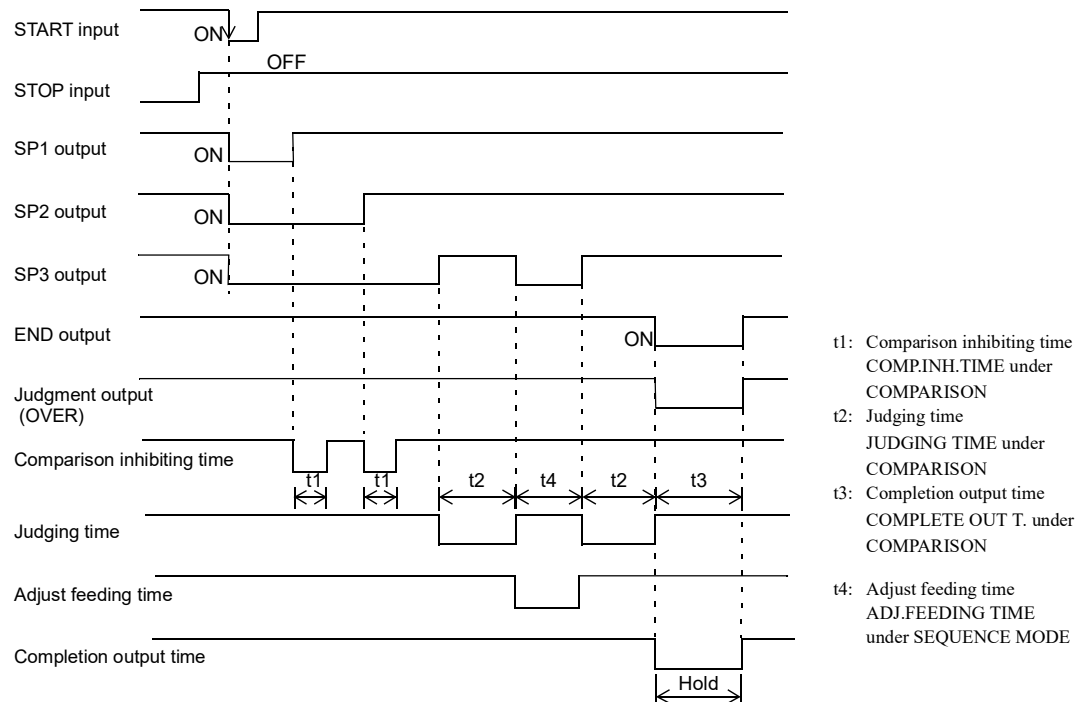
The overweight/underweight comparison timing is such that the OVER/UNDER COMP. setting under COMPARISON is ignored, but comparisons are made when the completion output is ON, and the weight value is held.

Conditional expression

- NZ output ON when the weight value \leq preset near zero value
- * The large/medium/small feeding gate signal is turned ON at the ON edge (OFF \rightarrow ON) of the START signal.
- SP1 output OFF when the net weight \geq preset final weight value - preset SP1 value
- SP2 output OFF when the net weight \geq preset final weight value - preset SP2 value
- SP3 output OFF when the net weight \geq 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.

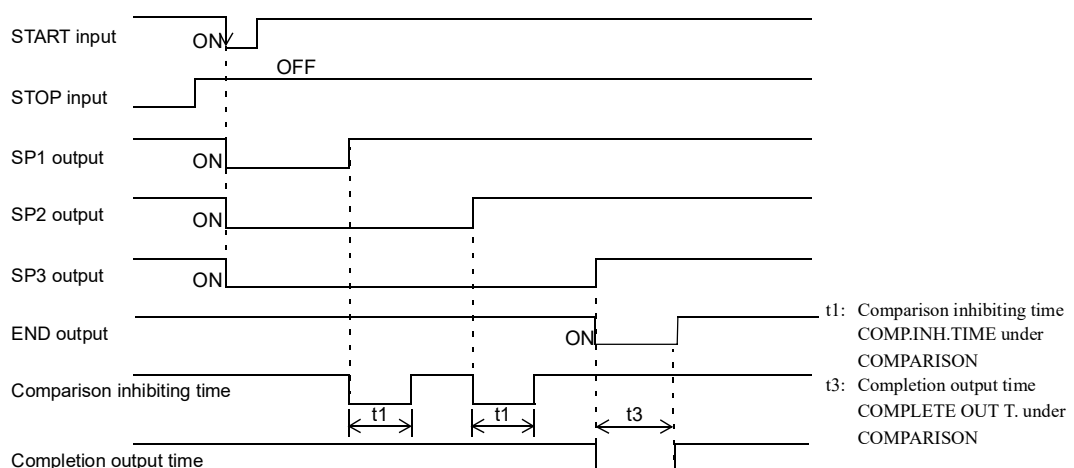
11-3-2. Sequence when the adjust feeding is ON



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.

