F340A *DIGITAL INDICATOR*

OPERATION MANUAL

UNIPULSE

01 Aug. 2017
Rev. 1.44

Introduction

We appreciate your kind purchase of F340A Digital Indicator.
To take full advantage of high performance of F340A, Thoroughly read this operating manual first before use and understand the explanations contained herein for correct operating procedures.

Safety precautions

Be sure to read for safety.

Make sure that installation, maintenance, and inspection of the F340A are performed by personnel with electrical expertise.
In this manual, precautions for safe use of the F340A are separately described as ⚠ Warning and ⚠ Caution in the following text. The precautions described in this text are important contents related to safety. Use this indicator with accurate understanding of the contents.

⚠ Warning

Events that may cause death or severe injury to personnel in the event of misuse.

⚠ Caution

Events that may cause injury to personnel or material damage in the event of misuse.

⚠ Warning

Events that may cause death or severe injury to personnel in the event of misuse.

Design warning

- Prepare a safety circuit outside the F340A so that the entire system functions safely if the F340A fails or malfunctions.
- Be sure to contact our sales representative before use if the F340A will be used as follows:
  - if the indicator is used in an environment not described in the operation manual;
  - if the indicator is used in a way that causes substantial effects on medical devices, transportation equipment, entertainment devices, safety devices, etc.

Installation warning

- Do not disassemble, repair, or alter the F340A. Fire or electric shock may occur.
- Do not install into the following environments:
  - Locations with corrosive gas or combustible gas;
  - Locations over which water, oil, or chemical splash

⚠ Warning

Events that may cause death or severe injury to personnel in the event of misuse.

Wiring warning

- Do not connect commercial power supply directly to a signal I/O terminal.
- Be sure to perform class D grounding when installing the main unit
- The AC cable included is for use in Japan and the rating is AC125V, 7A. Prepare a separate AC cable if the indicator is used at a voltage higher than the rating or is used overseas.
- Be sure to check that the power is off before the following actions:
  - Removal and installation of optional connectors and so forth;
  - Wiring and connection of cables to a power input terminal;
  - Wiring and connection of cables to a signal I/O terminal;
  - Connection to protective grounding terminals.
- Be sure to check signal names and pin assignment numbers and to wire cables properly before connecting to a signal I/O terminal.
- Make sure to attach the terminal block cover included after wiring power supply. Electric shock may occur.
- Install a lightning surge protector (optional) as a measure against lightning surges.
- Be sure to check wiring and so on carefully before turning power on.

Startup/maintenance warning

- Use power supply voltage and load within the specified range and rating.
- Do not damage power cords. Fire or electric shock may occur.
- Do not touch a signal I/O terminal while the power is on. This may cause electric shock and malfunction.
- Electric shock may occur inside when the cover of the main unit is opened. Internal capacitors are charged even if power supply is cut off. Contact us for inspection and repair of internal parts.
- Turn power off and unplug power cable immediately if smoke, abnormal smell, or abnormal noise is detected.

⚠ Caution

Events that may cause injury to personnel or material damage in the event of misuse.

Installation precautions

- The F340A must be incorporated into the control panel and so forth.
- Do not install into 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.
- Perform adequate shielding if the indicator is used in the following locations:
  - Near power lines;
  - Locations subject to strong electric field and magnetic field;
  - Locations subject to noise such as static electricity and relays.
- Install as far away as possible from equipment generating high frequency, high voltage, large current, surge, etc. Perform wiring of cables separately from these power lines. Do not perform parallel wiring and identical wiring.
- Do not use the indicator if damaged.

Wiring precautions

- Tighten power input terminal screws to the torque specified.
  Loose tightening may cause short-circuiting, fire, or malfunction.
  Tightening torque: 0.5N・m
- Use shielded cables for cables (sensors, external I/O, options).
- The temporary overvoltage applied to the power should not exceed 1500V.

Startup/maintenance precautions

- Be sure to have a time interval of five seconds or longer between turning power on and off.
- Use after warming up for 30 minutes or longer following the startup of power supply.
- Protective performance of the F340A may be lost if it is not used as specified.
- Care
  - Unplug the power supply during maintenance.
  - Do not wipe with a wet cloth, benzin, thinner, alcohol, etc. Doing so may cause discoloration or deformation of the F340A.
    When dirty, clean using a cloth soaked in diluted neutral detergent followed by a soft, dry cloth.

⚠ Caution

Events that may cause injury to personnel or material damage in the event of misuse.

Transportation precautions

- Although the F340A package is designed to absorb shock sufficiently during shipping, re-use of the same packaging materials may damage the indicator when shock is encountered. When sending this product to us for repair and so on, package it using sufficient shock-absorbing materials.

Disposal precautions

- Dispose of as industrial waste.

Products supporting RoHS directive

The parts and accessories used in this machine (including the operation manual, package box and so on) support RoHS Directive, which regulates the use of toxic substances that may have adverse effects on the environment and human body.

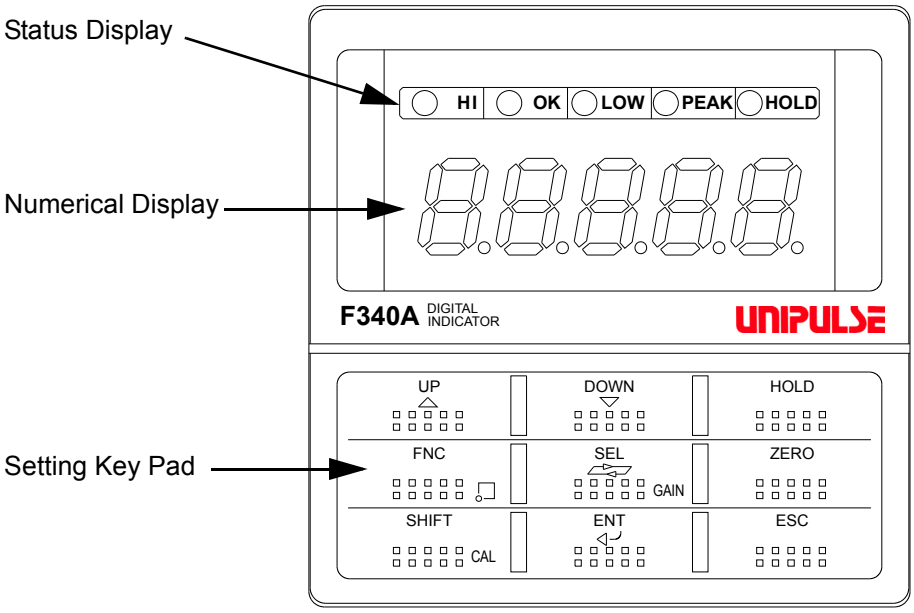
RoHS directive

RoHS stands for Restriction on Hazardous Substances. This is an EU regulation regarding toxic substances. This Directive prohibits the use of six specific substances in electrical/electronic equipment products sold in the EU region. The six substances include lead, mercury, cadmium, hexavalent chromium, PBB (polybrominated biphenyl) and PBDE (polybrominated diphenyl ether).

CONTENTS

1. FUNCTIONAL DESCRIPTIONS

1-1. Front Panel



1-1-1. Status Display

The F340A status is indicated. Setting items are indicated when setting.

HI: This LED turns on when the indicated value is larger than the set value of the high limit (indicated value > high limit)
Operation of the high limit relay is on.

OK: This LED turns on when the indicated value is smaller than the set value of the high limit and larger than the set value of the low limit
(low limit ≦ indicated value ≦ high limit)

LOW: This LED turns on when the indicated value is smaller than the set value of the low limit (indicated value < low limit)
Operation of the low limit relay is on.

PEAK: This LED is blinking when the Peak Hold function is activated.

HOLD: This LED turns on when the indicated value is the held value.

1-1-2. Numerical Display

The three types of display are provided.

1) Indicated value

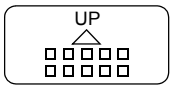
2) Set value

3) Overflow display

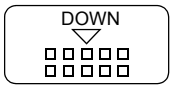
- Minus overflow of the A/D converter -LoAd (-LOAD)
- Plus overflow of the A/D converter LoAd (LOAD)
- Indicated value overflowed (indicated value < -19999) oFL1 (OFL1)
- Indicated value overflowed (indicated value > 19999) oFL2 (OFL2)

1-1-3. Setting Key Pad

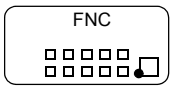
These are keys for commanding settings and operations.



Increments by one the numeric in the blinking digit of the setting item selection or set value.

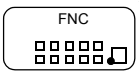


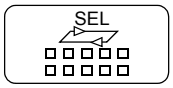
Decrements by one the numeric in the blinking digit of the setting item selection or set value.



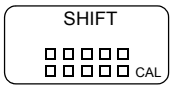
Enters the setting mode. Setting mode "F1" is indicated.
This key sets a decimal point in the span calibration.

Indicated value display → Setting mode "F1" display

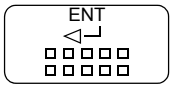




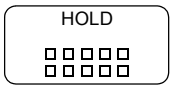
Enters the actual load calibration mode.
Select the setting mode number and the blinking digit of the setting value in setting.

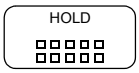


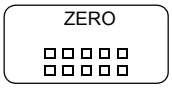
Enters the equivalent input calibration mode.
Inputs the minus sign in setting.



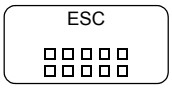
Validates setting items and set values.



Starts the Hold function. To cancel the Hold function, press  key again.



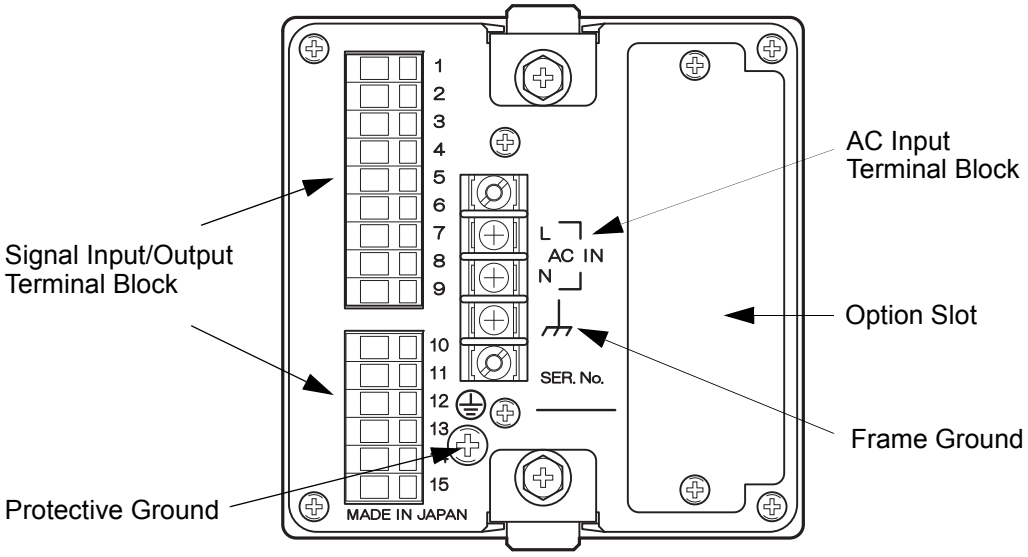
Forcibly resets the indicated value to zero (digital zero function).
When the calibration LOCK is turned off, the digital zero function is not activated using this key.External DZ input is also disabled.



Cancels setting and returns to the indicated value display.

Setting in progress —ESC→ Indicated Value display

1-2. Rear Panel



1-2-1. Protective Ground ⏚

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

1-2-2. 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.

1-2-3. Option Slot

One option board can in stall in the option slot.

- BCD Parallel data output (BCO)
- RS-232C Interface (232)
- D/A Converter (voltage output) (DAV)
- D/A Converter (current output) (DAI)

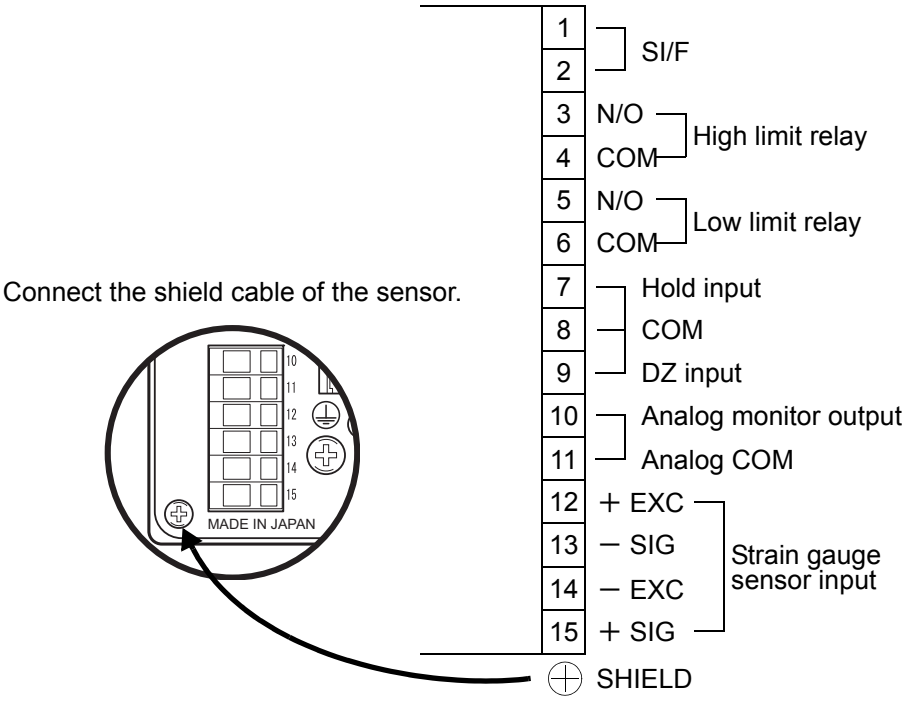
1-2-4. AC Power Input Terminal Block

Connect AC power code. The input voltage is 100V-240V AC.
The frequency is 50/60Hz.

1-2-5. Signal Input/Output Terminal Block

This terminal block is used for input/output of control signals, SI/F data output, and input of strain gauge sensor signals.

- Terminal block Assignment



1・2 : Two-wire serial interface (SI/F) for connecting printers and external display from UNIPULSE.
This interface has no polarity and can connect up to three external devices.
Use parallel two-core cables or captire cables.

3 ～ 6: Output terminals of the high/low limit relays.
3 ..... High limit relay (N/O)
4 ..... High limit COM
5 ..... Low limit relay (N/O)
6 ..... Low limit COM

7・8: Terminals for inputting hold signals
7 ..... Hold input
8 ..... COM

8・9: Terminals for inputting digital zero signals. Available in LOCK ON only.

9 ..... DZ input

8 ..... COM

10・11: Terminal for output of a voltage proportional to the sensor input.

Output voltage is approx. 2V per 1mV/V (sensor input).

10 ..... Voltage output (0 to Approx. ±6V)

11..... COM

12 ～ 15: Terminal for connecting a strain gauge sensor

12 ..... +EXC

13 ..... -SIG

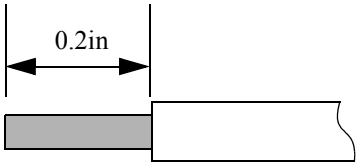
14 ..... -EXC

15 ..... +SIG

2. CONNECTION

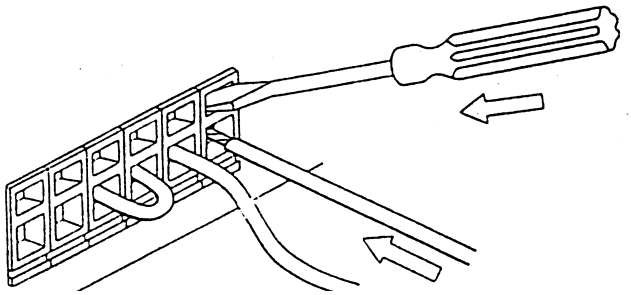
2-1. Connecting to Cage Clamp Terminal Block

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



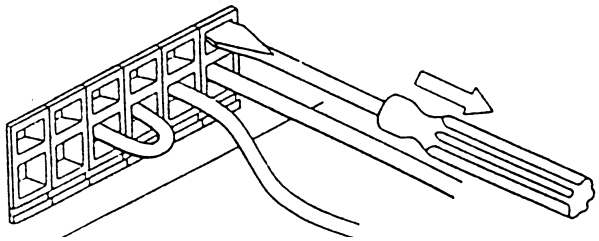
2. Twist the bare wire to fit the terminal hole.

3. Insert the supplied screwdriver into the upper hole and lift upward.



4. Insert the twisted wires into the lower hole.

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

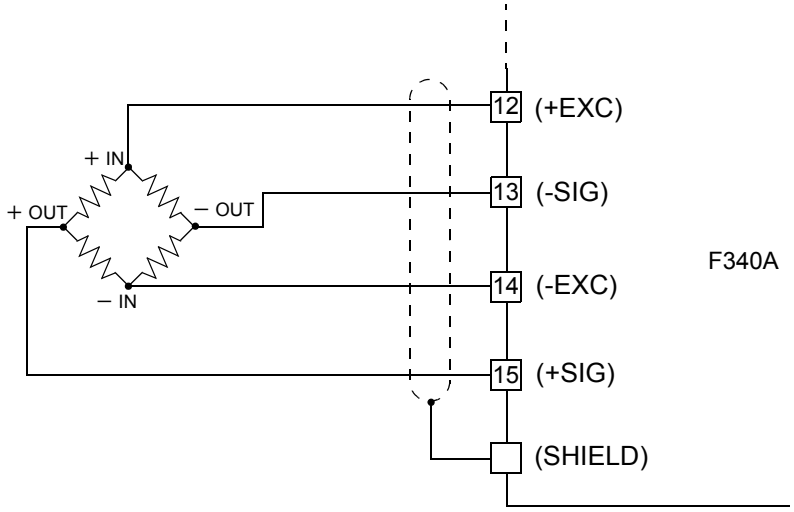


Request

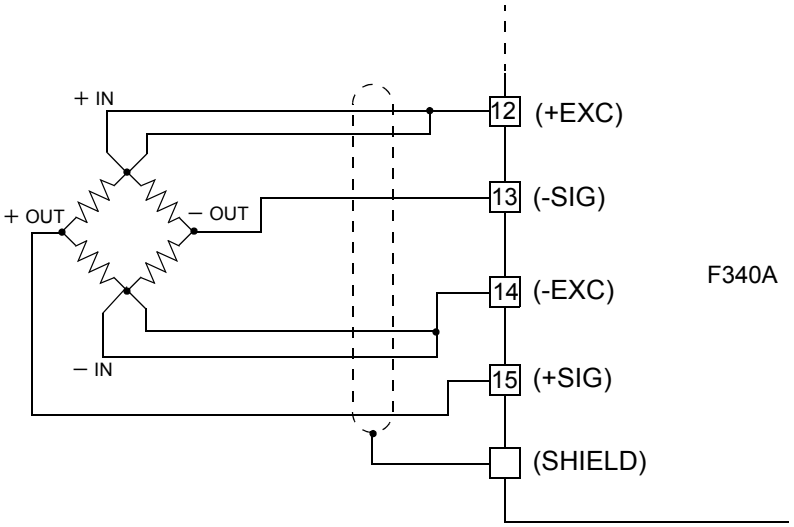
- Cable can be from 24 to 14AWG (0.2 to 2.5mm^2)
- It is not necessary to solder the cable wires or to fix a solderless terminal.
- If several cables to be inserted to the same hole,twist those cable wires together and insert.