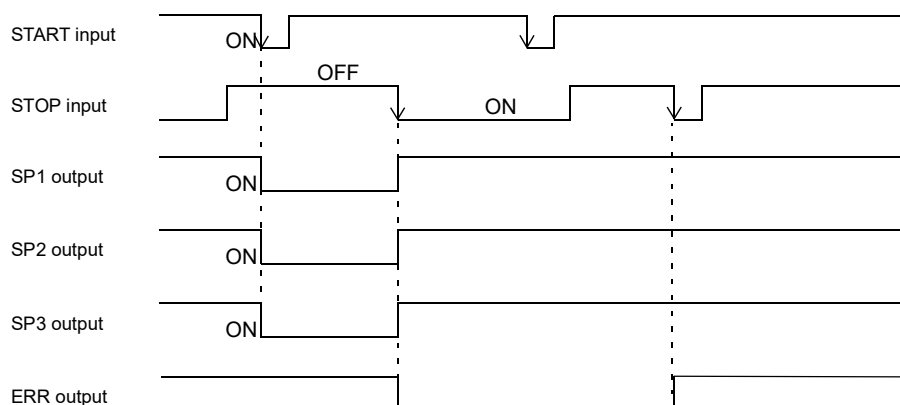
11-3-3. Sequence with no judgment



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



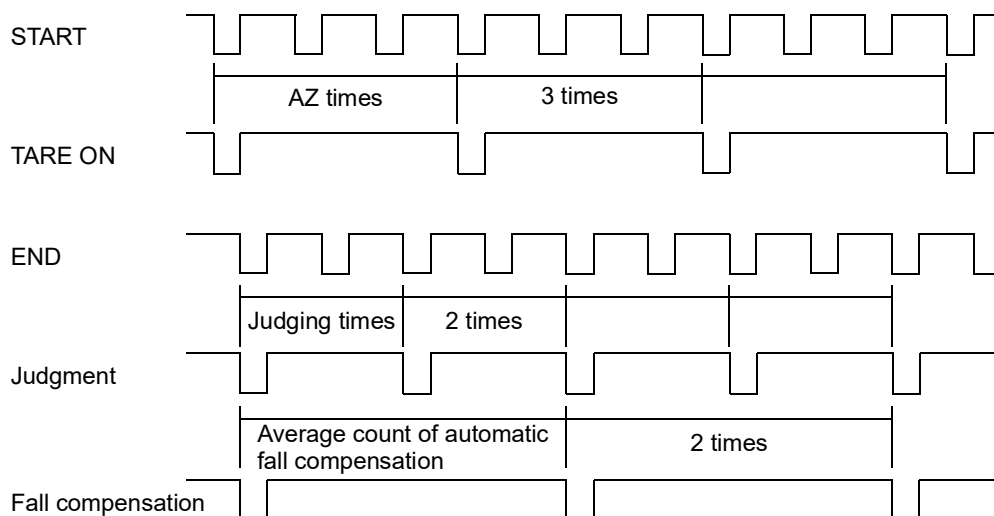
When the STOP signal is turned ON, all the signals of the SP1 output, SP2 output and SP3 output are turned OFF.

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.

(Refer to " ■ B4 terminal function selection" on page 35.)

(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. (Refer to page 24.)

* This input terminal can be set to HOLD.

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

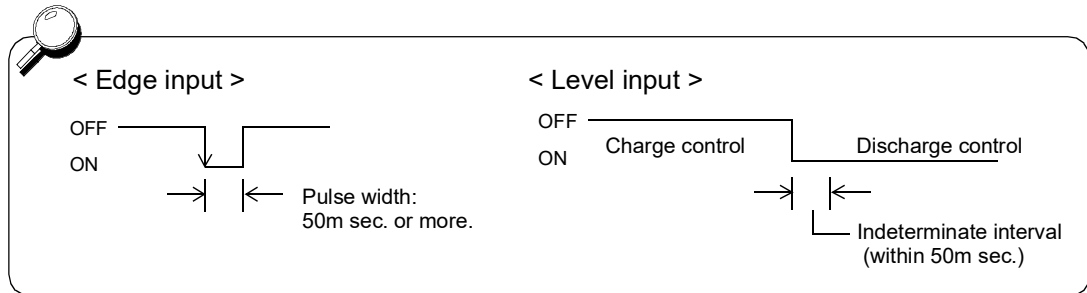
This is valid when charge/discharge selection is external.

OFF will result in charge control, and ON will result in discharge control. (Refer to page 24.)

(9) START (Start) <Edge input>

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

These are valid when the control is in the sequence mode. (Refer to page 42.)



■ 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. (Refer to page 26.)

(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. (Refer to page 25.)

(8) STAB (Stable) (A9)

This turns ON when a stable. (Refer to page 28.)

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

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

13. AUTOMATIC PRINT

The F600AT 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 F600AT and to write parameters into the F600AT.

This interface is convenient to process controls, totals, records, etc., by connecting the F600AT 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 F600AT.

■ 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, refer to "13 AUTOMATIC PRINT" on page 45.

■ Baud rate

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

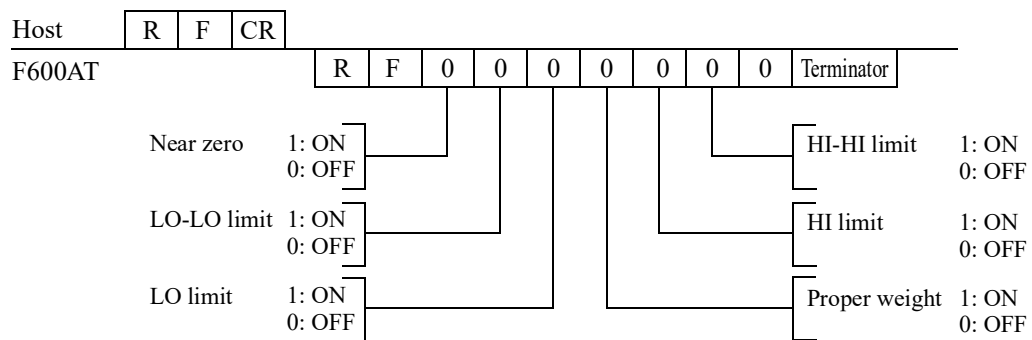
■ Character length

Alternatives: [7bit] [8bit]

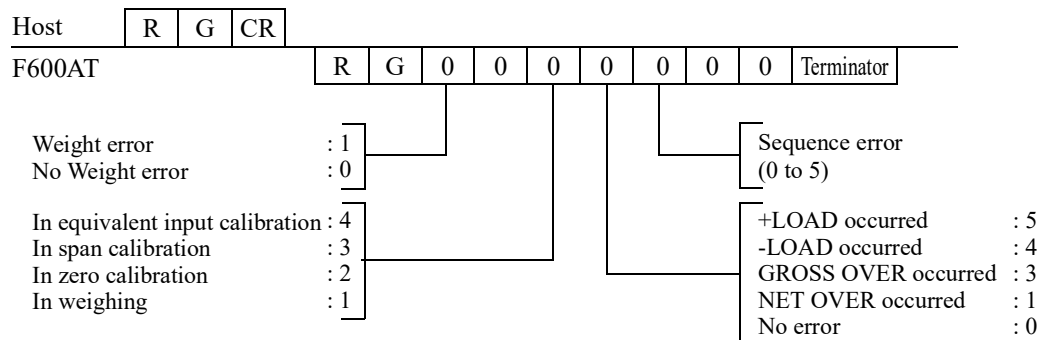
■ Parity bit

Alternatives: [NONE] [ODD] [EVEN]

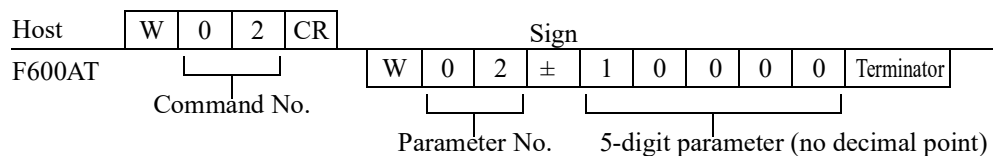
- Status read (7-digit)



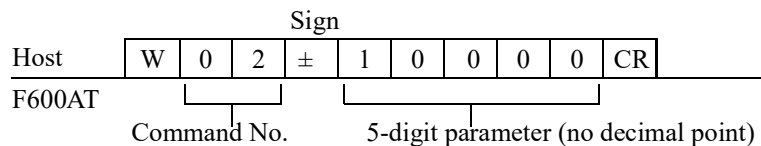
- Status read (7-digit)



- Parameter read (example: High limit)



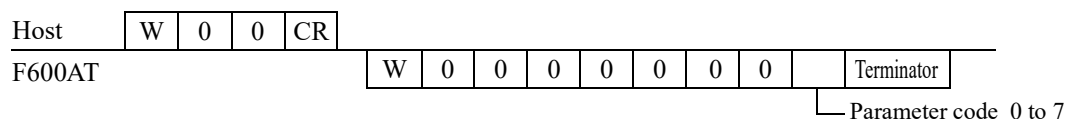
- Parameter write (example: High limit)



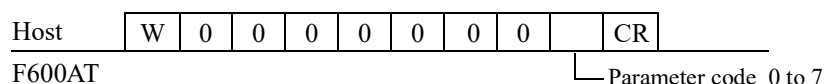
* When you write in a setup which it is not with the sign, put "0" in the sign digit.