2-2. Connecting Strain Gauge Sensor

- 4-wire sensor



- 6-wire sensor



- Cable colors of sensors

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.

2-3. Connecting Power Input Terminal

AC spec.

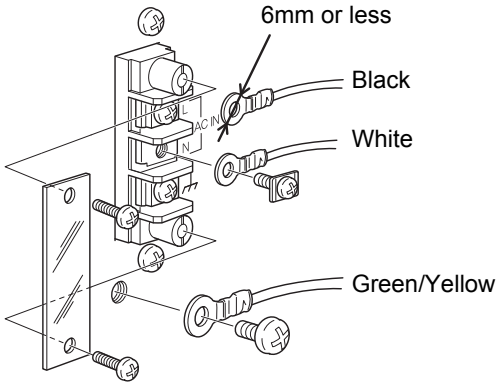
Connect AC power code. The input voltage is 100V-240V AC. The frequency is 50/60Hz.
Before connecting cables to the terminal block, put on climp-style terminals to the cables as shown in the figure so that the cables tips might not straggle.

1) Make sure that no power is applied.

2) Remove the screws (two), and remove the terminal block cover.

3) Remove the two screws (M3) at the terminal block..

4) Align the solderless terminals with the screw holes, and then tighten the screws.
   L : Black
   N : White



5) Install the terminal block cover, and fix it with the screws (two).

6) Remove the screws (M4) of the protective ground, align the crimp contacts with the screw holes, and then tighten the screws.

   ⏚ : Green/Yellow

DC spec. (Depending on the request at the time of order)

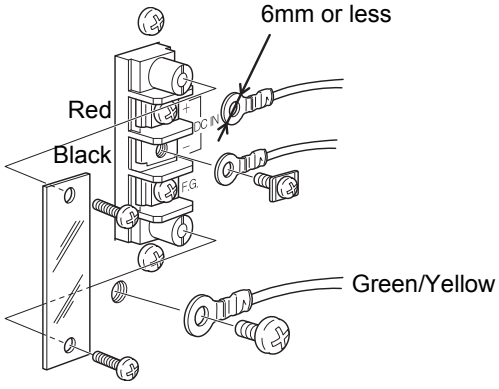
Connect the positive (+) side of the power source to the red screw side of the terminal block on the back of the F340A, and its negative (-) side to the black screw side. The input voltage is 12V-24V DC.

1) Make sure that no power is applied.

2) Remove the screws (two), and remove the terminal block cover.

3) Remove the two screws (M3) at the terminal block..

4) Align the solderless terminals with the screw holes, and then tighten the screws.
   ＋ : Red screw
   － : Black screw



5) Install the terminal block cover, and fix it with the screws (two).

6) Remove the screws (M4) of the protective ground, align the crimp contacts with the screw holes, and then tighten the screws.

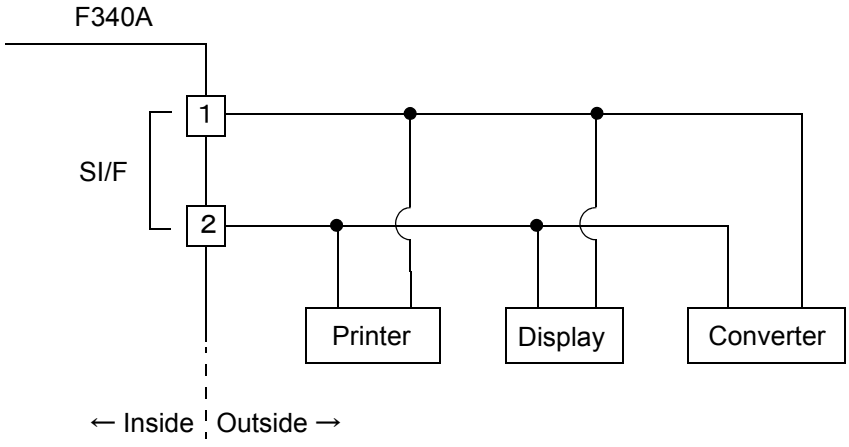
   ⏚ : Green/Yellow

⚠ CAUTION

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

2-4. Connecting SI/F

Two-wire serial interface (SI/F) for connecting printers and external display from UNIPULSE.
This interface has no polarity and can connect up to three external devices.
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 (32.8yds). When a two-core shielded twisted pair cable is used, the transmitting distance is approximately 300m (328yds).
Do not parallel it with AC lines and high-voltage lines. It may cause of malfunction.



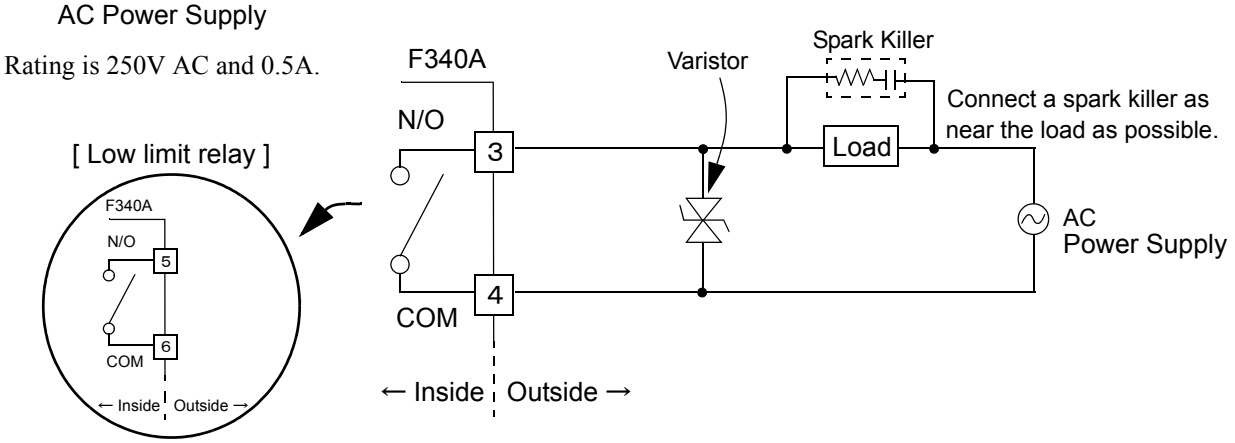
2-5. Connecting High / Low Limit Relays

- Connecting External Load

[High limit relay]

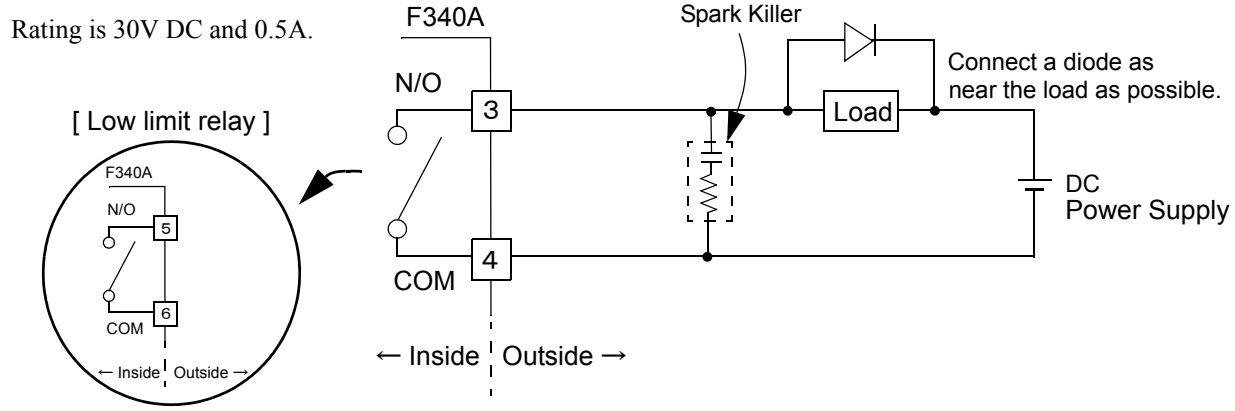
AC Power Supply

Rating is 250V AC and 0.5A.



DC Power Supply

Rating is 30V DC and 0.5A.



⚠ CAUTION

Overvoltage and overcurrent may cause breakdown of the relay as well as shortening its life.

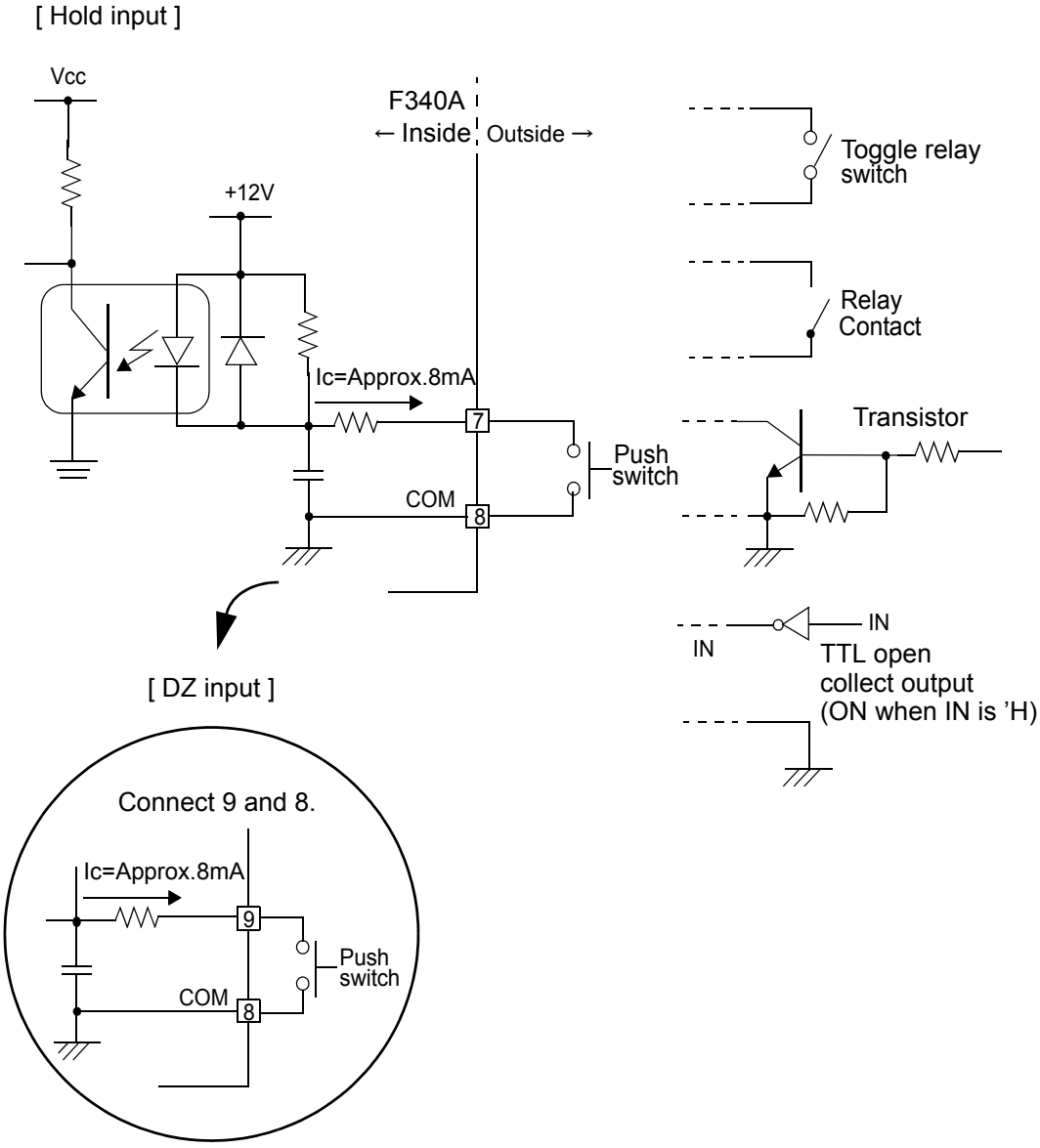
It is recommended to connect a spark killer etc. to the connected load according to AC/DC (refer to the connection examples). With a noise killer, you can make the life of the relay longer as well as making it resistible against noise.

Never short-circuit the load.

Should you do it, the equipment will break down.

2-6. Connecting Hold and Digital Zero Signals

- Equivalent circuit (input)



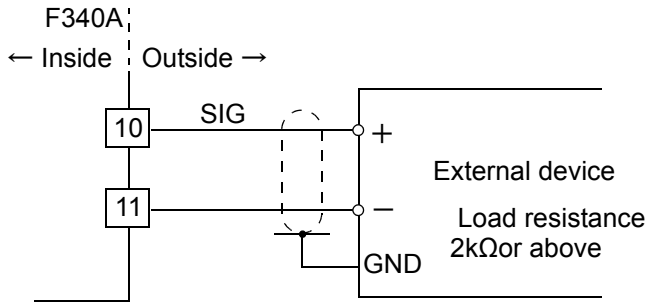
⚠ CAUTION

- Avoid applying external voltages to the signal
- Use external elements which withstands Ic=10mA
- Leakage current from external element must be 30μA or below

2-7. Connecting Analog Monitor Output (VOL OUT)

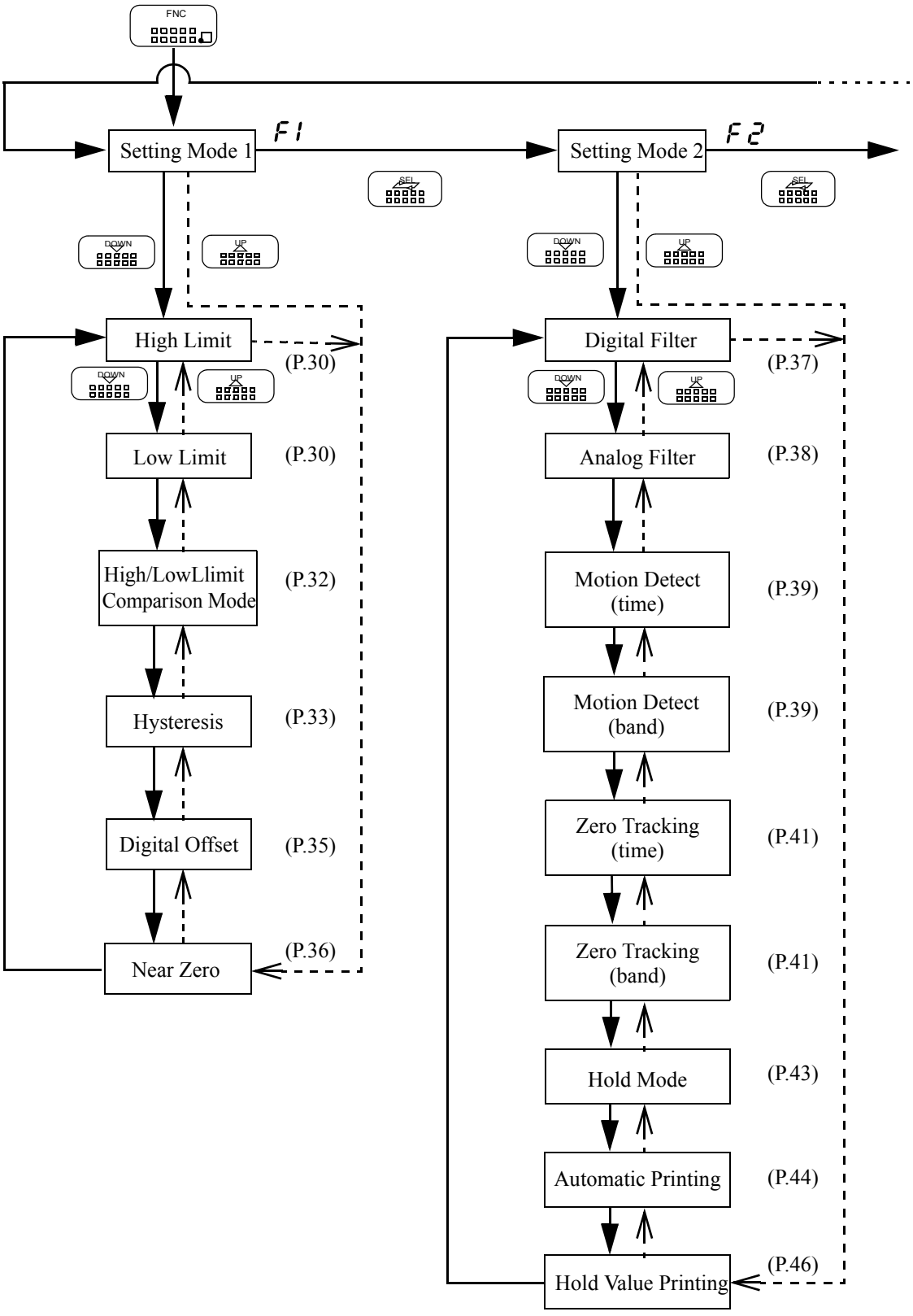
Terminal for out put of a voltage proportional to the sensor input .

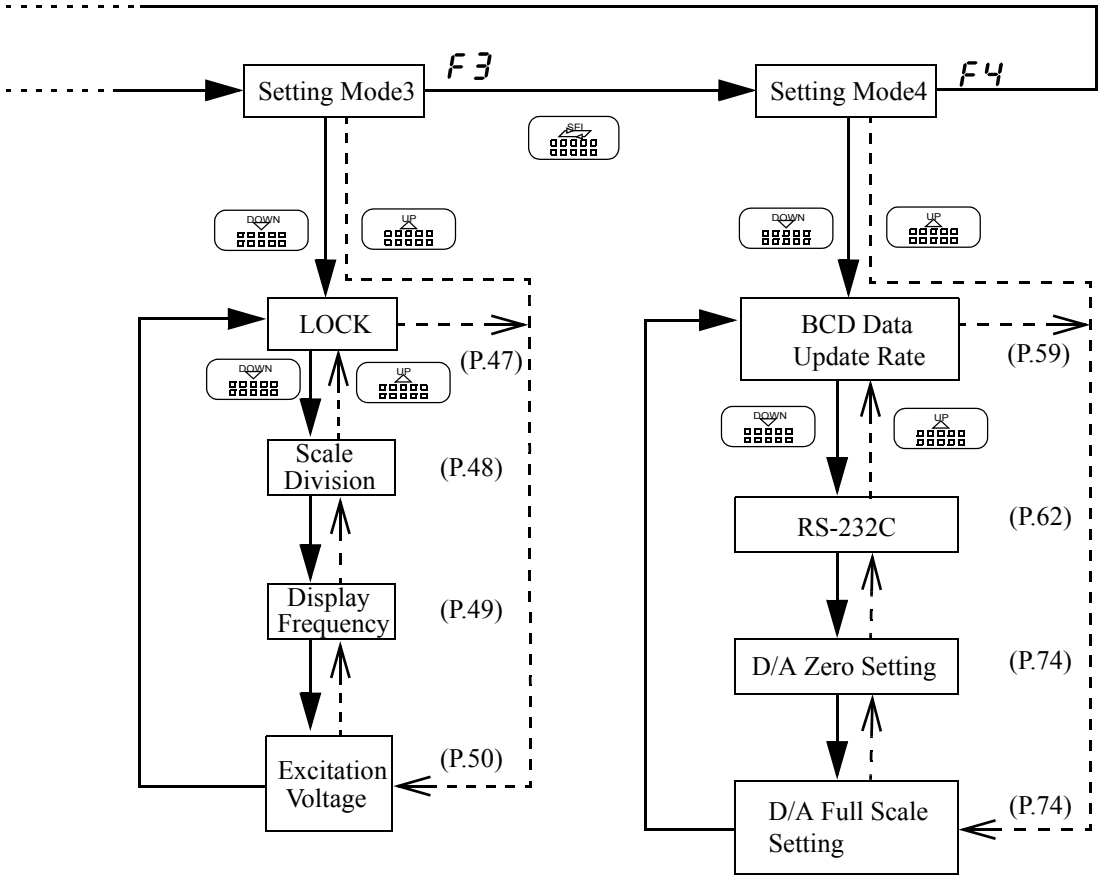
Output voltage is approx. 2V per 1mV/V(sensor input).



3. SETTING MODE CONFIGURATION

3-1. Selection of Setting Items



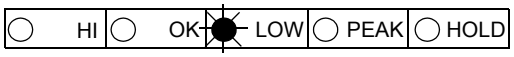

Setting Mode3
F3
Setting Mode4
F4
SEL
DOWN
UP
LOCK
(P.47)
Scale Division
(P.48)
Display Frequency
(P.49)
Excitation Voltage
(P.50)
BCD Data Update Rate
(P.59)
RS-232C
(P.62)
D/A Zero Setting
(P.74)
D/A Full Scale Setting
(P.74)

3-2. Display of Setting Items

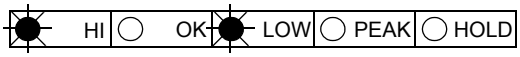
- Mode1

(1) High Limit

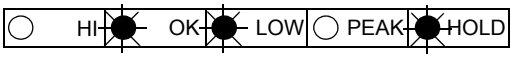
(2) Low Limit



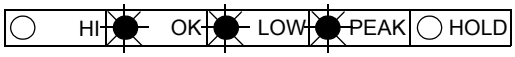
(3) High/Low Limit Comparison Mode



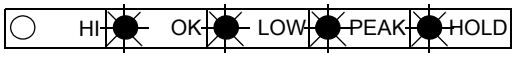
(4) Hysteresis



(5) Digital Offset

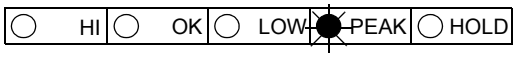


(6) Near Zero

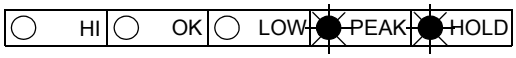


- Mode2

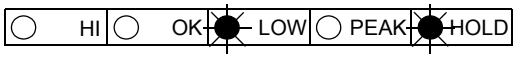
(1) Digital Filter



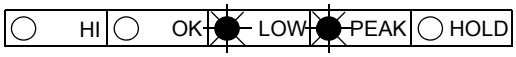
(2) Analog Filter



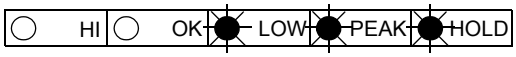
(3) Motion Detect (time)



(4) Motion Detect (band)



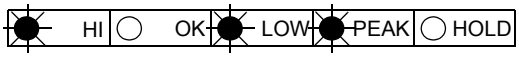
(5) Zero Tracking (time)



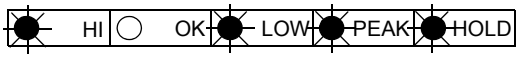
(6) Zero Tracking (band)

(7) Hold Mode

(8) Automatic Printing

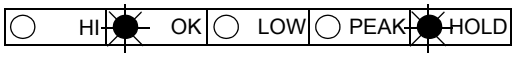


(9) Hold Value Printing



- Mode3

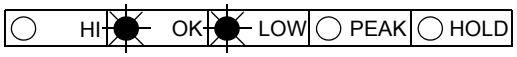
(1) LOCK



(2) Scale Division

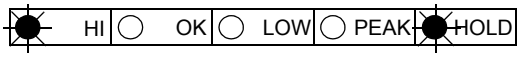
(3) Display Frequency

(4) Excitation Voltage

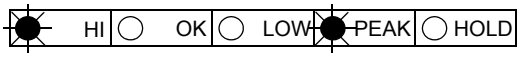


- Mode4

(1) BCD Data Update Rate

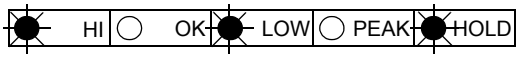


(2) RS-232C



(3) D/A Zero Setting

(4) D/A Full Scale Setting



3-3. List of Values

Setting Mode1

	Item	Default	Set Value LOCK	Calibration LOCK
1	High Limit	075.00	○	
2	Low Limit	025.00	○	
3	High/Low Limit Comparison Mode	0	○	
4	Hysteresis	00.00	○	
5	Digital Offset	000.00	○	
6	Near Zero	001.00	○	

Setting Mode2

	Item	Default	Set Value LOCK	Calibration LOCK
1	Digital Filter	0	○	
2	Analog Filter	2	○	
3	Motion Detect (time)	1.5	○	
4	Motion Detect (band)	05	○	
5	Zero Tracking (time)	0.0	○	
6	Zero Tracking (band)	00	○	
7	Hold Mode	0	○	
8	Automatic Printing	1	○	
9	Hold Value Printing	0	○	

Setting Mode3

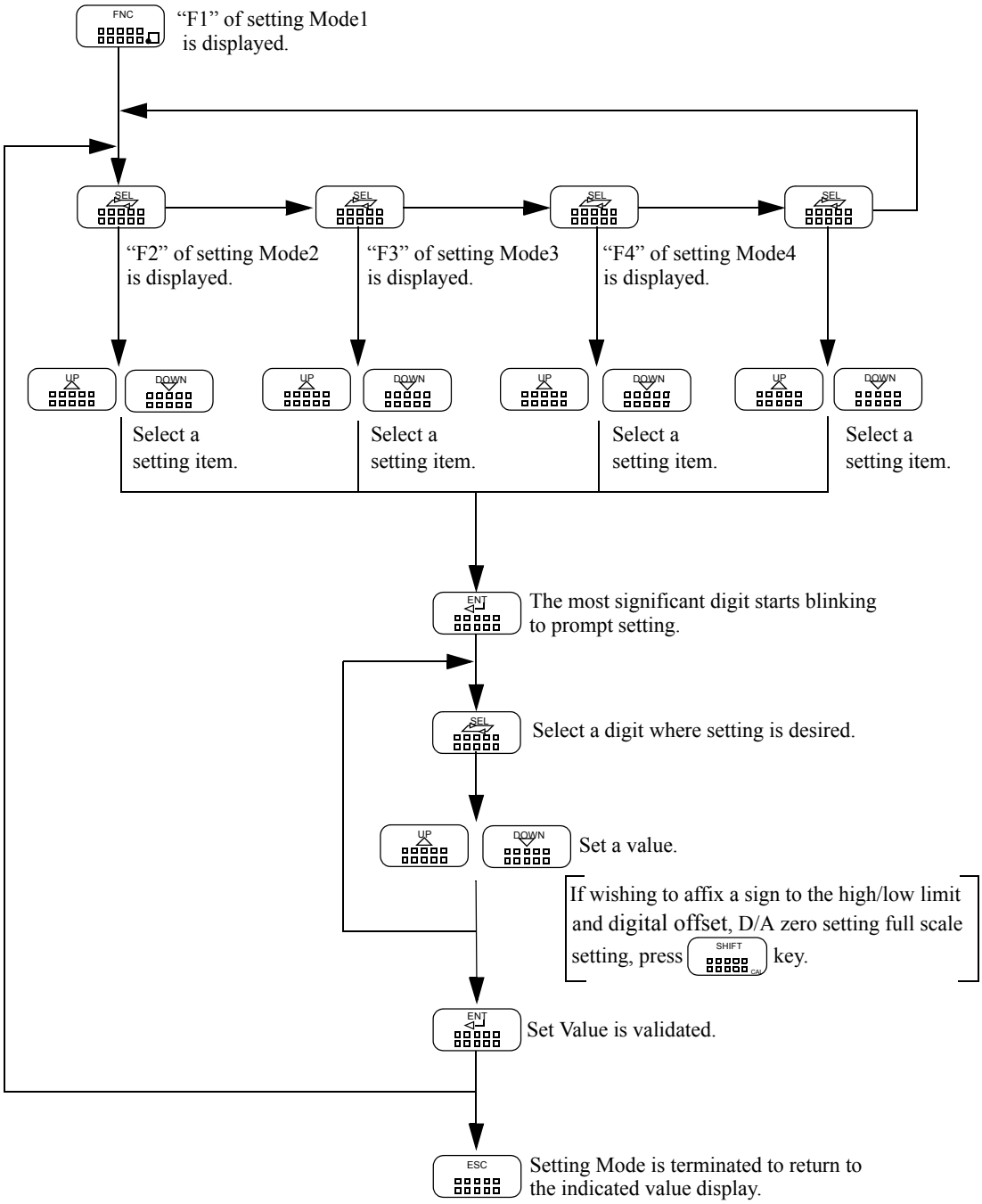
	Item	Default	Set Value LOCK	Calibration LOCK
1	LOCK	0000		
2	Scale Division	0.01		○
3	Display Frequency	3		○
4	Excitation Voltage	1		○

Setting Mode4

	Item	Default	Set Value LOCK	Calibration LOCK
1	BCD Data Update Rate	0	○	
2	RS-232C	13010	○	
3	D/A Zero Setting	000.00	○	
4	D/A Full Scale Setting	100.00	○	

* Default: factory-set value

3-4. Setting Procedure



If one minute has elapsed after FNC key is pressed without any key hit before ENT key is pressed, the setting is canceled and the indicated value is displayed again. The set value is not stored in this case.

4. CALIBRATION

"Calibration" refers to an operation whereby matching between the F340A and a strain gauge sensor is obtained. The F340A uses the two calibration methods as described below.

◇ Equivalent Input Calibration

This approach uses no actual loads but key entry of the rated output value of the strain gauge sensor (mV/V) and the rating value (value to be displayed).

This method is simple and employed when actual loads cannot be applied.

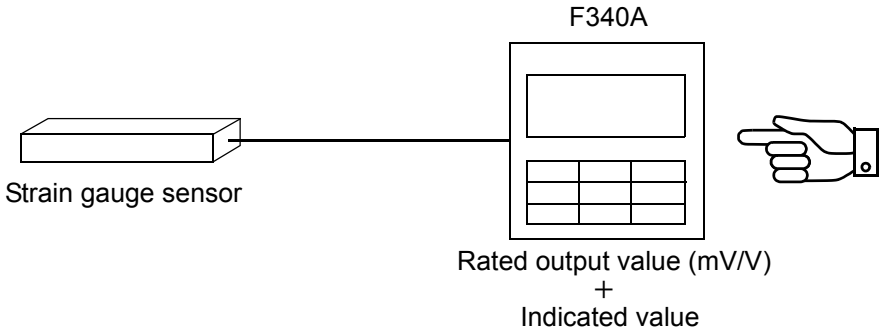
For example

Gain will be automatically decided by registering the values indicated as follows:

for load: 2.001mV/V - 100.0kgf

for pressure: 2.002mV/V - 10.00kgf/cm^2, and

for torque: 2.502mV/V - 15.00kgf•m.



A data sheet will be attached to a strain gauge sensor you buy.

On the data seat, the following values are listed.

Capacity..... Load (unit: kg, t, etc.)

Rated Output .....Voltage (unit: mV/V)

Non-Linearity, Hysterisis,

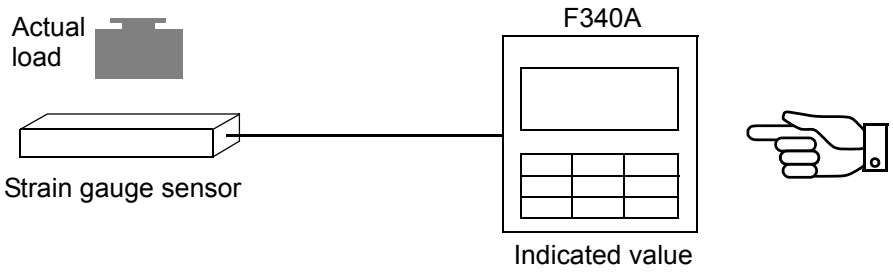
Input Resistance, Output Resistance,

Zero Balance, etc.

The Capacity and the Rated Output are necessary values for the equivalent input calibration. Input these two values to F340A.

◇ Actual Load Calibration

This approach provides calibration by applying an actual load to the strain gauge sensor and inputting the actual load value. This calibration is without little errors and more correct.



4-1. Equivalent Input Calibration Procedure

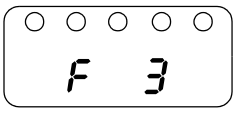
The equivalent input calibration uses the following procedure :

Releasing Calibration LOCK	Release the Calibration LOCK that inhibits calibration.
Setting Scale Division	Set the minimum value of the digital change desired. (omissible if no desired value is present)
Equivalent Input Calibration	Set the rated output vale and zero point of the strain gauge sensor.
Calibration Lock	Set the calibration of ON to prevent misoperation.

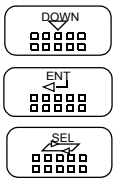
- Releasing Calibration LOCK

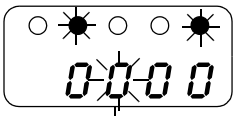
Releasing Calibration LOCK

1)Select setting mode 3.

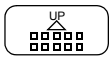


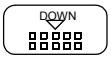
2)Select calibration lock.



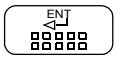


Calibration LOCK
1: ON
0: OFF

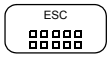
Use 

and 

key to set the calibration lock of OFF (0),

then use 

key to validate the setting.

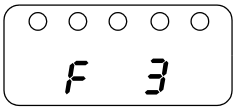
To return to the indicated value display, press 

key.

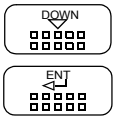
- Setting of Scale Division (Omissible if no change is needed)

Setting of Scale Division

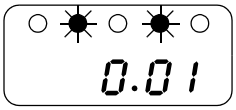
1) Select setting mode 3.

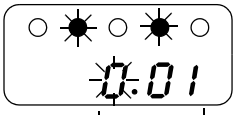


2) Set the scale division.



Press twice.

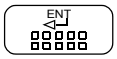




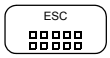
Scale Division (001 to 100)

Use 

keys to set the scale division,

then use 

key to validate the setting.

To return to the indicated value display, press 

key.

* When you set the equivalent input calibration, the change that digit to place a decimal point is set.

- Equivalent Input Calibration

Equivalent Input Calibration

1) Start the equivalent input calibration.

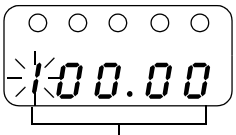
SHIFT CAL → ENT

Example of a sensor having the output value of 2.010mV/V for rated 100.00kgf (N)

Rated Output Value (0.001 to 9.999mV/V)

2) Set the rated output value of the sensor.

Use UP DOWN and SEL keys to set the rated output value, then use ENT key to validata the setting.

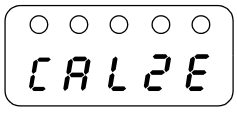


Rated Value (00000 to 19999)

3) Set the rated value.

Use UP DOWN and SEL keys to set the rated value, then use ENT key to validate the setting. Press FNC key at a blinking digit to place a decimal point immediately after the digit.

4) Place the sensor without load and set the zero point. Check that the sensor is unloaded, then press ZERO and ENT keys in this order.



If the indicated value following the display CAL2E is zero, the equivalent input calibration is terminated.

If a calibration error display appears, take a proper action according to the error, then perform calibration again.

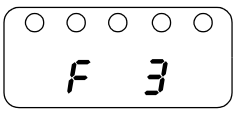
cErrS …Span set value is “00000”. Set a correct span value.

On completion of calibration, turn on the calibration LOCK.

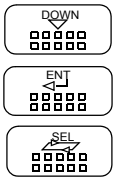
- Calibration LOCK

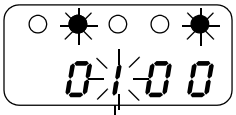
CalibrationLOCK

1) Select setting mode 3.

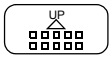


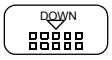
2) Select calibration lock.



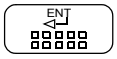


Calibration LOCK
1: ON
0: OFF

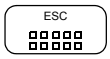
3) Use 

and 

key to set the calibration lock of ON (1),

then use 

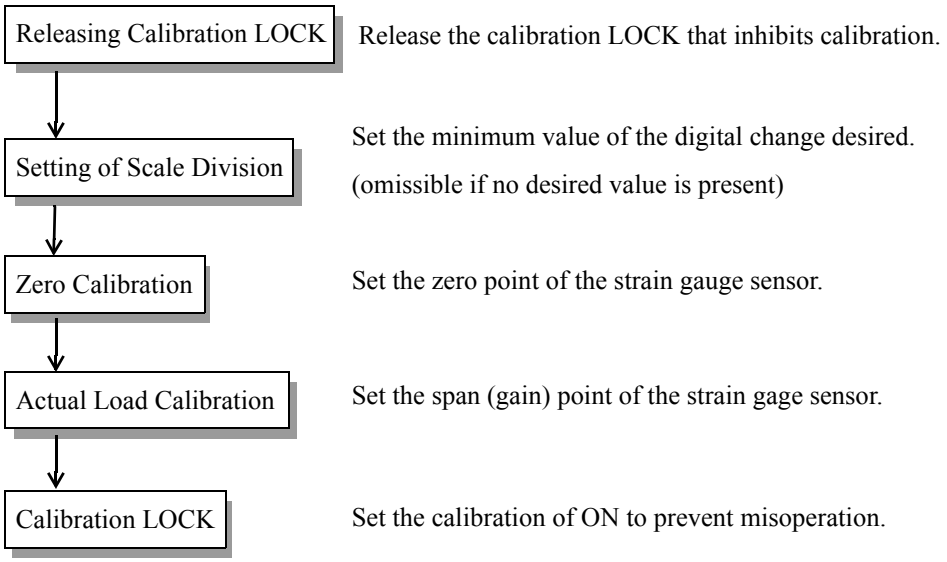
key to validate the setting.