* Please refer to "21 SETTING ITEM LIST" on page 65 for command No. and the number of set digits.

- Parameter code read



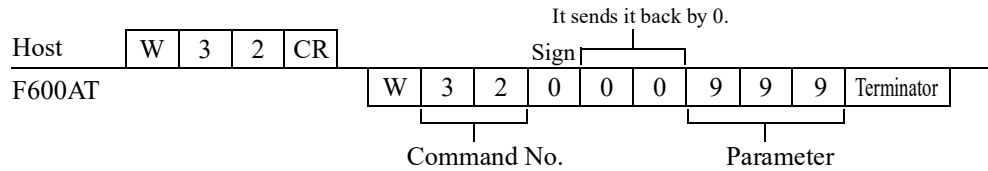
- Parameter code write





- Please refer to "21 SETTING ITEM LIST" on page 65 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.

* Refer to 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:

W	8	3	0	0	2	0	0	0	CR	LF
---	---	---	---	---	---	---	---	---	----	----

Input 2.000mV/V as a value of 2000 with no decimal point.

- 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:

W	8	4	0	1	0	0	0	0	CR	LF
---	---	---	---	---	---	---	---	---	----	----

Input 100.00kg as a value of 10000 with no decimal point.

- 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.

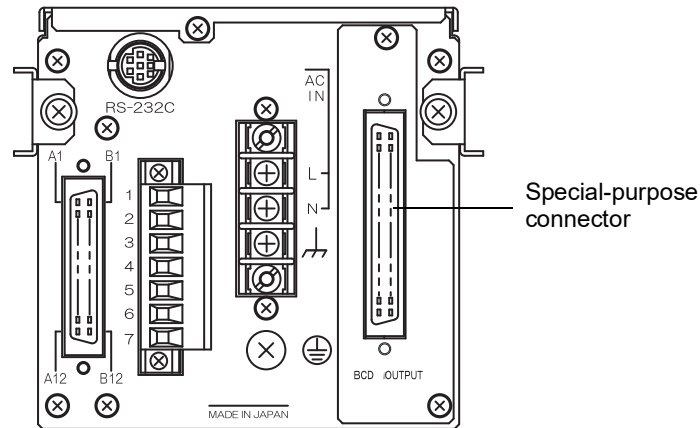
When the net weight is displayed, the header becomes “NT”, and the net weight is transmitted.

- | | |
|--|---|
| <p>*1 H In holding
 O Weight error
 S Stable
 M Unstable</p> <p>*2 T Zero tracking ON
 A Zero tracking OFF</p> <p>*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</p> <p>*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</p> <p>*5 N Near zero OFF
 Z Near zero ON</p> | <p>For final weight (DIS.-O/U)
 G OVER and UNDER OFF
 V OVER ON
 U UNDER ON</p> <p>For final discharge mode
 E Completion ON
 3 SP3 ON
 2 SP2 ON
 1 SP1 ON
 G Completion, SP1, SP2, and SP3 OFF</p> |
|--|---|

15. BCD DATA OUTPUT (OPTION)

The BCD data output is an interface to extract the indicated value of the F600AT as BCD data. This interface is convenient to process controls, totals, records, etc., by connecting the F600AT to a computer, process controller, sequencer or the like.

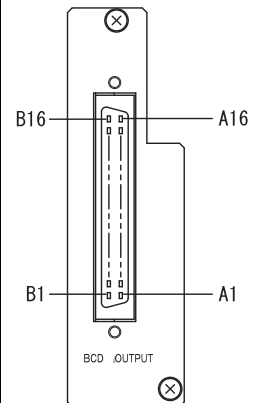
The I/O and internal circuits are electrically insulated by photocoupler.



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)

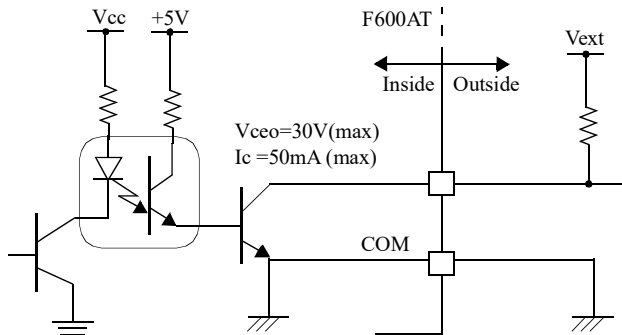
Connector cover: FCN-360C032-B (manufactured by FUJITSU COMPONENT or equivalent)

(Connector & cover optional type: CN51)

15-2. Equivalent Circuit

- Output

The signal output circuit is operated through an open collector.



- Internal transistor status

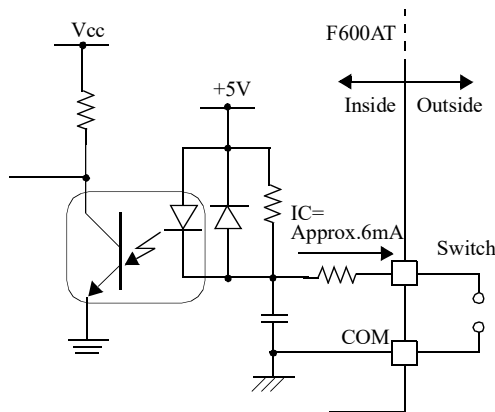
Output data	Negative	Positive
0	OFF	ON
1	ON	OFF

Through logic switching (B14)

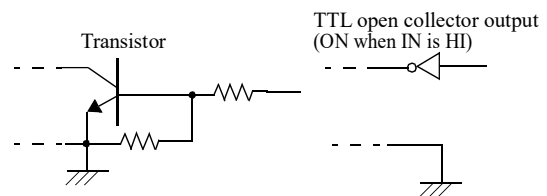
- Output pin level

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 $I_c=10\text{mA}$.
- Leakage from the external element is required to be $30\mu\text{A}$ 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.