To return to the indicated value display, press 

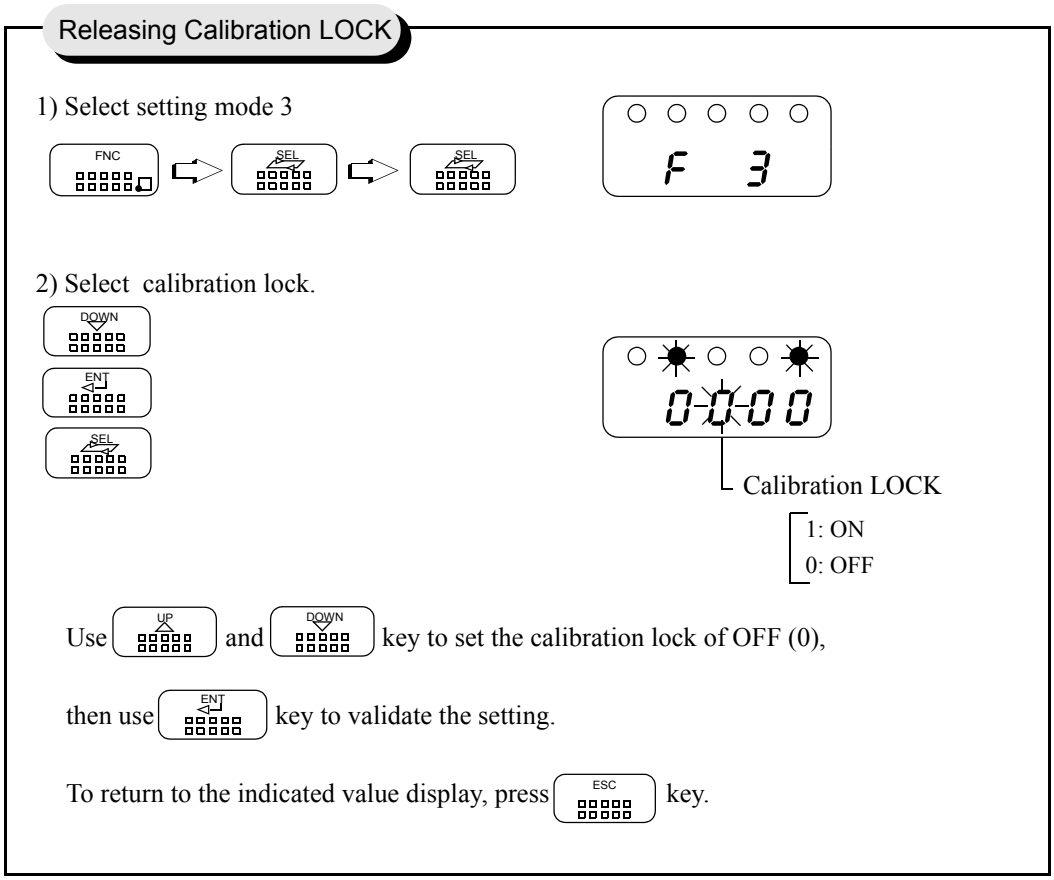
key.

4-2. Actual Load Calibration

The actual load calibration uses the following procedure



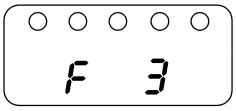
- Releasing Calibration LOCK



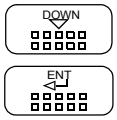
- Setting of Scale Division (omissible if no change is needed)

Setting of Scale Division

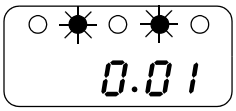
1) Select setting mode 3.

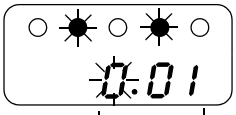


2) Set the scale division.

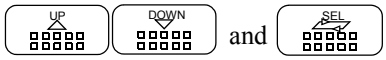


Press twice.

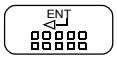




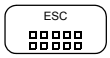
Scale Division (001to 100)

Use 

keys to set the scale division,

then use 

key to validate the setting.

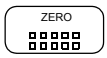
To return to the indicated value display, press 

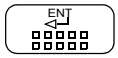
key.

* When you set the actual load calibration, the change that digit to place a decimal point is set.

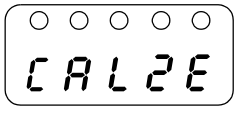
- Zero Calibration

Zero Calibration

1) Check that the sensor is unloaded, then press 

and 

keys in this order.

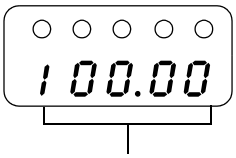


If the indicated value following the display CAL2E is zero, the zero calibration is terminated.

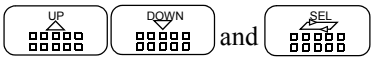
- Actual Load Calibration

Actual Load Calibration

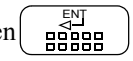
1) Apply an actual load to the sensor and set the actual load value.



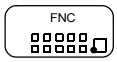
Indicated Value of (00000 to 19999)
Actual Load Value

Use 

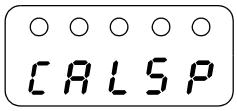
keys to set the actual load value,

then 

key to validate the setting.

To move the decimal point, press 

key at a blinking digit.



If the indicated value following the display CALSP is Actual Load, the Actual Load calibration is terminated.

If a calibration error display appears, take a proper action according to the error, then perform calibration again.

cErr5 …Span set value is “00000”.
Set a correct span value.

cErr6 …Output of the strain gauge sensor does not reach the span adjustment range.
Confirm whether an actual load is put on the strain gauge sensor. Calibration may not be performed without load

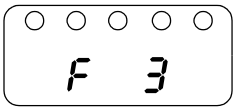
cErr7 …Output of the strain gauge sensor is on the minus side.
Check to see if the +SIG and -SIG wiring if the sensor is reversed.

On completion of calibration, turn on the calibration LOCK.

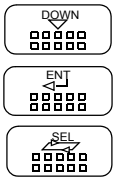
- Calibration LOCK

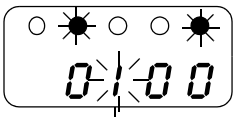
Calibration LOCK

1) Select setting mode 3.

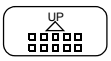


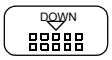
2) Select calibration lock.



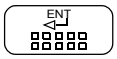


Calibration LOCK
1: ON
0: OFF

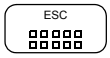
3) Use 

and 

key to set the calibration lock of ON (1),

then use 

key to validate the setting.

To return to the indicated value display, press 

key.

5. SETTING OF FUNCTIONS

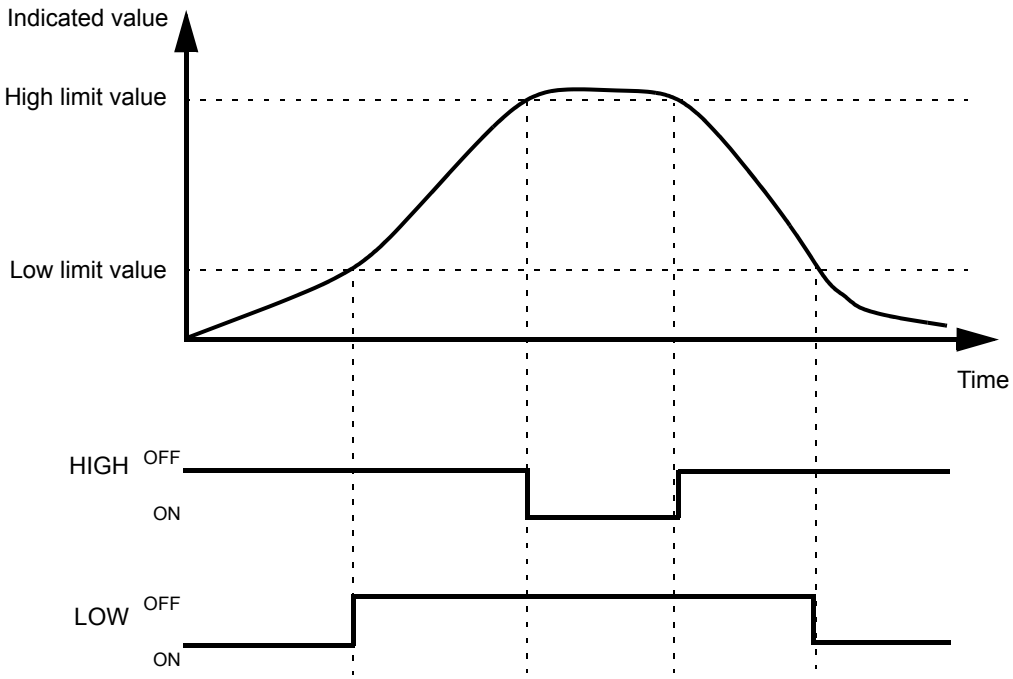
5-1. High /Low Limit Value

High / Low limit value are functions whereby the high output is turned on when the indicated value exceeds the high / low output is turned on when it drops below the low limit.

[HIGH/LOW output conditions]

HIGH : Indicated value > High limit value

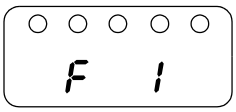
LOW : Indicated value < Low limit value



Setting of High/Low Limit Value

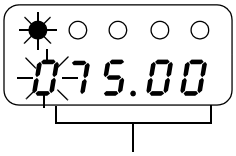
1) Select setting mode 1.

FNC



2) Select high limit value.

DOWN ENT



High Limit Value (00000 to±19999)

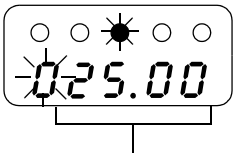
Use UP DOWN and SEL keys to set the high limit value.

Press SHIFT CAL key to place a minus sign. press ENT key to validate the setting.

3) Select low limit value.

DOWN

ENT



Low Limit Value (00000 to±19999)

Use UP DOWN and SEL key to set the low limit value.

Press SHIFT CAL key to place a minus sign.

Press ENT key to validate the setting.

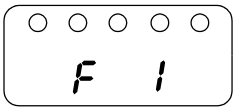
To return to the indicated value display, press ESC key.

5-2. High / Low Limit Comparator Mode

High / Low Limit Comparator Mode

1)Select setting mode 1.

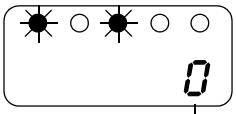
FNC



2)Select high / low limit comparator mode.

DOWN Press three times.

ENT



High / Low Limit Comparator Mode

- 3: Comparison is made at stable status except for near zero.
- 2: Comparison is always made except for near zero
- 1: Comparison is made in the stabl status.
- 0: Comparison is always made.

Use UP and DOWN keys to set the high / low Limit Comparator Mode,

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

Except for Mode 0 (Comparison is always made) of the High / Low Limit Comparator Mode, setting is closely related to Near Zero and Motion Detect functions. For details, see Near Zero on page 36 and Motion Detect on page 39.

5-3. Hysteresis

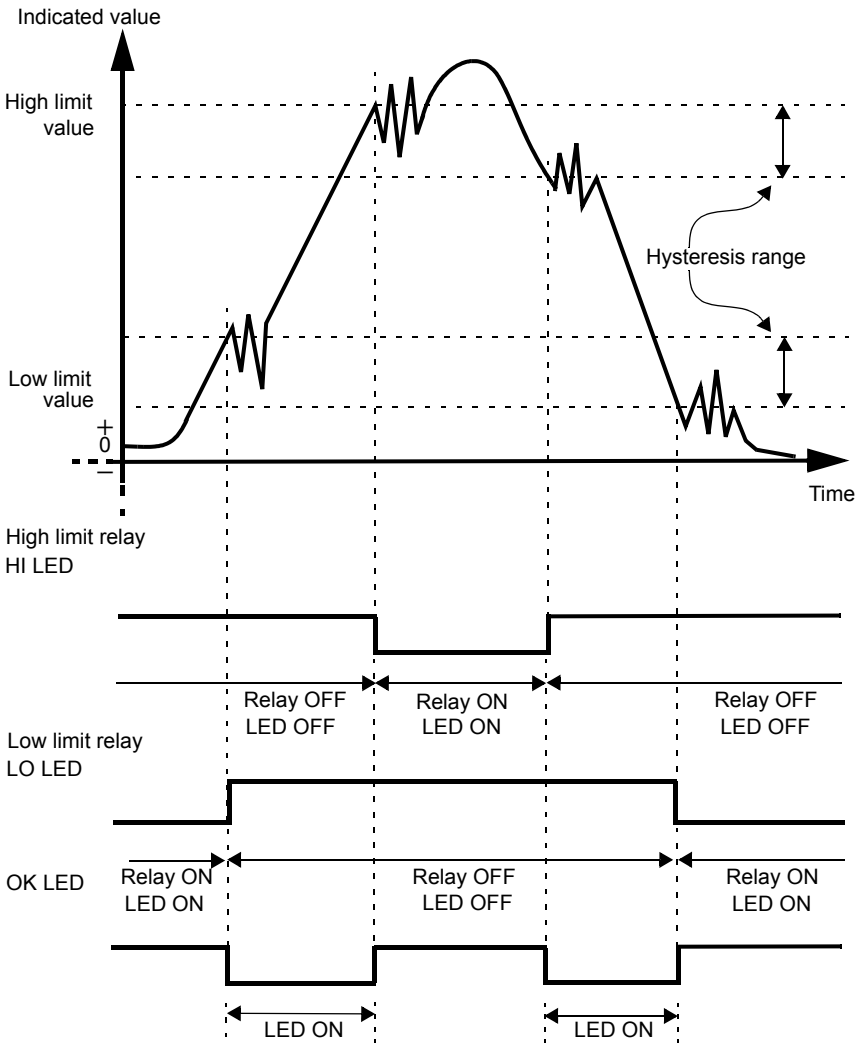
The Hysteresis function provides a range of high/low limit comparator off. Usually the high limit comparator is turned on when the indicated value is above the high limit value and turned off when below. If you set a hysteresis range, the comparator is turned off when the indicated value is below the high limit value by the hysteresis setting. This is effective in preventing chattering caused when signals are slightly varying (vibrating).

〈Comparison conditions〉

- High limit ON conditions : Indicated value > High limit value
  OFF conditions : Indicated value ≦ (High limit value − Hysteresis set value)

- Low limit ON conditions : Indicated value < Low limit value
  OFF conditions : Indicated value ≧ (Low limit value + Hysteresis set value)

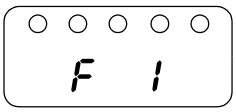
- Hysteresis operation



Setting of Hysteresis

1) Select setting mode 1.

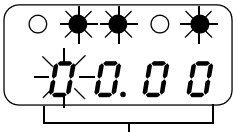
FNC



2) Select hysteresis.

DOWN Press four times.

ENT



Hysteresis (0000 to 9999)

Use UP DOWN and SEL keys to set the hysteresis range,

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

Hysteresis setting is the same for high / low limit.

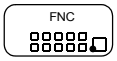
5-4. Digital Offset

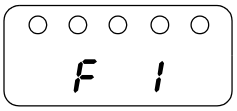
This function subtracts a set value from the indicated value. If you make digital offset , the value which is obtained by subtracting the set value from the indicated value will be displayed. This is convenient when you cannot obtain zero by unloading the equipment for some reason or when you want to give offset.

(Indicated value to be displayed) = (Actual indicated value) - (Digital offset setting value)

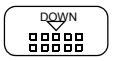
Setting of Digital Offset

1) Select setting mode 1.

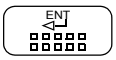


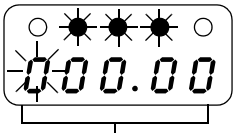


2) Select digital offset.

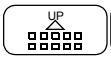


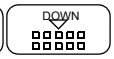
Press five times.



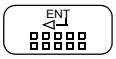


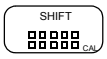
Digital Offset (00000 to± 19999)

Input an digital offset setting value with 

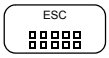


and 

keys and validate it with 

key. Press 

key to put minus sign.

To return to the indicated value display, press 

key.

5-5. Near Zero

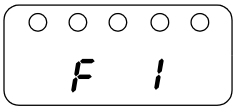
The Near Zero function detects that the indicated value is near zero.

Near Zero ON/OFF is closely related to Automatic Printing and High and Low Limit Comparator Mode.
For details, see High and Low Limit Comparator Mode on page 33 and Automatic Printing on page 46.

Setting of Near Zero

1) Select setting mode 1.

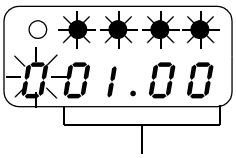
FNC



2) Select near zero.

DOWN Press six times.

ENT



Near Zero (00000 to 19999)

Use UP DOWN and SEL keys to set the near zero.

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

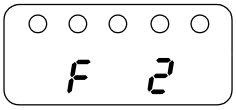
The Near Zero function operates at an absolute value.

5-6. Digital Filter

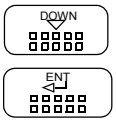
This function minimizes instability of the weight value by calculating the average frequency of the data converted from analog to digital. The frequency of the moving average selected from OFF(0 or 1) ~ 64 times. A higher frequency will make a more stable display with slower response.
A lower frequency will have quicker response but more unstable display.

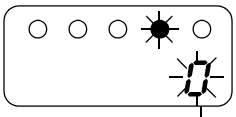
Setting of Digital Filter

1) Select setting mode 2.



2) Select digital filter.





Digital Filter

5 : 64 times	2 : 8 times
4 : 32 times	1 : 4 times
3 : 16 times	0 : OFF

Use UP and DOWN keys to set the digtal filter,

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

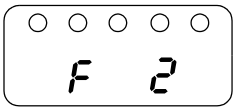
5-7. Analog Filter

This is a lowpass filter filtering the strain gage sensors input signal and cutout the noise element. Lowpass filter cutout freguency is selectable in the 4/10/100/3k Hz.

Setting of Analog Filter

1) Select setting mode 2.

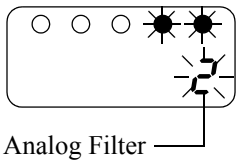
FNC → SEL



2) Select analog filter.

DOWN Press twice.

ENT



Analog Filter

- 3 : 3kHz
- 2 : 100Hz
- 1 : 10Hz
- 0 : 4Hz

Use UP and DOWN keys to set the analog filter,

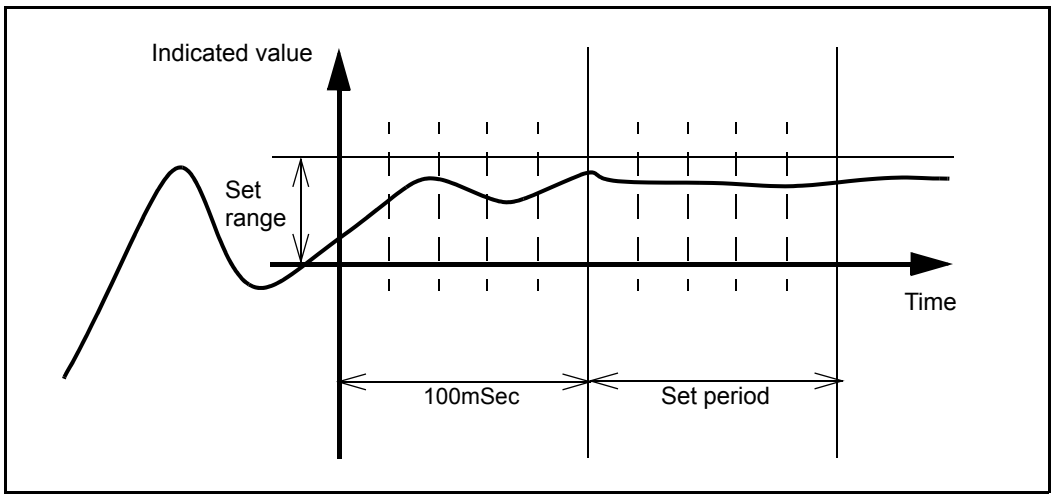
then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

5-8. Motion Detect

Setting of parameters for detecting stable measurement is required.

If the difference between the current indicated value and that of 100msec before fall within the specified range and the status last for a specified time, indicated values are assumed stable.