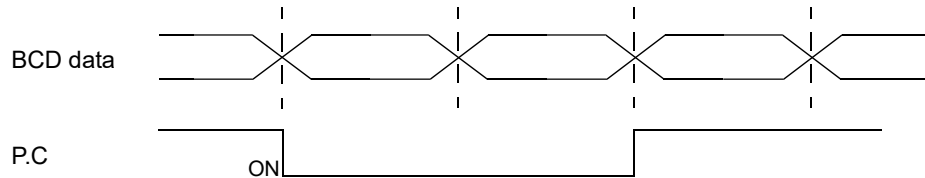
15-4. Signal Output Timing

- P.C

Note: P.C should also be acquired in synchronization with the strobe signal as in the case of the data signal. (Refer to page 53.)

● HI/LO limit output

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

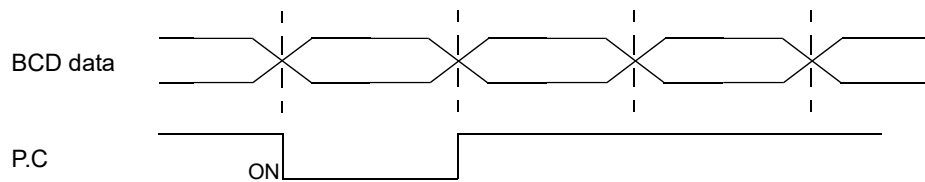


● In the discharge control mode; simple comparison mode

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

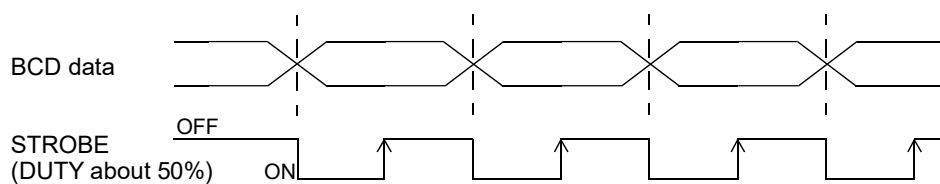
The signal is output with +ADC OVER (+LOAD) or -ADC OVER (-LOAD) overflow (NET OVER or GROSS OVER).

- 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]

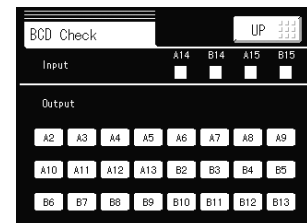
Select the weight value for BCD output. If “INDICATE” is selected, the weight indicated by the indicator is output.

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)

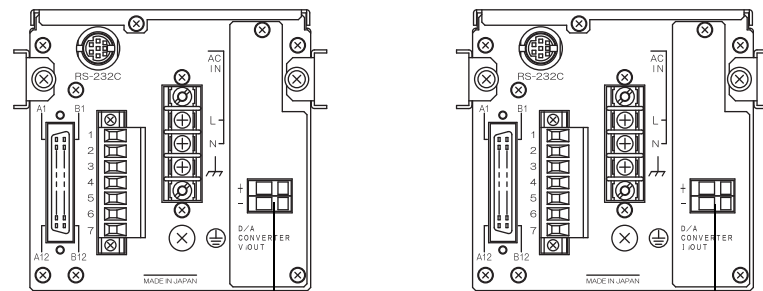
D/A converter is provided for obtaining analog output synchronized with the indicated value of the F600AT.

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. $\pm 10\%$ FS.

* Either voltage output or current output can be mounted.

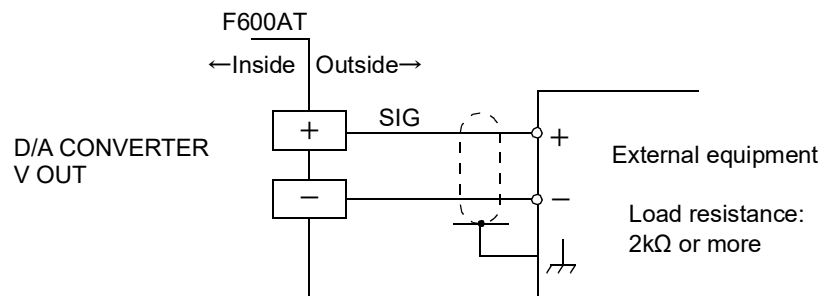


Voltage/ Current output terminals:
Terminals to extract voltage or current signals.
0 to +10V and 4 to 20mA can be obtained by the
voltage output and current output, respectively.

- Taking voltage output signals

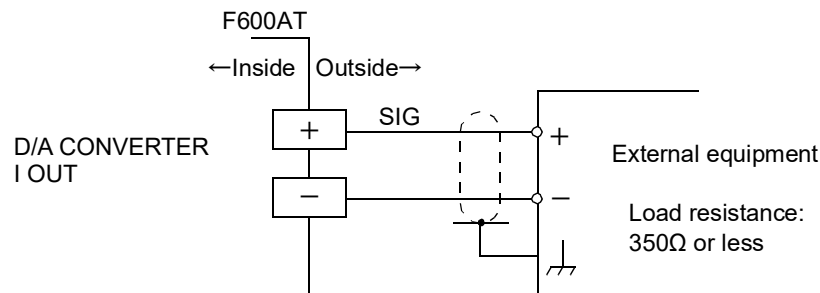
Connect external equipment (2k Ω or more load resistance) to + and - of the F600AT.

For connection, refer to "Connection of the D/A Converter Options" page 56.



- Taking current output signals

Connect external equipment (350 Ω or less load resistance) to + and - of the F600AT.



- 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

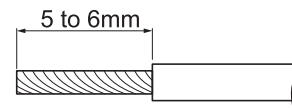
The terminal block for the D/A converter options is the cage clamp type. Connect according to the following procedures.

As for wire materials, use parallel 2-core cables, cabtyre cables, or the like.

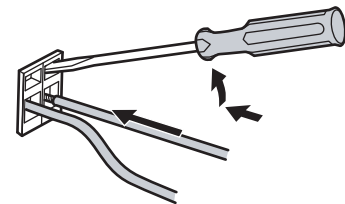
Connect to the cage clamp type terminal block by using the attached miniscrewdriver.

- 1) Strip the casing 0.2in (6mm) on the cable to be connected.

Twist the bare wire to fit the terminal hole.



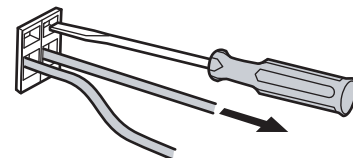
- 2) Insert the supplied screwdriver into the upper hole and lift upward.



- 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 2.5mm²).
- 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

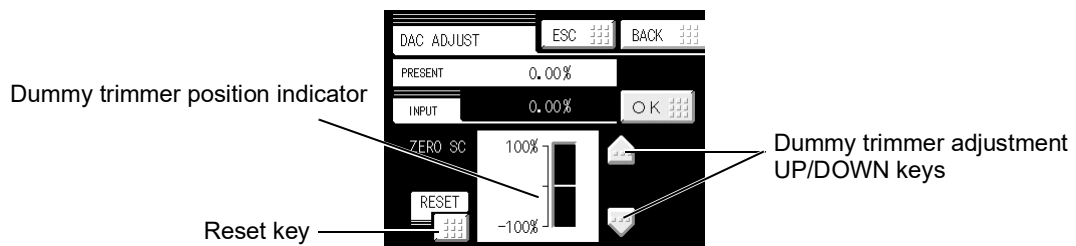
Set the indicated value for outputting 20mA (10V).



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  key.

While monitoring the output value, finely adjust the output with the dummy trimmer the UP/DOWN   keys, and press the  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; $\pm 1.0\text{V}$, and current; $\pm 1.6\text{mA}$.
- * 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 31, " ■ [GROSS/NET] key" on page 34, " ■ [DZ] key" on page 34, " ■ [TARE]key" on page 34, " ■ [Cursor ON/OFF]key" on page 34, " ■ [START/STOP] key" on page 34.

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 \leq 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

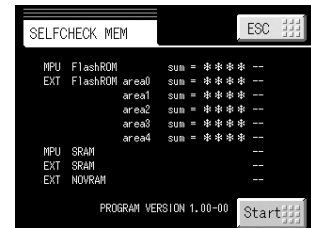
Self-check is performed when the setting is called.

■ 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

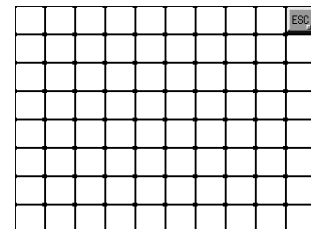
Check the memory to see that it is free from defects. The result is displayed in a moment after the  key at the lower right of the screen is pressed. Or, check the version here.



■ Self-check KEY

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

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

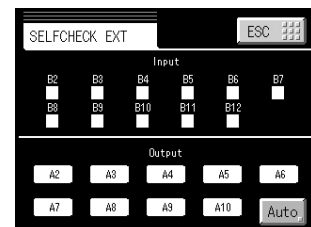


■ Self-check EXT

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.



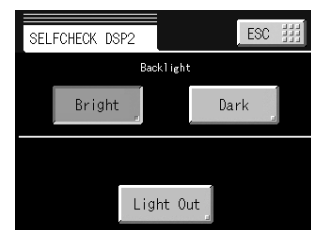
■ Self-check DSP2

Check the backlight and status indicator lamp.


The backlight turns bright by pressing "" button, and turns dark by pressing "" button.

The backlight goes out when the "" button is pressed, and after that, it recovers when the screen is touched.

The status indicator lamp lights in green and red alternately.



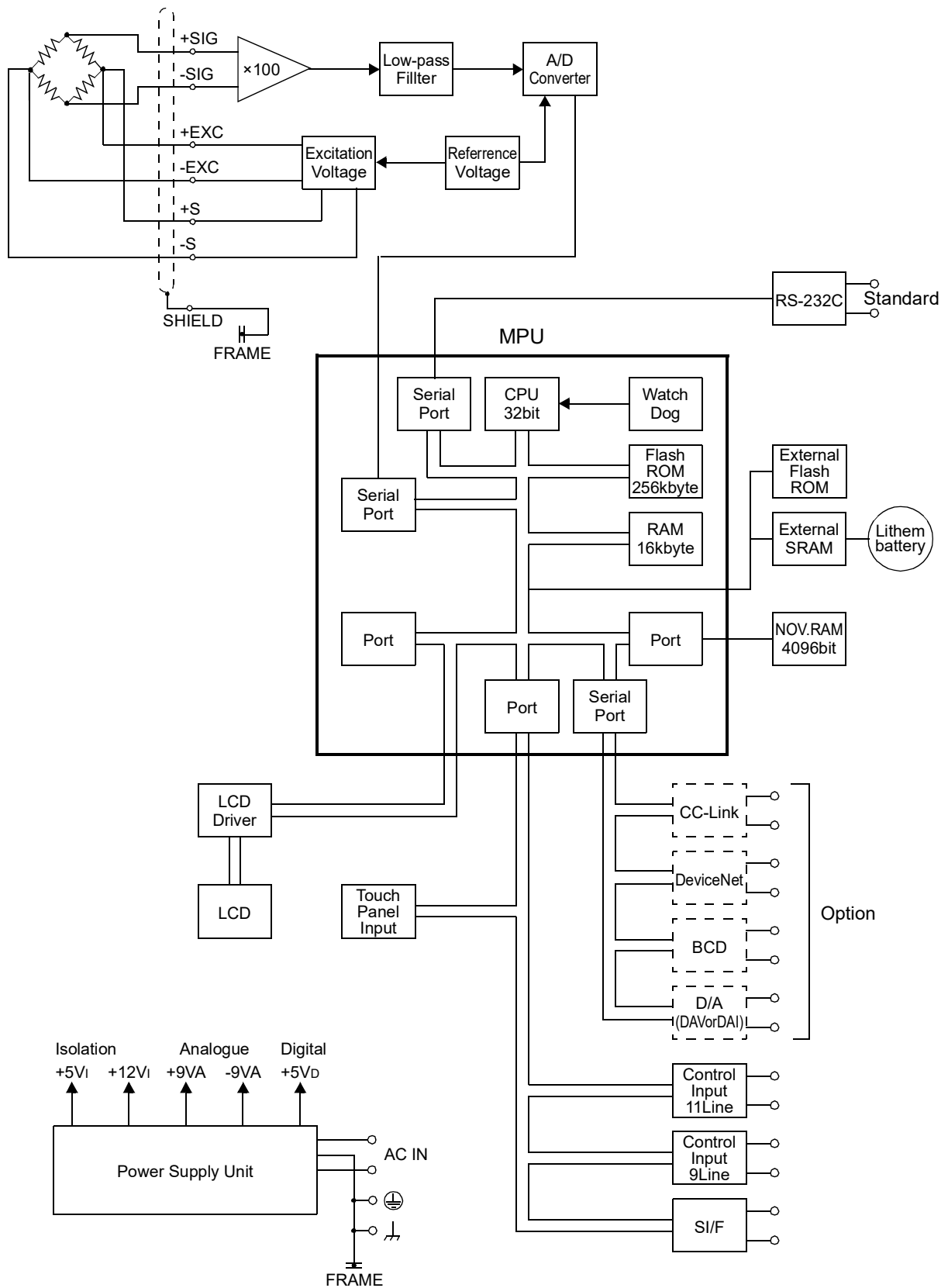
■ Self-check COM

The data displayed under "Transmit data" is sent by pressing the  key.

Under "Receive data", externally transmitted data is displayed.