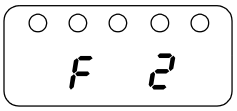


Whether the indicated value is stable or not is closely related to Automatic Printing and High and Low Limit Comparator Mode. For details, see High and Low Limit Comparator Mode on page 32 and Automatic Printing on page 44

Setting of Motion Detect

1) Select setting mode 2.

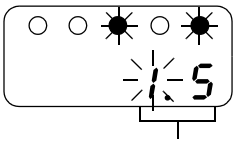
FNC → SEL



2) Select motion detect (time).

DOWN Press three times.

ENT

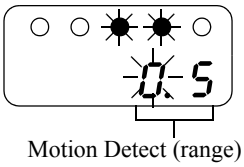


Motion Detect (time)
(0.0 to 9.9s)

Use UP DOWN and SEL keys to set the motion detect (time)

then use ENT key to validate the setting.

3) Select motion detect (range).



Motion Detect (range)
(00 to 99division)

Use UP DOWN and SEL keys to set the motion detect (range)

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

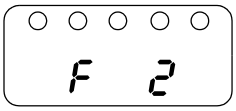
5-9. Zero Tracking

The Zero Tracking function automatically tracks and compensates a fine shift of the zero point due to a factor such as a drift.

Setting of Zero Tracking

1) Select setting mode 2.

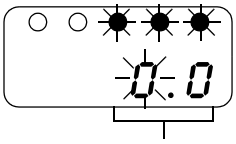
FNC → SEL



2) Select zero tracking (Time).

DOWN Press five times.

ENT



Zero Tracking (Time)
(0.0 to 9.9S)

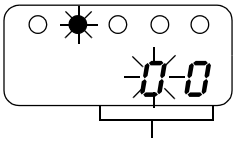
Use UP DOWN and SEL keys to set the zero tracking (time),

then use ENT key to validate the setting.

3) Select zero tracking (range).

DOWN

ENT



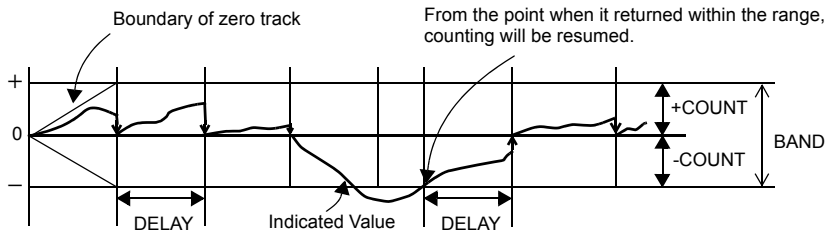
Zero Tracking (range)
(00 to 99)

Use UP DOWN and SEL keys to set the zero tracking (range),

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

- The Zero Tracking function automatically resets the zero point to zero at a specified time interval when the zero point move amount is below the specified range.
- The time (tracking delay) is set in units of 0.1 seconds, from 0.1 to 9.9 seconds. The range (tracking band) is set in units of quarters of the indicated value. (The indicated value 02 corresponds to 0.5 scales and 12, 3 scales.) If the time is set to 0.0 sec. and range to 00, the Zero Tracking function does not work.



BAND=COUNT×the minimum digital scale×2

Request

The Zero Tracking works from where the indicated value is zero. It does not work when the indicated value exceeds the tracking band. In this case,specify the zero point using the Digital Zero or Zero Calibration.

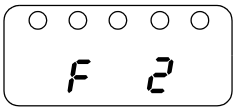
5-10. Hold Mode

The F340A provides the Peak Hold function to hold and display the peak value (maximum value) of the input signal, and the Sample Hold function to hold and display an optional point.

Setting of Hold Mode

1) Select setting mode 2.

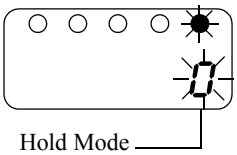
FNC → SEL



2) Select hold mode.

DOWN Press seven times.

ENT



Hold Mode

1 : Peak Hold
0 : Sample Hold

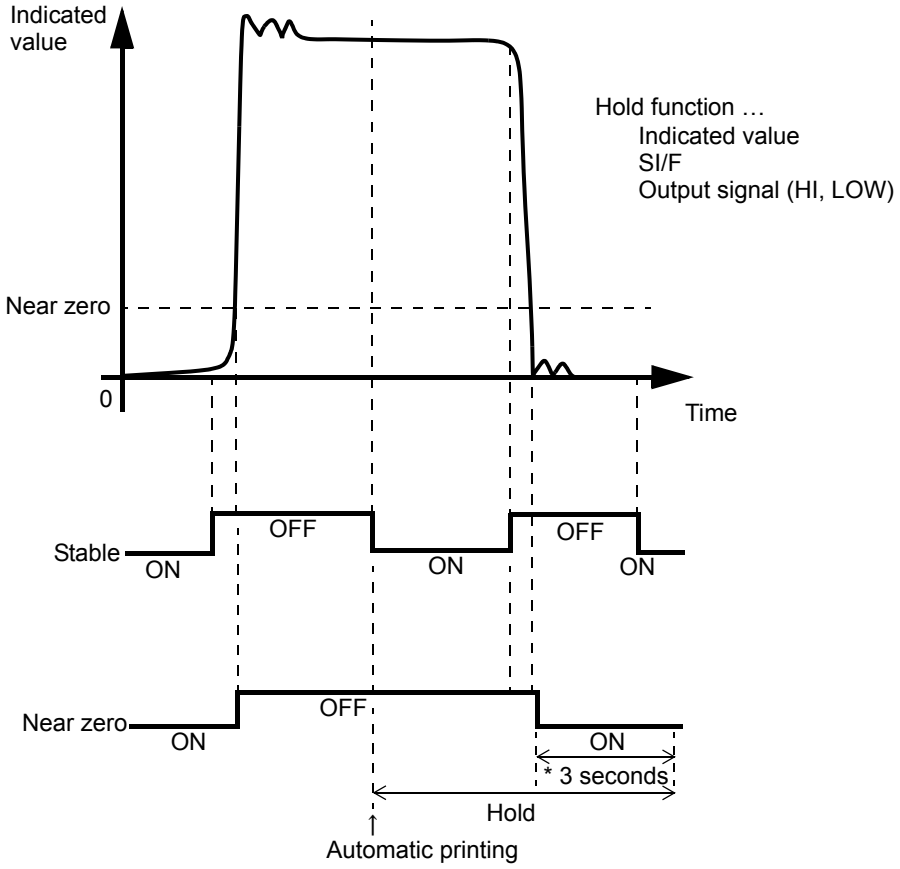
Use UP and DOWN keys to set the hold mode, then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

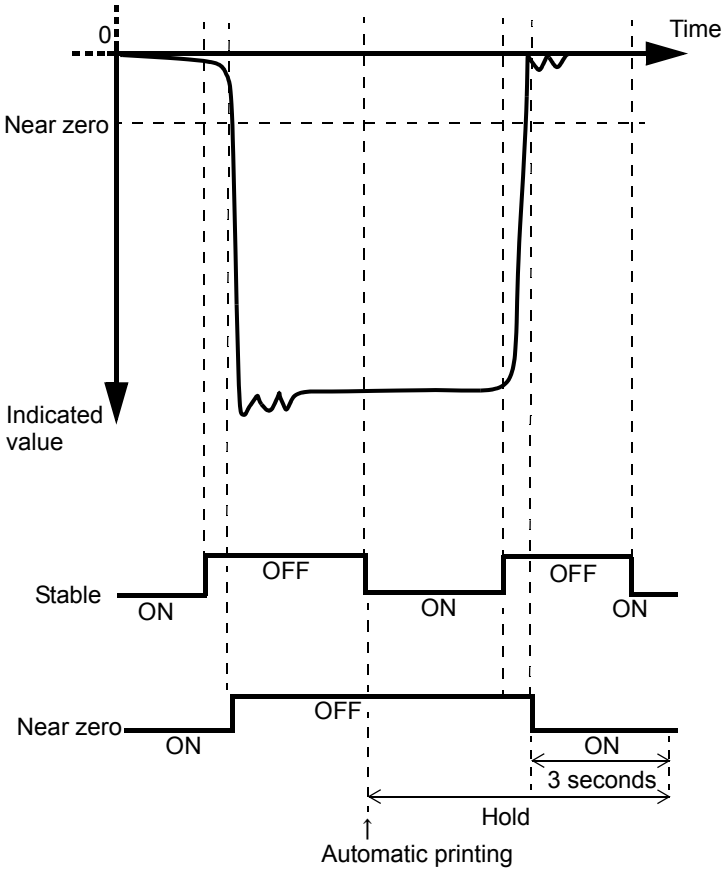
5-11. Automatic Printing

The Automatic Printing function automatically prints out indicated values on a UNIPULSE printer connected to the F340A over the SI/F. Printing is made when indicates vales are stable. (Parameter for stabilization is set in the Motion Detect function.) The stabilized indicated value can be held for three seconds (indicated value hold function).

- Operation of the indicated value hold function



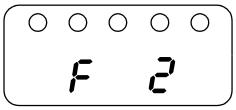
* If the state of Near Zero ON is not keeping for three min utes, the hold values was not canceled.



Setting of Automatic Printing

1) Select setting mode 2.

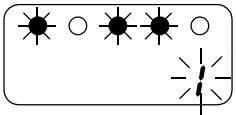
FNC → SEL



2) Select automatic printing.

DOWN Press eight times.

ENT



Automatic printing

- 2 : Automatic printing ON, Indicated value HOLD
- 1 : Automatic printing ON
- 0 : Automatic printing OFF

Use UP and DOWN keys to set the automatic printing,

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

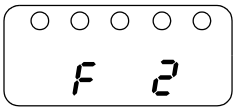
5-12. Hold Value Printing

The Hold Value Printing function automatically prints out the peak value (held value) on a UNIPULSE printer connected to the F340A over the SI/F.

Setting of Hold Value Printing

1) Select setting mode 2.

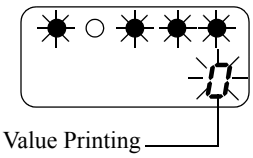
FNC → SEL



2) Select hold value printing.

DOWN Press nine times.

ENT



Hold Value Printing

1 : Hold value printed when Hold is canceled
0 : No printing

Use UP and DOWN keys to set the hold value printing,

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

If setting Hold Value Printing when the hold value canceled,
Automatic Printing did not work.

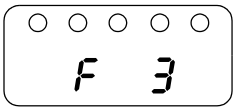
5-13. LOCK

The Setting value LOCK function inhibits changes to setting to prevent changes to set values or calibrated values through misoperation.

Setting of LOCK

1) Select setting mode 3.

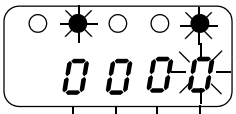
FNC → SEL → SEL



2) Select lock.

DOWN Select

ENT



Setting Value LOCK
- 1 : LOCK
- 0 : LOCK released

Calbration LOCK
- 1 : LOCK
- 0 : LOCK released

Hold key operation
- 1 : Invalid
- 0 : Valid

Zero key operation
- 1 : Invalid
- 0 : Valid

Use UP DOWN and SEL key to set the lock,

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

For setting items locked by using set value LOCK and calibration value LOCK , see the set value list on page 17.

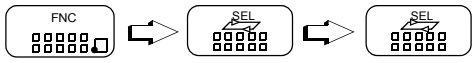
The Digital Zero function by using the ZERO key on the front panel is not effective when the Setting value LOCK (calibrated value) is released (nor is it effective from the rear panel DZ). On completion of calibration set the calibration value LOCK.

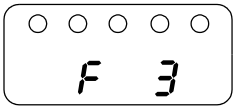
5-14. Scale Division

This function sets the minimum value of the digital change.

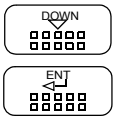
Setting of Scale Division

1) Select setting mode 3.

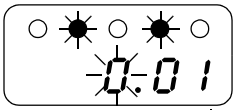




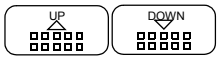
2) Select scale division.



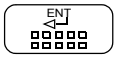
Press twice.



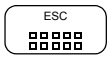
Scale Division
(001 to 100)

Use 

key to set the scale division,

then use 

key to validate the setting.

To return to the indicated value display, press 

key.

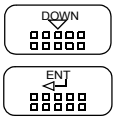
5-15. Display Frequency

The Display frequency function is used to select the times the indicated values are displayed per second. A/D conversion count is fixed to 100 per second.

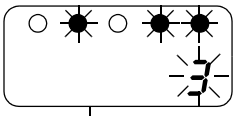
Setting of Display Count

1) Select setting mode 3.

2) Select display frequency.

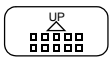


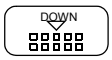
Press three times.



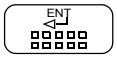
Display Frequency

- 3 : 25/sec.
- 2 : 13/sec.
- 1 : 6/sec.
- 0 : 3/sec.

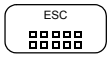
Use 

and 

keys to set the display frequency,

then use 

key to validate the setting.

To return to the indicated value display, press 

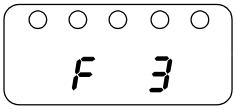
key.

5-16. Excitation Voltage

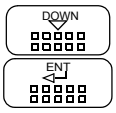
This function selects the bridge excitation voltage to be supplied to the strain gauge sensor.

Setting Excitation Voltage

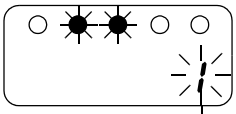
1) Select setting mode 3.



2) Select excitation voltage.

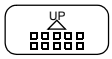


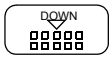
Press four times.

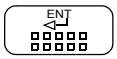


Excitation Voltage

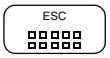
1 : 10 V
0 : 2.5V

Set excitation voltage with 

and 

keys and validate it with 

key.

To return to the indicated value display, press 

key.

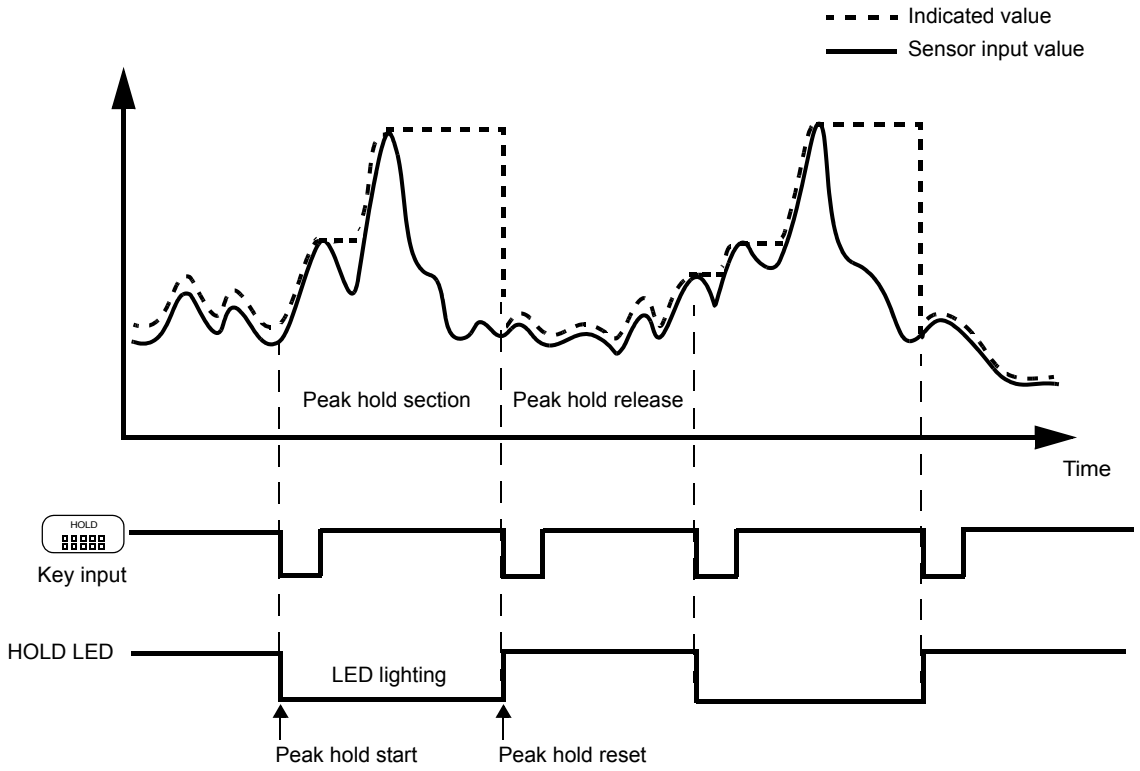
⚠ CAUTION

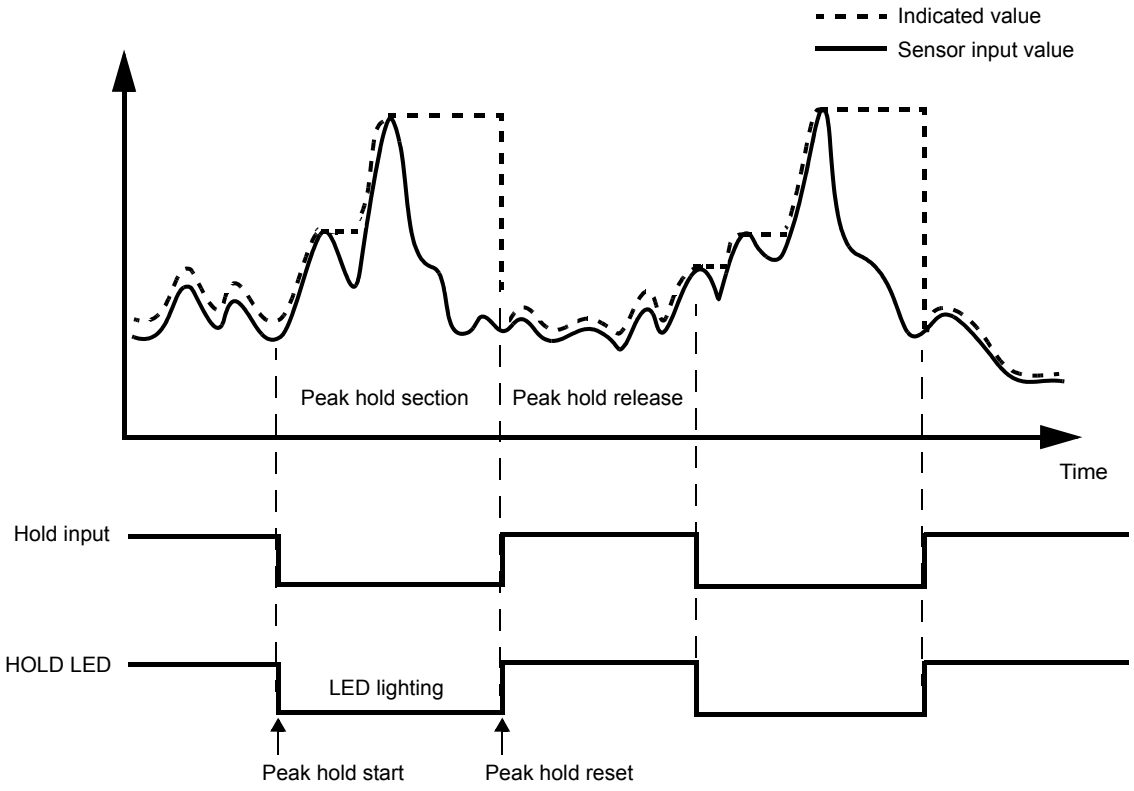
Use a strain gauge sensor to be connected to the F340A whose maximum excitation voltage is above the bridge excitation voltage specified.
If the bridge excitation voltage is greater than the maximum excitation voltage of the sensor, the sensor may overheat or may be damaged.