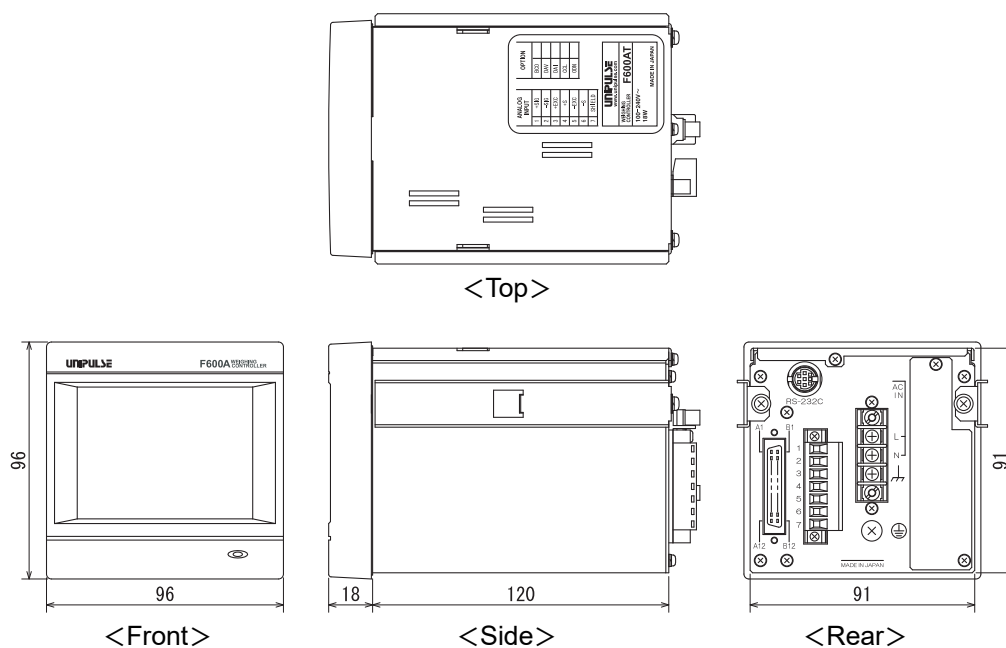
19. BLOCK DIAGRAM



20. DIMENSIONS

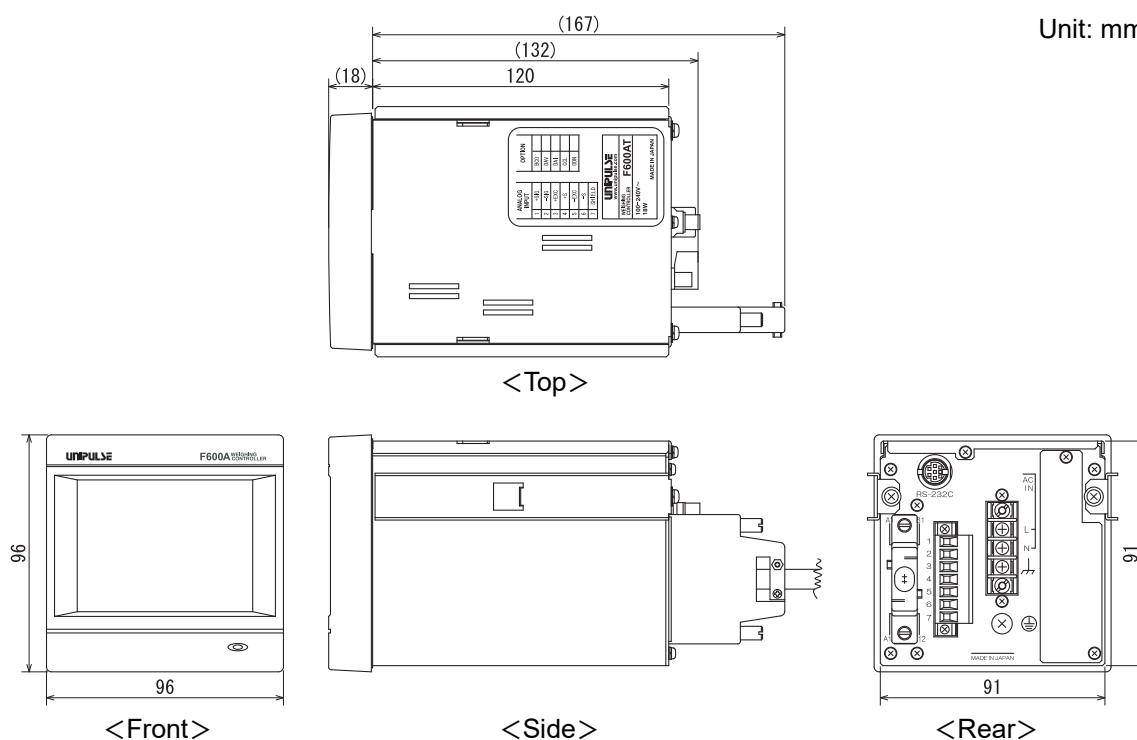
■ Standard equipment

Unit: mm

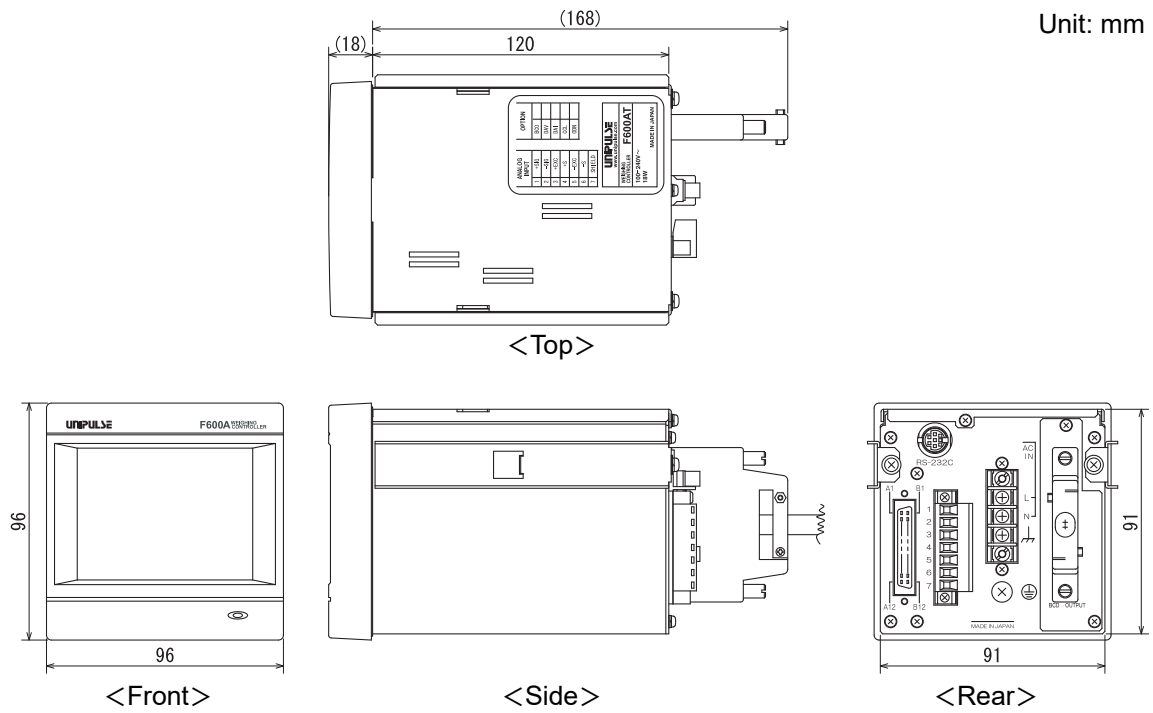


■ When the external input/output signals is connected

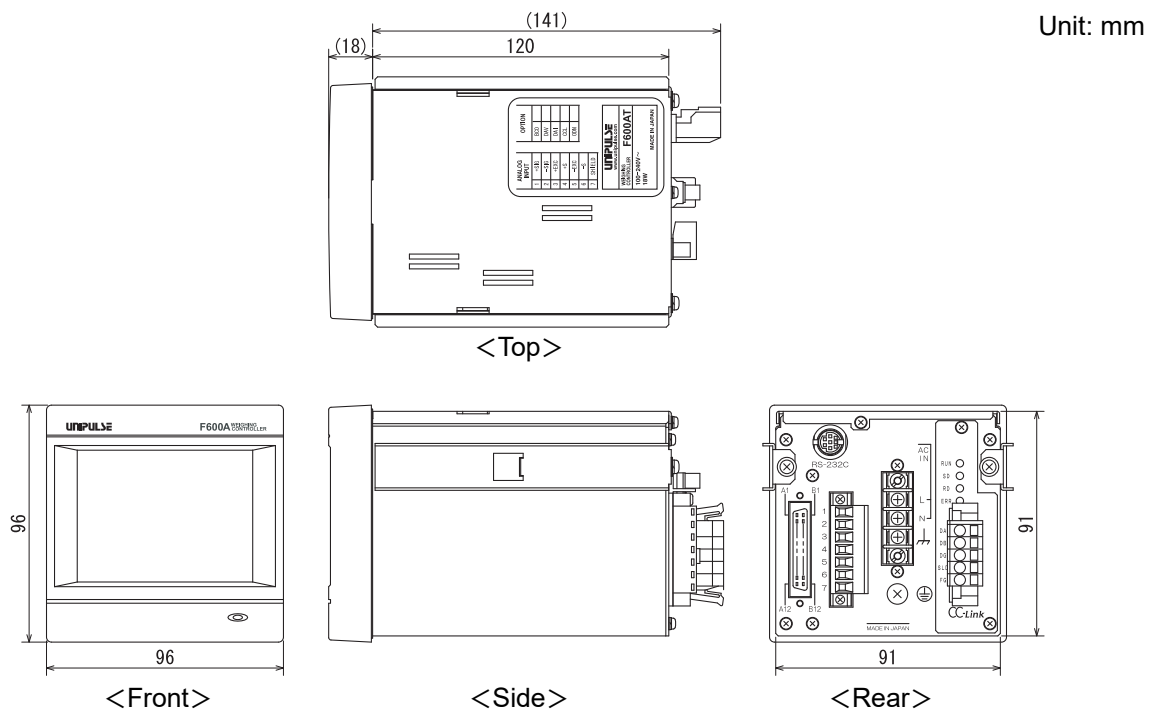
Unit: mm



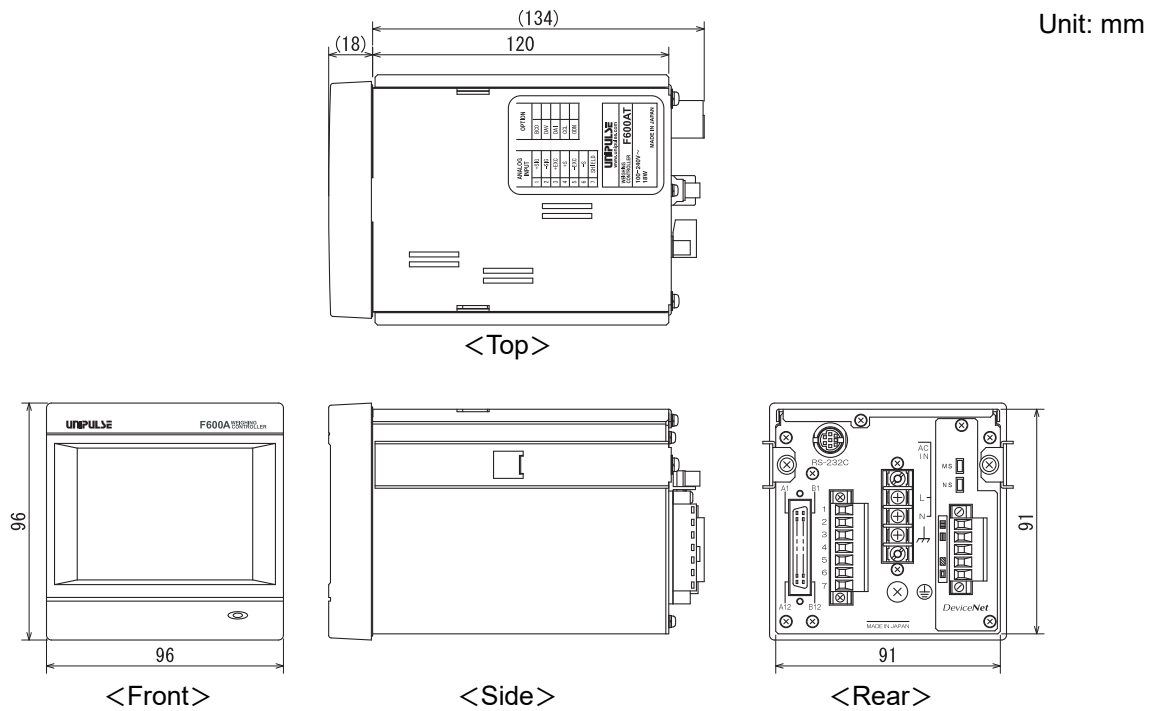
■ When the BCD option is equipped



■ When the CC-Link option is equipped



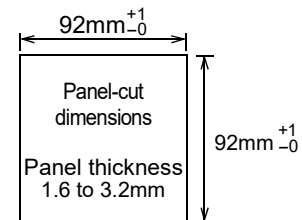
■ When the DeviceNet option is equipped



20-1. Installation in a Panel

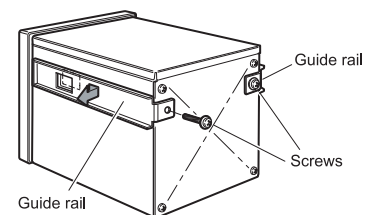
To install the F600AT into a control panel, use the following procedure.