6 HOLD FUNCTION

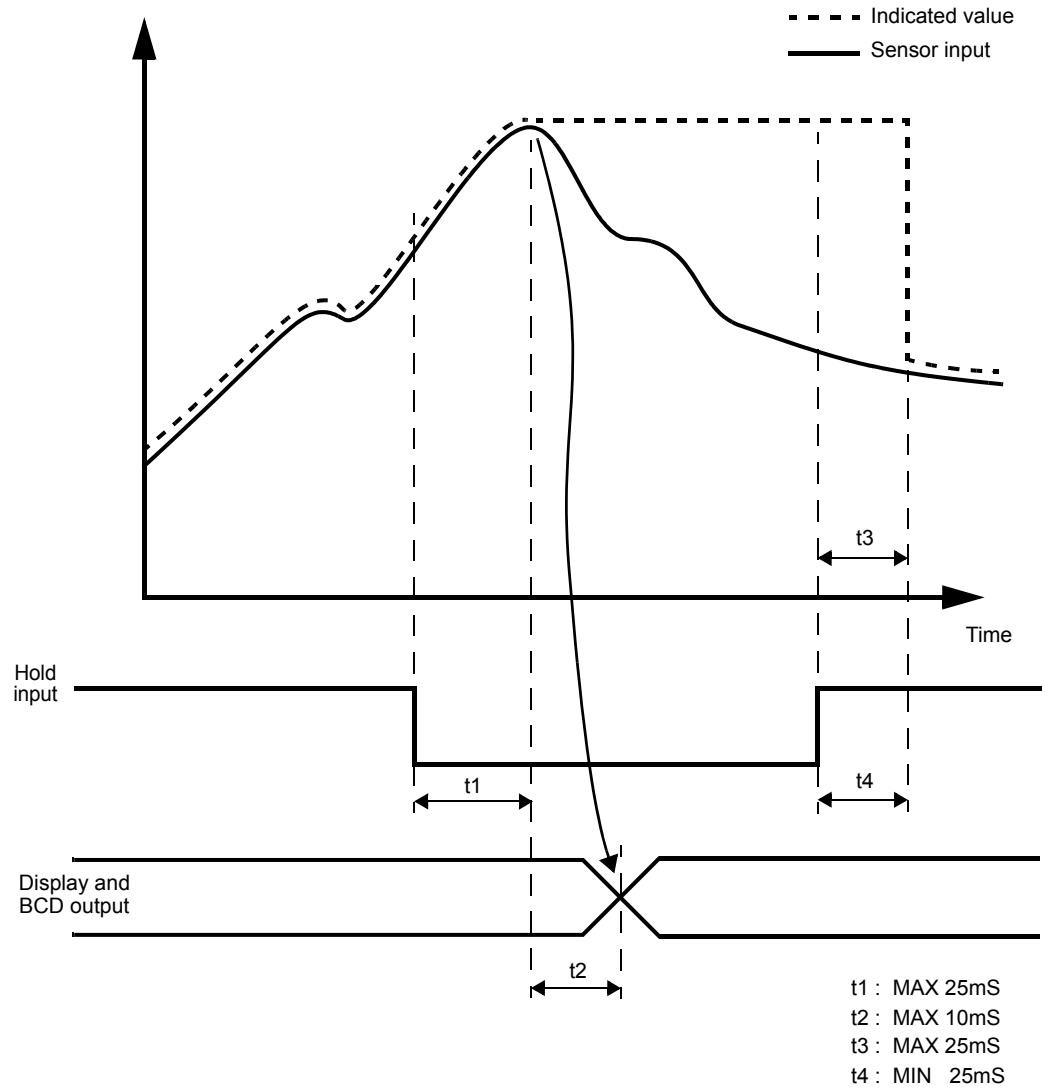
6-1. Peak Hold

- Peak Hold Operation





- Timing Chart



t1 : Time from the short-circuiting of the hold input (OFF → ON) to the display of the peak hold value.

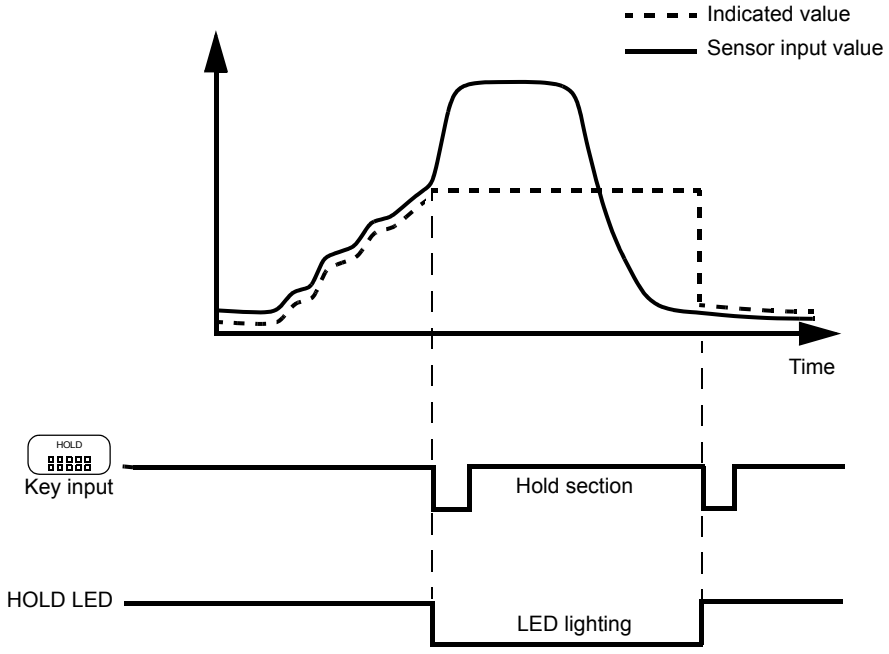
t2 : Time until the A/D conversion of the analog value.

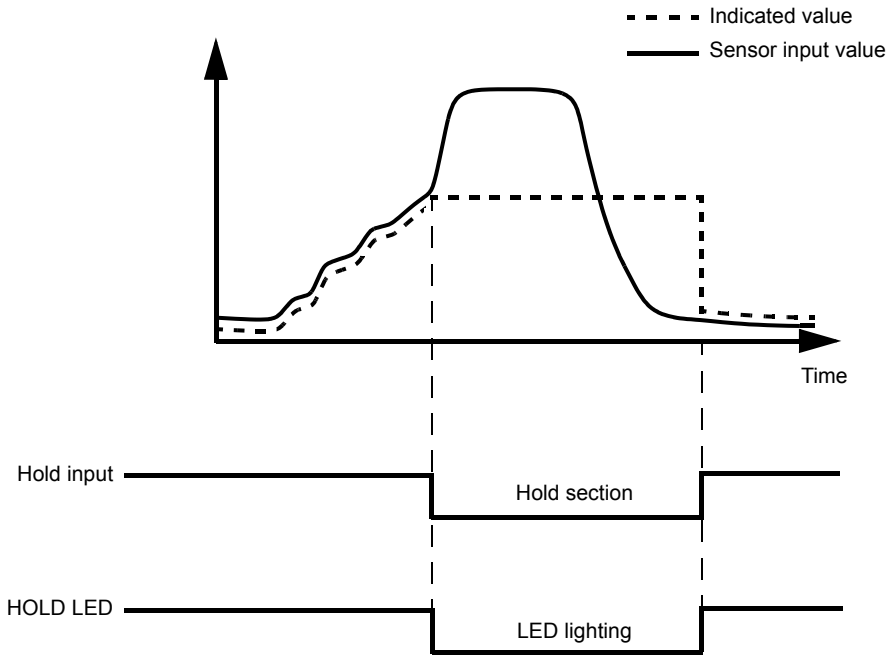
t3 : Time from the input of the hold input (ON → OFF) to the reset of the analog peak hold value.

t4 : The minimum tracking (resetting) time required for resetting the display of the held value.

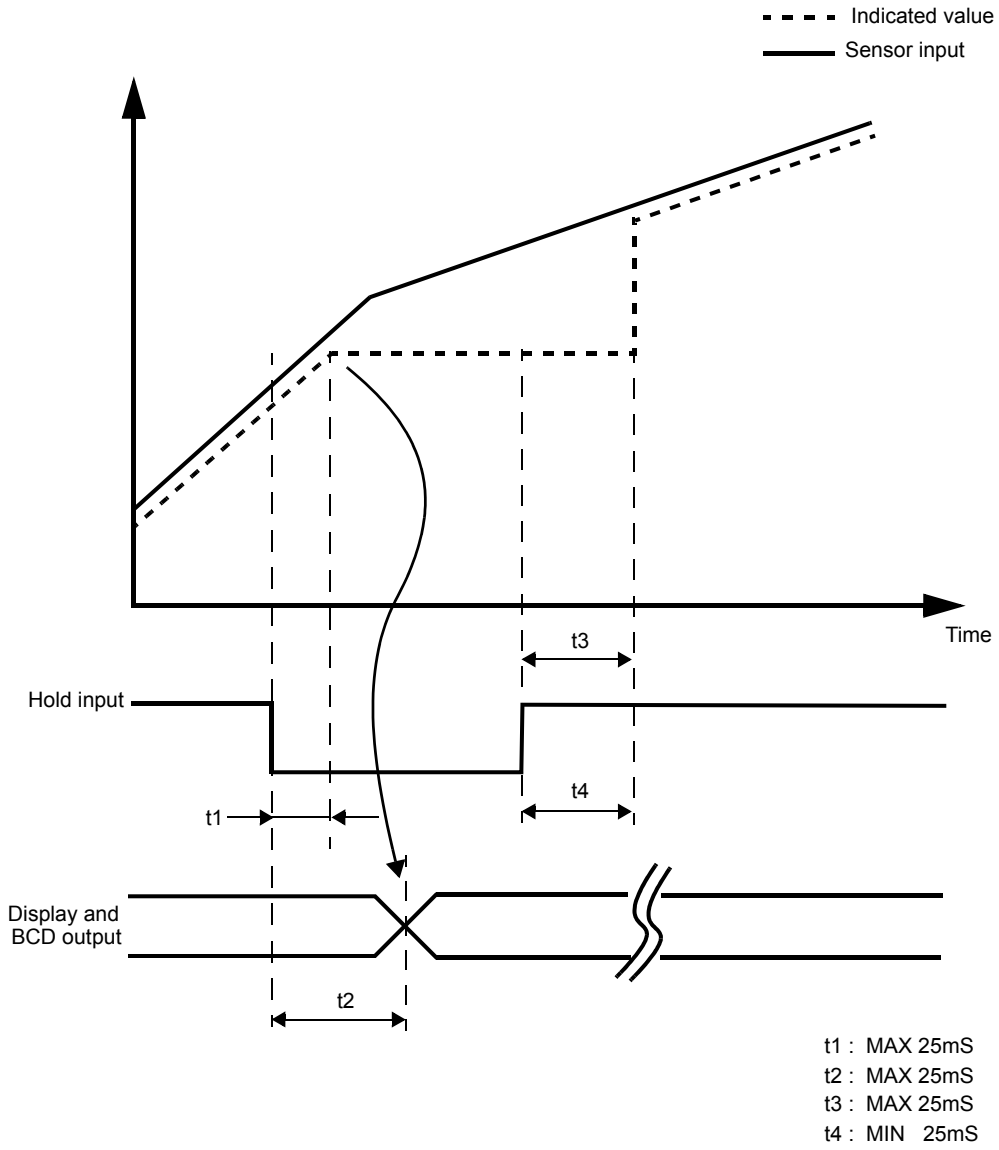
6-2. Sample Hold Operation (Digital Hold)

- Sample Hold Operation





- Timing Chart



t1 : Time from the short-circuiting of the hold input (OFF → ON) to the display of the hold value.

t2 : Time from start of the hold to the A/D conversion of the hold value.

t3 : Time from the input of the hold input (ON → OFF) to the reset of the analog hold.

t4 : The minimum tracking (resetting) time required for resetting the display of the held value.

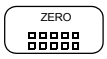
7. DIGITAL ZERO FUNCTION

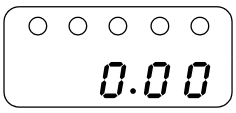
This function zeros the indicated value.

Digital Zero by Key Operation

Setting of Digital Zero

1) Perform digital zero.

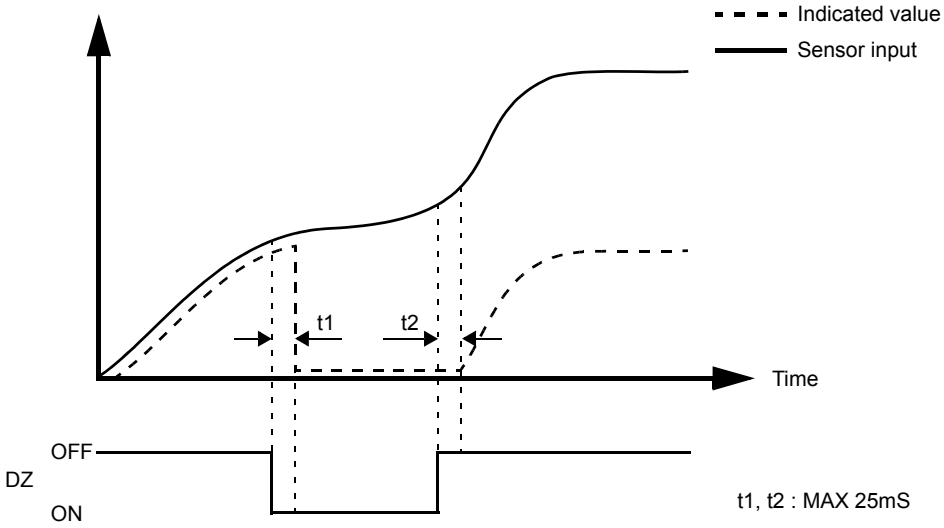




2) When the indicated value becomes zero, digital zero is completed.

Digital Zero by External Signal Input

The interval while the DZ input (9) and COM (8) on the signal input/output terminal block at the back are short-circuited, the digital zero function works to zero the indicated value.



t1 : Time from the short-circuiting of the DZ input (OFF → ON) to when the indicated value becomes 0

t2 : Time from the input of the DZ input (ON → OFF) to when the indicated value returns to tracking

Digital zero will not work when the calibration value LOCK is turned off.

It only works when the calibration value LOCK is turned on.

If you turn off the power, digital zero will be reset.

8. BCD DATA OUTPUT

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

8-1. Connector Pin Assignment

Amphenol Connector (36-Pin)

No.		Signal	No.		Signal
1	*	COM	19	*	COM
2	Out	1	20		
3	Out	2	21		
4	Out	4	22	Out	Near Zero
5	Out	8	23	Out	Minus (polarity)
6	Out	10	24	Out	OVER
7	Out	20	25	Out	P.C (stable)
8	Out	40	26	Out	STROBE
9	Out	80	27	In	BCD Data hold
10	Out	100	28	In	Logic Switching
11	Out	200	29		
12	Out	400	30		
13	Out	800	31		
14	Out	1000	32		
15	Out	2000	33		
16	Out	4000	34		
17	Out	8000	35		
18	Out	10000	36		

Compatible connector is DDK57-30360 or equivalent.

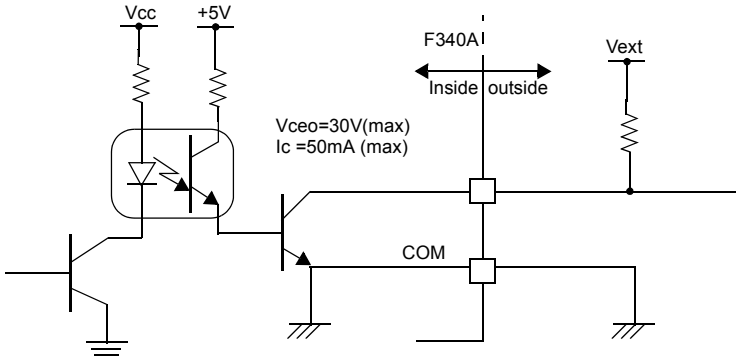
8-2. Logic Switching

The logic Switching function is used to switch between the signal output logics, positive logic and negative logic. Pin 28 is used for this purpose.
When COM and pin 28 are left open, the negative logic is used. When COM and pin 28 are short-circuited, the positive logic is used.

8-3. Equivalent Circuit

- Output

The signal output circuit employs the open collector output



● Internal transistor status

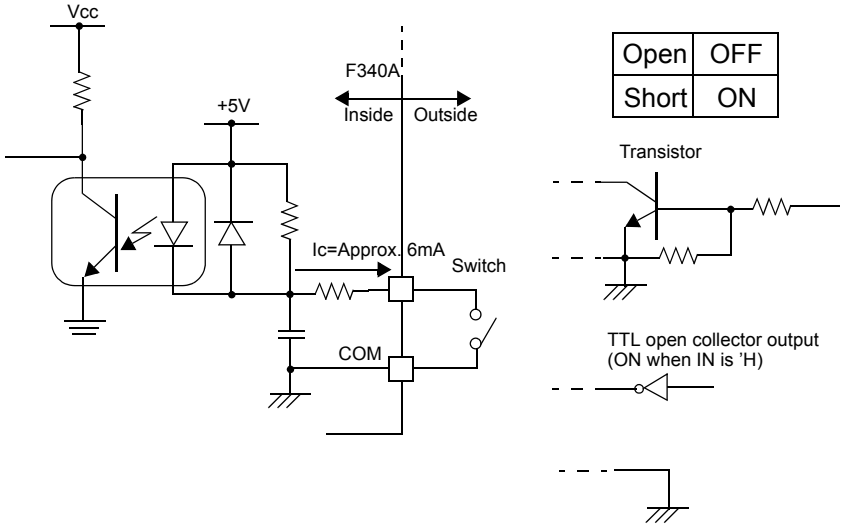
Output data	Negative	Positive
0	OFF	ON
1	ON	OFF

● Output pin level

Output data	Negative	Positive
0	H	L
1	L	H

Through logic switching (pin 28)

- Input



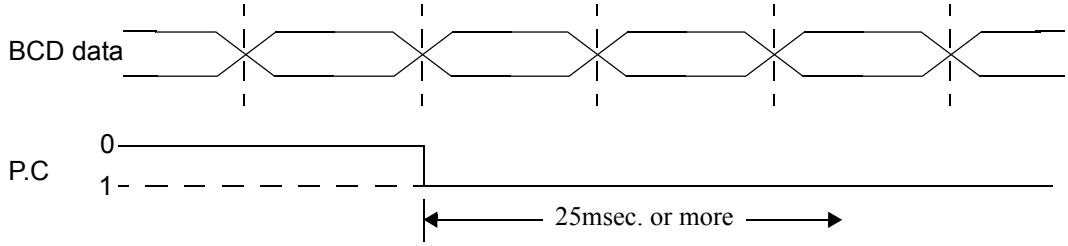
⚠ CAUTION

- Avoid applying external voltages to the signal input circuit.
- Use external elements which withstands Ic=10mA or above
- Leakage current from external element must be 30μA or below.