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.

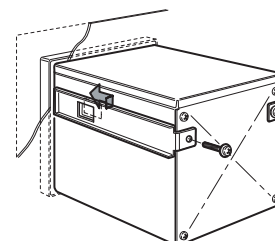
* Do not use other screws than those installed to the F600AT body



3. Fit in the F600AT 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			O		0 ~ 7	00(R/W)
1	1	HH	000.00	O		O		±00000 ~ ±99999	01(R/W)
	2	HI	000.00	O		O		±00000 ~ ±99999	02(R/W)
	3	LO	000.00	O		O		±00000 ~ ±99999	03(R/W)
	4	LL	000.00	O		O		±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			O		0 ~ 7	00(R/W)
1	1	FINAL	000.00	O		O		00000 ~ 99999	11(R/W)
	2	SP1	000.00	O		O		00000 ~ 99999	12(R/W)
	3	SP2	000.00	O		O		00000 ~ 99999	13(R/W)
	4	CPS	00.00	O		O		0000 ~ 9999	14(R/W)
2	5	AFFC	098.00		O	O		00000 ~ 99999	15(R/W)
	6	OVER	0.00	O		O		000 ~ 999	16(R/W)
	7	UNDER	0.00	O		O		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			O		0 ~ 7	00(R/W)
1	1	FINAL	000.00	O		O		00000 ~ 99999	11(R/W)
	2	SP1	000.00	O		O		00000 ~ 99999	12(R/W)
	3	SP2	000.00	O		O		00000 ~ 99999	13(R/W)
	4	CPS	00.00	O		O		0000 ~ 9999	14(R/W)
2	5	AFFC	098.00		O	O		00000 ~ 99999	15(R/W)
	6	HI	000.00	O		O		±00000 ~ ±99999	02(R/W)
	7	LO	000.00	O		O		±00000 ~ ±99999	03(R/W)

21.SETTING ITEM LIST

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] 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] 2: [EXTERNAL]	38(R/W)
	9	COMPLETE SIG. OUT	JUDGING TIME		○		○	0: [JUDGING TIME] 1: [JUD.or STABLE] 2: [JUD.& STABLE]	39(R/W)
	10	OVER/UNDER COMP.	REGULARLY		○		○	0: [REGULARLY] 1: [COMP. SIG.] 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] 2: [COMP OFF] 3: [ABS GROSS] 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] 3: [8times] 4: [16times] 5: [32times] 6: [64times] 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	BACKLIGHT BRIGHT-AND-DARK TIME	0minute		○		○	00 ~ 99	48(R/W)
	9	INDICATE COLOR	Yellow		○		○	0: [Yellow] 1: [Green] 2: [Blue] 3: [Comparison]	49(R/W)
	10	BACKLIGHT LIGHTING TIME	10minutes		○		○	00 ~ 99	4A(R/W)
3	11	DISPLAY SELECT	HH,H,L,LL (*)		○		○	0: [F, SP1-3] 1: [F, SP3, H, L] 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)
	14	LOCK2	OFF				○	0: [OFF] 1: [ON]	4E(R)

(*) It changes with comparison modes. (Refer to page 30.)

GRAPH

PAGE		Parameter	Initial value	L1	L2	S	N	Alternatives・Setting range	Communication Command No.
1	1	GRAPHIC MODE	CONTINUITY		○		○	0: [CONTINUITY] 1: [SINGLE] 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] 2: [20times] 3: [10times] 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] 2: [ZERO SCALE] 3: [FULL SCALE]	
	2	ZERO OUTPUT	000.00		○		○	00000 ~ 99999	
	3	FULLSCALE OUT.	100.00		○		○	00000 ~ 99999	

OPTION (In case of used CC-Link)

PAGE		Parameter	Initial value	L1	L2	S	N	Alternatives・Setting range	Communication Command No.
1	1	OCCUPIED STATION	4 stations		○		○	0: [1 station] 1: [2 stations] 2: [4 stations]	
	2	SPEED	10Mbps		○		○	0: [156kbps] 1: [625kbps] 2: [2.5Mbps] 3: [5Mbps] 4: [10Mbps]	
	3	STATION NUMBER	1		○		○	1 ~ 64	
	4	WGT SELECT CODE	Extinput		○		○	0: [Network] 1: [Extinput]	

OPTION (In case of used DeviceNet)

PAGE		Parameter	Initial value	L1	L2	S	N	Alternatives・Setting range	Communication Command No.
1	1	NODE ADDRESS	0		○		○	0 ~ 63	
	2	SPEED	500kbps		○		○	0: [125kbps] 1: [250kbps] 2: [500kbps]	
	3	WGT SELECT CODE	Extinput		○		○	0: [Network] 1: [Extinput]	
	4	COMM. MODE	Read only		○		○	0: [Read only] 1: [Write En.]	

21.SETTING ITEM LIST

SYSTEM

PAGE		Parameter	Initial value	L1	L2	S	N	Alternatives · Setting range	Communication Command No.
1	1	INITIALIZATION	CODE						
	2	SELFCECK DSP1						[CODE] [COMP.] [OPR.] [CAL.] [etc.]	
	3	SELFCECK MEM							
	4	SELFCECK KEY							
	5	SELFCECK EXT							
2	6	SELFCECK DSP2							
	7	SELFCECK 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 (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] 4: [N] 5: [lb]	88(R/W)
	9	DECIMAL PLACE	0.00		○		○	0: [NONE] 1: [0.0] 2: [0.00] 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] 2: [AT PRINT]	D1(R)
	2	BAUD RATE	9600BPS		○		○	0: [1200] 1: [2400] 2: [4800] 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 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 ±1 digit (When 3mV/V is input)
	Zero drift	Within 0.25μV/ °C RTI
	Gain drift	Within 25ppm/ °C
A/D converter	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	3.5 inch TFT color LCD module (Display area: 71mm×53mm) 320×240 dots	
Weight value display	5-digit 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). 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 (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	
	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)
		1 to 63 (when two station is occupied)
		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)
	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%)
		[Free power supply 50/60Hz]
	DC spec.	DC24V (±15%)
		(Depending on the request at the time of order)
Power consumption	AC spec.	18W max
	DC spec.	18W max
Operating conditions	Temperature	Operating temperature range: -10 °C to +40 °C
		Storage temperature range: -20 °C to +60 °C
	Humidity	80%RH or less (non-condensing)
Dimensions		96W × 96H × 138D (mm) (not including projections)
Weight		Approx.1.0kg

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