8-4. Signal Timing

- P.C

P.C goes on with the BCD data when measurement is stable. Perform data read approximately 25msec. after the trailing edge of the P.C

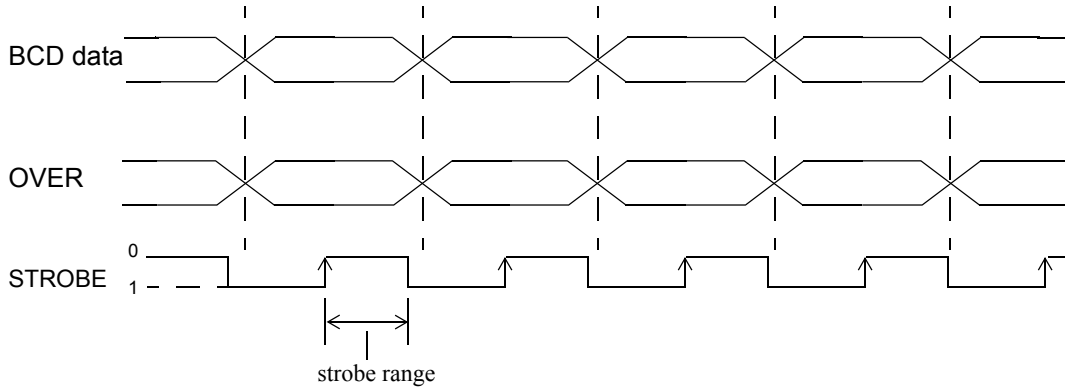


- OVER

Output when LOAD or -LOAD, and OFL1 or OFL2 are specified.

- STROBE

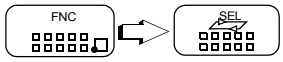
BCD data is updated on a per A/D conversion and the strobe pulse synchronous with the BCD data is output.Use the rising edge of the pulse to read data

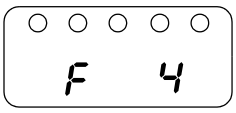


8-5. BCD Data Update Rate Selection

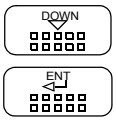
BCD Data Update Rate Selection

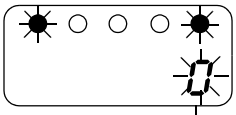
1) Select setting mode 4.





2) Set the update rate of BCD parallel data output.





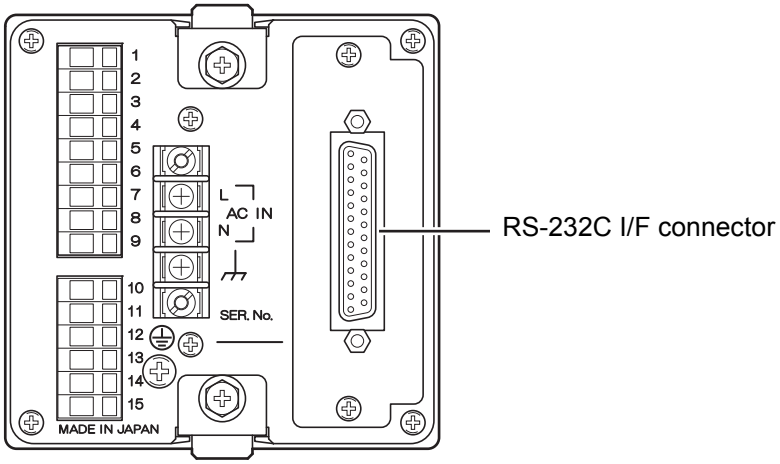
BCD Update Rate

0 : 100 times/sec.	STROBE Range	5msec
1 : 50 times/sec.	〃	10msec
2 : 20 times/sec.	〃	25msec
3 : 10 times/sec.	〃	50msec
4 : 5 times/sec.	〃	100msec
5 : 2 times/sec.	〃	250msec
6 : 1 times/sec.	〃	Approx. 500msec

Normaly, BCD data update synchronous the A/D conversion (100 times/sec).
When the BCD input equipment is low ability and can not read out the high rate of 100 times/sec., set the BCD data update rate is low.

9. RS-232C INTERFACE

RS-232C interface is used to read out the indicated value and the state of F340A and to write set values into F340A. It is convenient to connect F340A with a computer, a process controller and a sequencer, etc. to make processing such as control, aggregation, recording and so on.



9-1. Communication Specifications

9-1-1. Standard

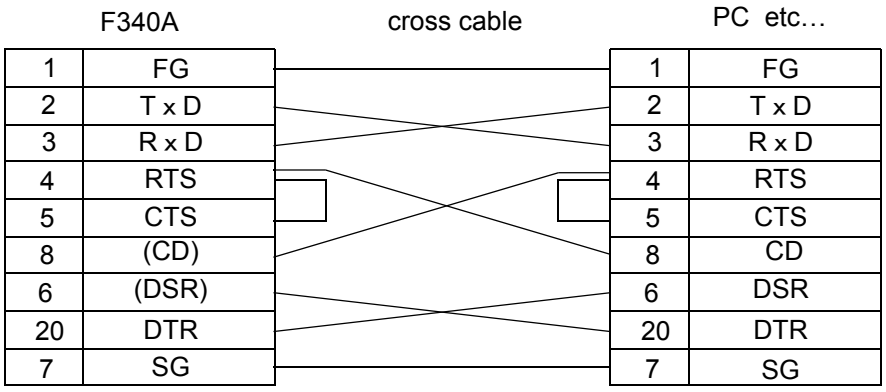
Signal level	:	Based on RS-232C	
Transmitting distance	:	Approx.15m	
Transmitting method	:	Asynchronous, Full duplex	
Transmitting speed	:	1200, 2400, 4800, or 9600bps selectable	
Bit configuration	:	Start bit	1
		Character length	7 or 8 bit selectable
		Stop bit	1or 2 bit selectable
		Parity	none,odd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

9-1-2. Connector Pin Assignment

Adaptable plug :25-pin D-sub connector

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

9-1-3. About Cables



* The avobe diagram is for connecting a personal computer as a DTE(Data Terminal Equipment)device.

  If it is a DCE (Data Circuit-terminating Equipment)device,connect pin to pin (DTR to DTR, DSR to DSR etc.)

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

9-2. Setting RS-232C Interface

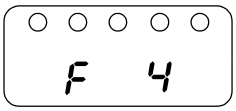
This will set the RS-232C communication conditions of F340A.

Setting of RS-232C

1) Select setting mode 4.

FNC → SEL

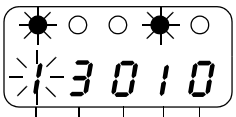
Press three times.



2) Select RS-232C.

DOWN Press twice.

ENT



Communication Mode

2 : Communication Mode 2 (transmits when printed)

1 : Communication Mode 1 (transmits continuously)

0 : Communication Mode 0 (performs communication by a command)

Baud Rate

3 : 9600bps
2 : 4800bps
1 : 2400bps
0 : 1200bps

Character Length

1 : 8bit
0 : 7bit

Parity Bit

2 : Even number
1 : Odd number
0 : None

Stop Bit

1 : 2bit
0 : 1bit

3) Input RS-232C with UP DOWN and SEL keys and validate it with ENT key.

To return to the indicated value display, press ESC key.

9-3. Communication Mode

1. Communication Mode 0

This mode performs communication by a command from the host computer.

In this mode, you can read out the indicated value, status, set values and write in set values.

2. Communication Mode 1

This mode continuously transmits the indicated values and the status.

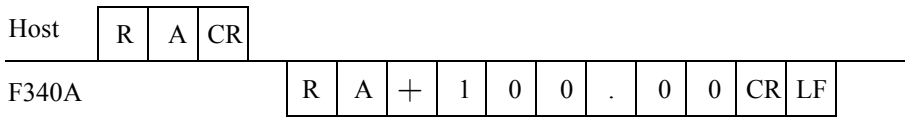
3. Communication Mode 2

This mode transmits the indicated values when they are printed.

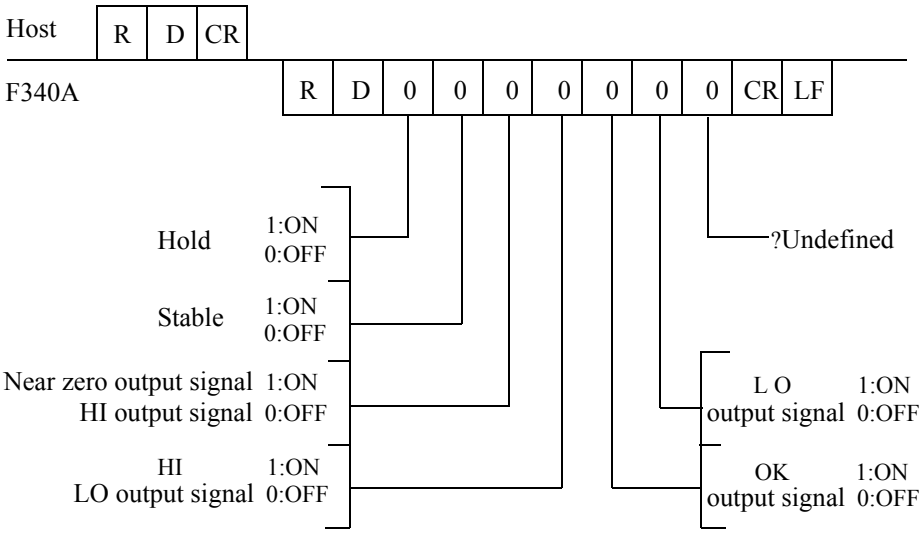
9-4. Communication Format

1. Communication Mode 0

- Reading Out the Indicated Value (the sign, indicated value with 5 digits and decimal point)



- Reading Out the Status (seven digits)



- Write in of the set value

High Limit	W	0	1							CR	LF	(Set value LOCK)
Low Limit	W	0	2							CR	LF	(Set value LOCK)
High/Low Limit Comparison Mode	W	0	3	0	0	0	0	0		CR	LF	(Set value LOCK)
Hysteresis	W	0	4	0	0					CR	LF	(Set value LOCK)
Digital Offset	W	0	5							CR	LF	(Set value LOCK)
Near Zero	W	0	6	0						CR	LF	(Set value LOCK)
Digital Filter	W	1	1	0	0	0	0	0		CR	LF	(Set value LOCK)
Analog Filter	W	1	2	0	0	0	0	0		CR	LF	(Set value LOCK)
MD (stable time)	W	1	3	0	0	0	0			CR	LF	(Set value LOCK)
MD (stable band)	W	1	4	0	0	0	0			CR	LF	(Set value LOCK)
Zero Tracking (time)	W	1	5	0	0	0	0			CR	LF	(Set value LOCK)
Zero Tracking (band)	W	1	6	0	0	0	0			CR	LF	(Set value LOCK)
Hold Mode	W	1	7	0	0	0	0	0		CR	LF	(Set value LOCK)
Automatic Printing	W	1	8	0	0	0	0	0		CR	LF	(Set value LOCK)
Hold Value Printing	W	1	9	0	0	0	0	0		CR	LF	(Set value LOCK)

Set value No. — Max 5digits

Sign bit
- 0 : In signed setting, this will be recognized as plus.
- — : This will be recognized as minus.

* Do not put other than zero into a place which is set zero.

LOCK	W	2	1	0	0					CR	LF
Scale Division	W	2	2	0	0	0	0	0		CR	LF
Display Frequency	W	2	3	0	0	0	0	0		CR	LF
Excitation Voltage	W	2	4	0	0	0	0	0		CR	LF
BCD Data Update Rate	W	3	1	0	0	0	0	0		CR	LF
RS-232C	W	3	2	0						CR	LF
D/A Zero Setting	W	3	3							CR	LF
D/A Full Scale Setting	W	3	4							CR	LF

(calibration LOCK)

Set value No. — Max 5digits

Sign bit

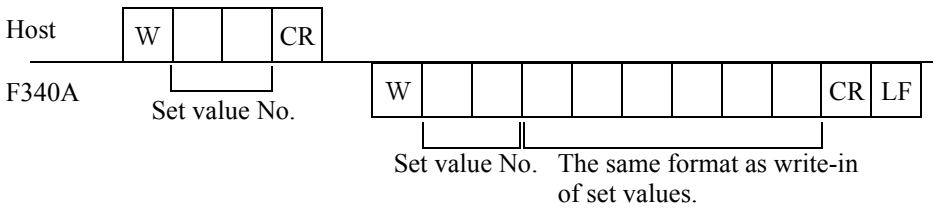
0 : In signed setting, this will be recognized as plus.

— : This will be recognized as minus.

* Do not put other than zero into a place which is set zero.

It is impossible to write W24 and W34.

- Reading out Set Values

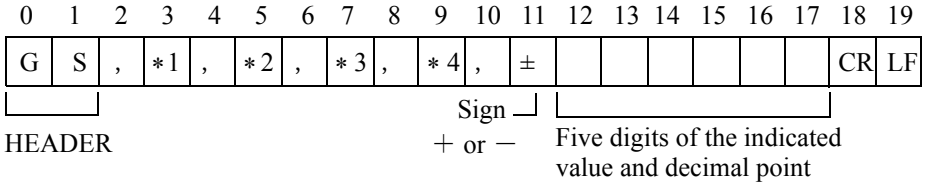


- Command (host → F340A)

Hold	C E CR	
Hold Reset	C F CR	
Digital Zero	C G CR	(This is effective only when the calibration value LOCK is "1".)
Digital Zero Reset	C H CR	(This is effective only when the calibration value LOCK is "1".)
Print Instruction	C I CR	(This will issue print a command onto SIF.)

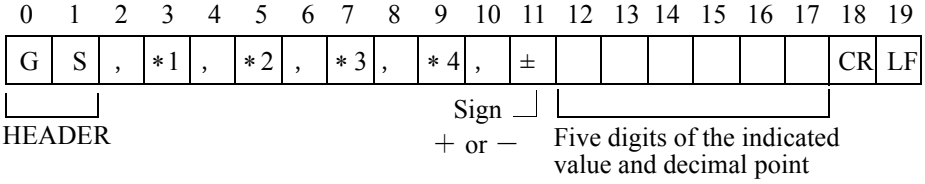
2. Communication Mode 1

This mode will continuously transmit the indicated values.



3. Communication Mode 2

This mode will transmit when the indicated value is printed.



*1

O.....Over Load (LOAD, OFL)
S.....Stable
M .....Not Stable
H.....Hold

* 1 Priority H > O > (S or M)

*2

A.....Zero Tracking OFF
T .....Zero Tracking ON

*3

H.....High Limit ON
L .....Low Limit ON
G.....High / Low Limit OFF
N.....High / Low Limit ON
F.....Compare OFF

* 3 Priority N > (H or L) F > G

*4

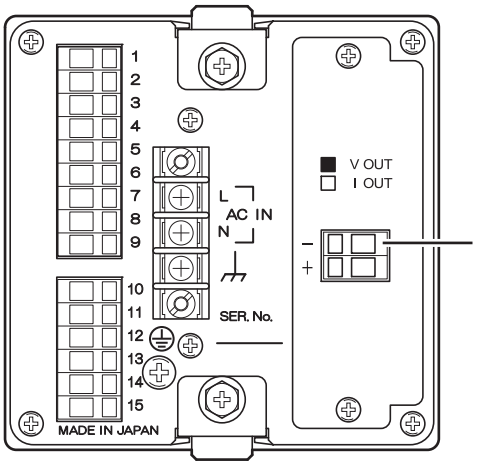
N.....Zero Near OFF
Z .....Zero Near ON

10. D/A CONVERTER

The D/A converter analog output can be selected from the voltage output and the current output.
Please depending on the request at the time of order.

10-1. Voltage Output (DAV) (Depending on the request at the time of order.)

This converter is used to obtain an analog output which is linked with the indicated value of the F340A.
The range of the analog output is from -10 to +10V.
An analog output from -10V to +10V can be obtained with respect to any digital values set by the D/A zero setting and the D/A full scale setting functions.
The output circuit and the main circuit are isolated.

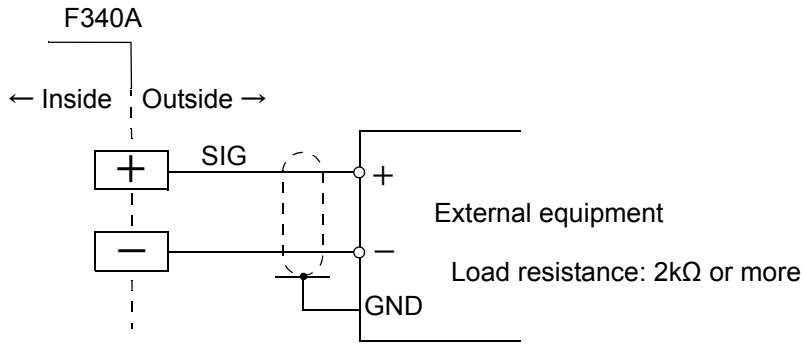


Terminals for obtaining voltage signal.
"+" is for signal, and "-" is for ground.
-10 to +10V can be obtained.

Voltage output	: -10 to +10V (load resistance; 2kΩ or more)
D/A conversion speed	: 100 times/sec.
Resolution	: 1/6000
Over range	: -11.0 to +11.0V

10-1-1. Obtaining Voltage Output Signal

Use + and - terminals of F340A connecting to them an external equipment (with load resistance of 2kΩ or more).

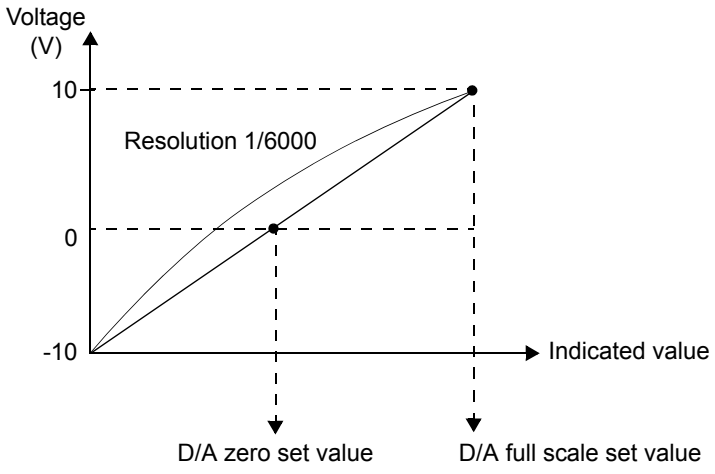


⚠ CAUTION

- Do not apply external voltages. Breakage will result.
- Do not short-circuit the voltage output. Doing so will cause a failure.
  Also, connecting a capacity load may cause oscillation.

10-1-2. Setting of D/A Zero and Gain

With the D/A converter of the F340A, an analog output is obtained by setting the indicated value to output 0V (D/A zero set value) and the indicated value to output 10V (D/A full scale set value). Respective set values are inputted by the D/A zero and full scale setting functions.



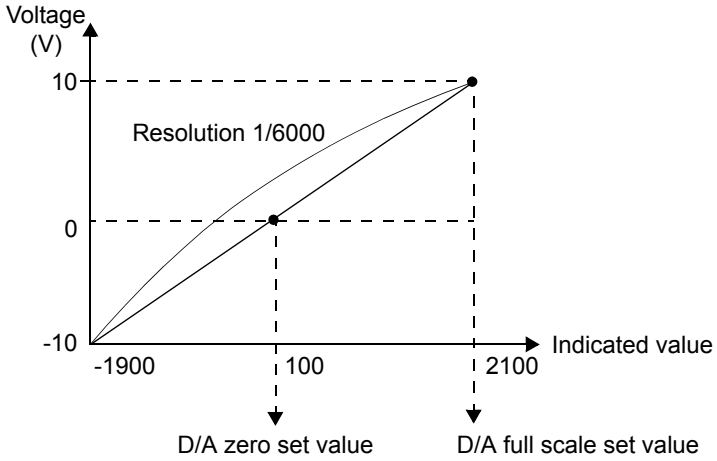
Example of Setting

In the case where:

D/A output mode ..... 0 (linked with indicated value)

D/A zero setting 00100

D/A full scale setting 02100



	Indicated value	Voltage (V)
Full scale →	-1900	-10.00
Zero →	100	0.00
	1100	5.00
	1600	7.50
Full scale →	2100	10.0
	2120	10.1

10-1-3. About D/A Resolution

The resolution of the D/A converter is 1/6000 with respect to 0 to ±10V.
In other words, the minimum unit of voltage is:

(+10 to (-10V)) × 1/6000 = 3.33mV.

Also, the minimum unit of indicated value is:

(D/A full scale set value - D/A zero set value) × 2 × 1/6000.

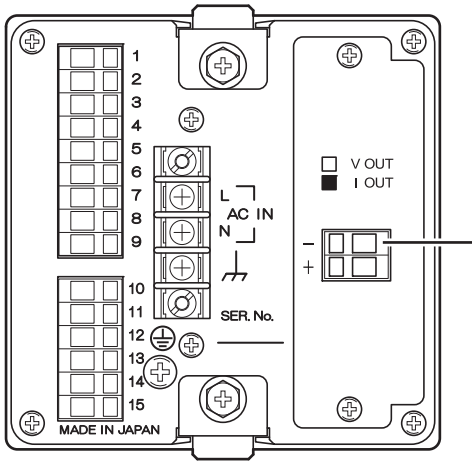
10-2. Current Output (DAI)
(Depending on the request at the time of order.)

This converter is used to obtain an analog output which is linked with the indicated value of the F340A.

The range of the analog output is from 4 to 20mA.

An analog output from 4mA to 20mA can be obtained with respect to any digital values set by the D/A zero setting and the D/A full scale setting functions.

The output circuit and the main circuit are isolated.

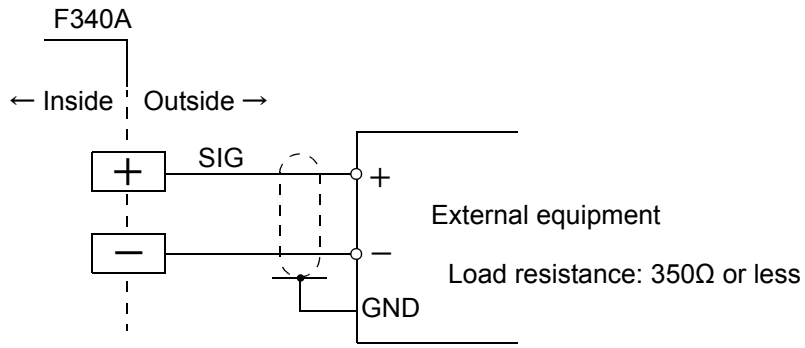


Terminals for obtaining current signal.
"+" is for signal, and "-" is for ground.
4 to 20mA can be obtained.

Current output	: 4 to 20mA (load resistance; 350Ω or less)
D/A conversion speed	: 100 times/sec.
Resolution	: 1/3000
Over range	: 3.2 to 20.8mA

10-2-1. Obtaining Current Output Signal

Use + and - terminals of F340A connecting to them an external equipment (with load resistance of 350Ω or less).

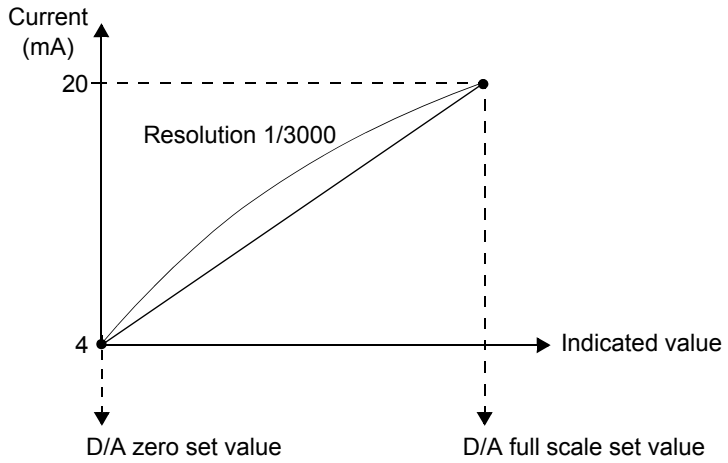


⚠ CAUTION

Do not apply external currents. Breakage will result.
Also, connecting a capacity load may cause oscillation.

10-2-2. Setting of D/A Zero and Gain

With the D/A converter of the F340A, an analog output is obtained by setting the indicated value to output 4mA (D/A zero set value) and the indicated value to output 20mA (D/A full scale set value). Respective set values are inputted by the D/A zero and full scale setting functions.



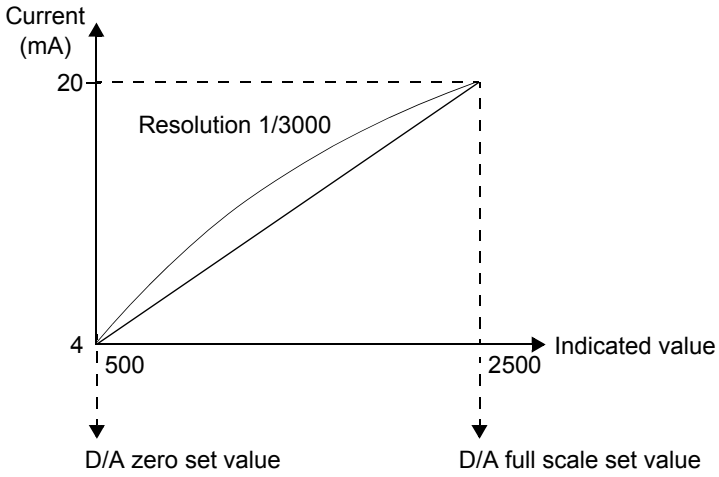
Example of setting

In the case where:

D/A output mode ..... 0 (linked with indicated value)

D/A zero setting 00500

D/A full scale setting 02500



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

10-2-3. About D/A Resolution

The resolution of the D/A converter is 1/3000 with respect to 4 to 20mA.
In other words, the minimum unit of voltage is:

(20 - 4mA) × 1/3000 = 5.33μA.

Also, the minimum unit of indicated value is:

(D/A full scale set value - D/A zero set value) × 1/3000.

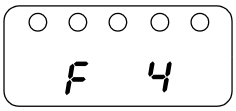
10-3. Setting D/A Zero Full Scale

This will set the D/A zero full scale of F340A.

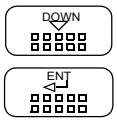
Setting D/A Zero Full Scale

1)Select setting mode 4.

Press three times.



2)Set D/A zero.

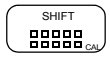


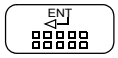
Press three times.

D/A Zero Value (00000 to ±19999)

Set D/A zero with 

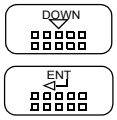
and 

keys. Press 

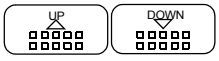
key to put minus sign. When you have made setting, validate it with 

key.

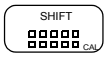
3)Set D/A full scale.

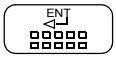


Press one time.

Set D/A full scale with 

and 

keys. Press 

key to put minus sign. When you have made setting, validate it with 

key.

10-4. About D/A Output Error

This is an error which is output only when D/A option is provided.

dEr 1

D/A output is less than the range of output.

For current output: about 0mA or less

For voltage output: about -12.5V or less

dEr 2

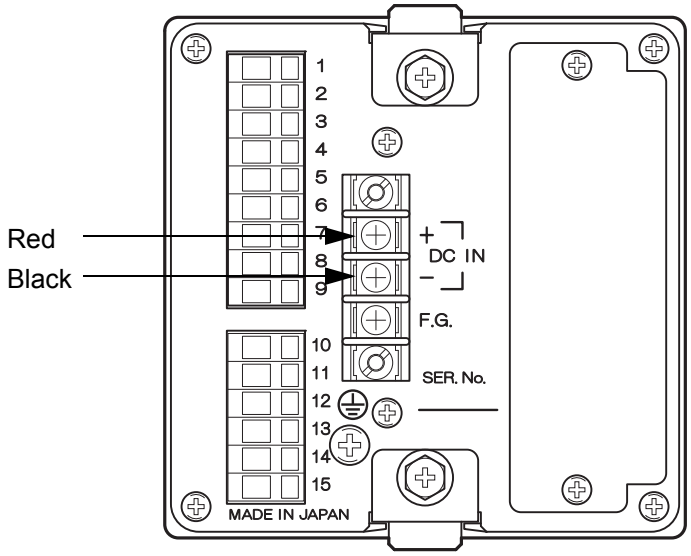
The D/A output exceeds the range of the output.

For current output: about 24mA or more

For voltage output: about 12.5V or more

11. DC POWER SOURCE

By specifying at the time of shipment, F340A can be used with DC power supply.



Connect the positive (+) side of the power source to the red screw side of the terminal block on the back of the F340A, and its negative (-) side to the black screw side.

Input voltage range (voltage between terminals of the F340A)

DC12 ～ 24V (±15%)

⚠ CAUTION

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

Power consumption

15W max

Request

Use a source power (or battery) of 3A DC or more.

12. OVERSCALE/ERROR DISPLAYS

12-1. Overscale Display

Minus overflow of the A/D converter (under -3.2mV/V between ±SIG)	-LoAd
Plus overflow of the A/D converter (over 3.2mV/V between ±SIG)	LoAd
Indicated value overflowed (indicated value<-1999)	oFL1
Indicated value overflowed (indicated value>1999)	oFL2

12-2. Calibration Error Display

Span set value is "00000"	cErr5
Output of the strain gauge sensor does not reach the span adjustment range.	cErr6
Output of the strain gauge sensor is on the minus (negative) side.	cErr7

12-3. Other Error Display

CPU has not received the data of ADC.	AdErr
Checksum error: The fault (data breakage) of program data has occurred.	Err
NOVRAM (non-volatile memory) error: The fault of the memory which memorizes setting value etc. has occurred.	n Err

The above-mentioned error is a hardware error and can consider the fault of parts.

Although it may return by ON/OFF of a power, when not repaired, please repair can be performed at UNIPULSE or at distributor.

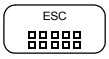
13. SELF-CHECK FUNCTION AND INITIALIZATION

13-1. Self-Check

The F340A incorporates the Self-check Function to detect errors in the internal circuits and in programs and the Visual-check Function to visually check the indicator.

Setting Method

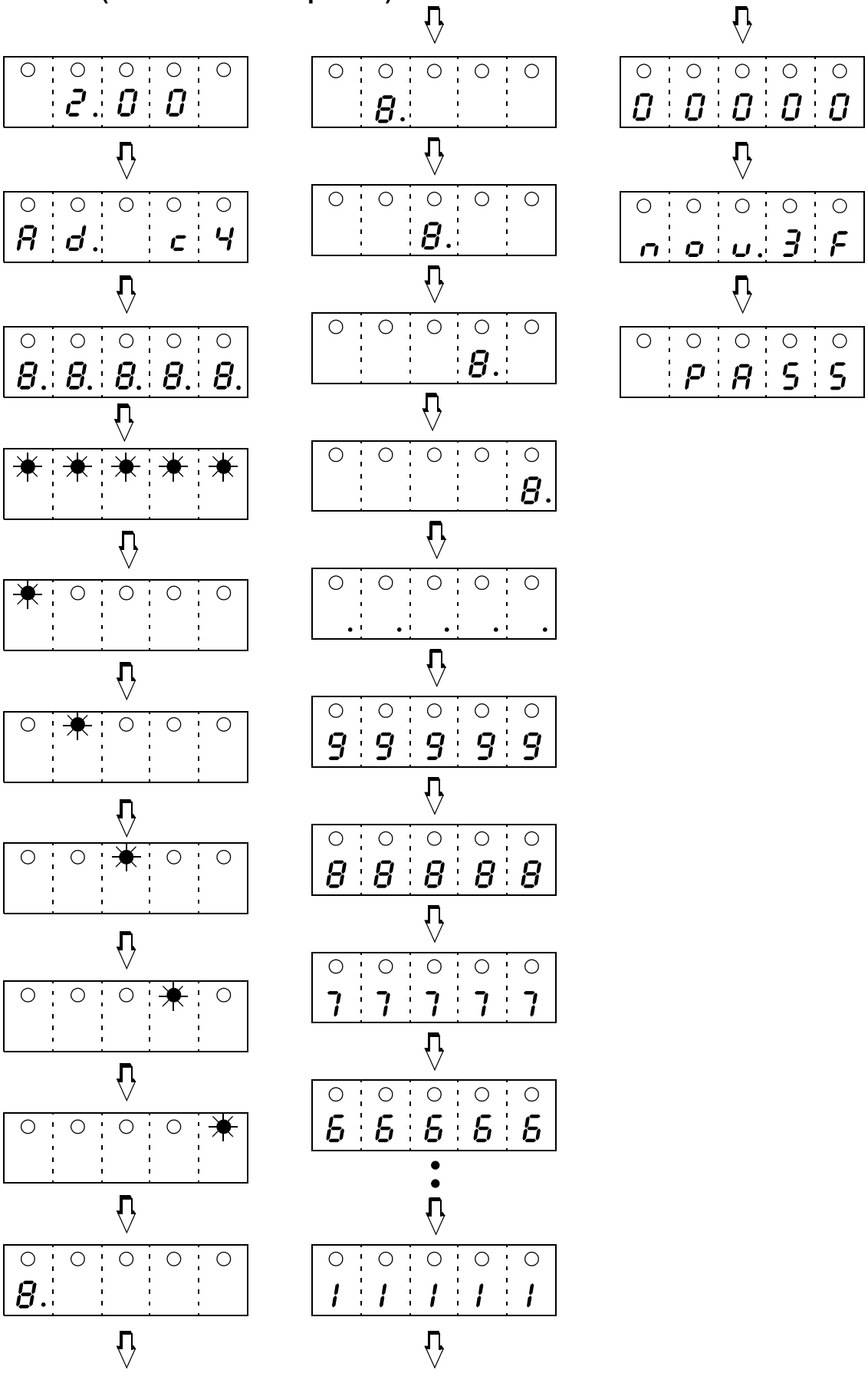
1) Turn off the power to the F340A.

2) Turn on the power with 

key held down.

The self-check is completed in 30 seconds. The display " PASS " should appear, then the indicate value should follow.This ensures that the F340A is in normal operation.

Self-check (Visual-Check Sequence)

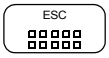


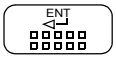
13-2. Initialization

The Initialization is an operation to reset the memory to the factory setting. This operation resets all set values except calibrated values (obtained through zero calibration and span calibration) to the factory setting

Setting Method

1) Turn off the power to the F340A.

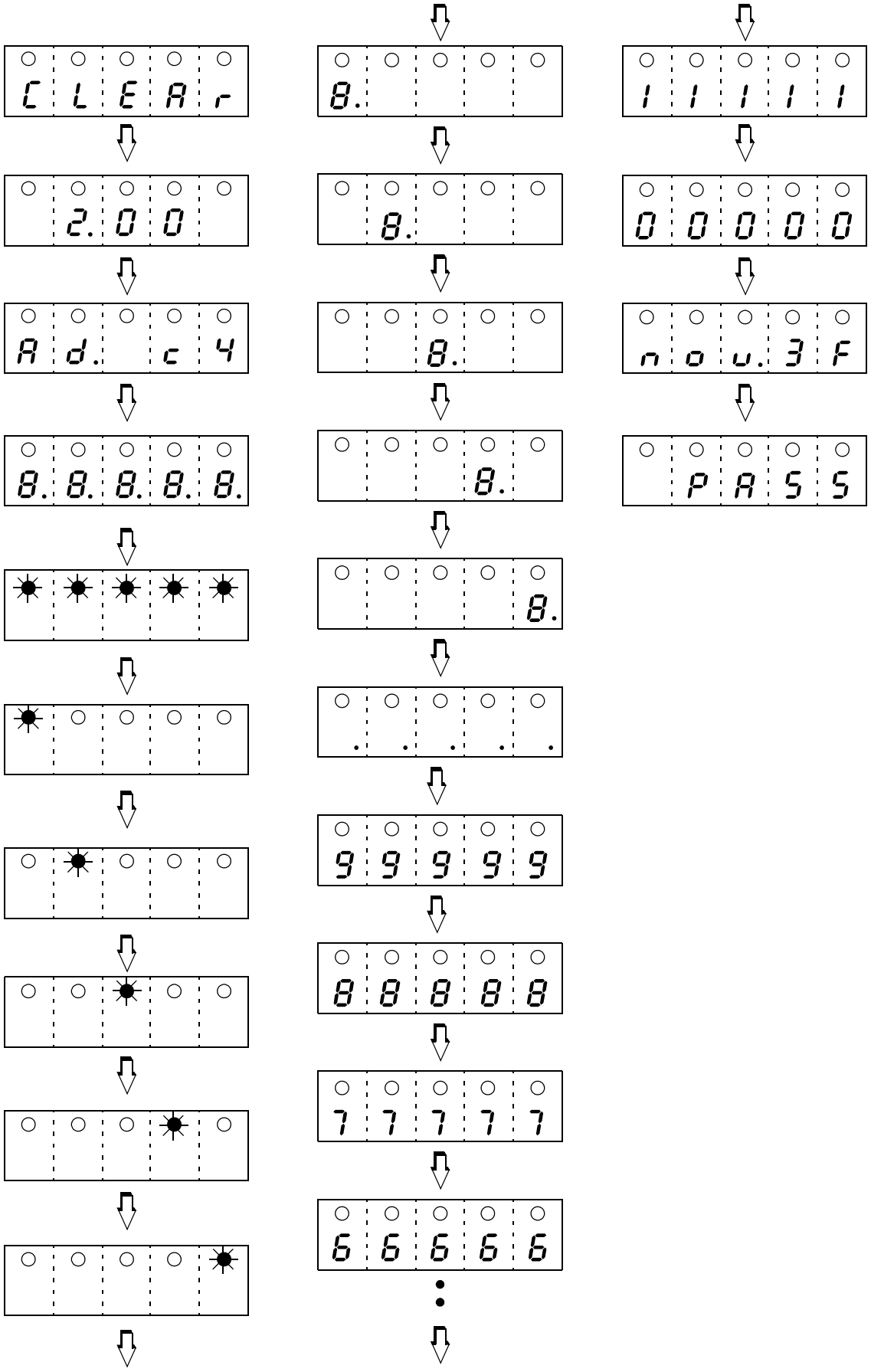
2) Turn on the power with 

and 

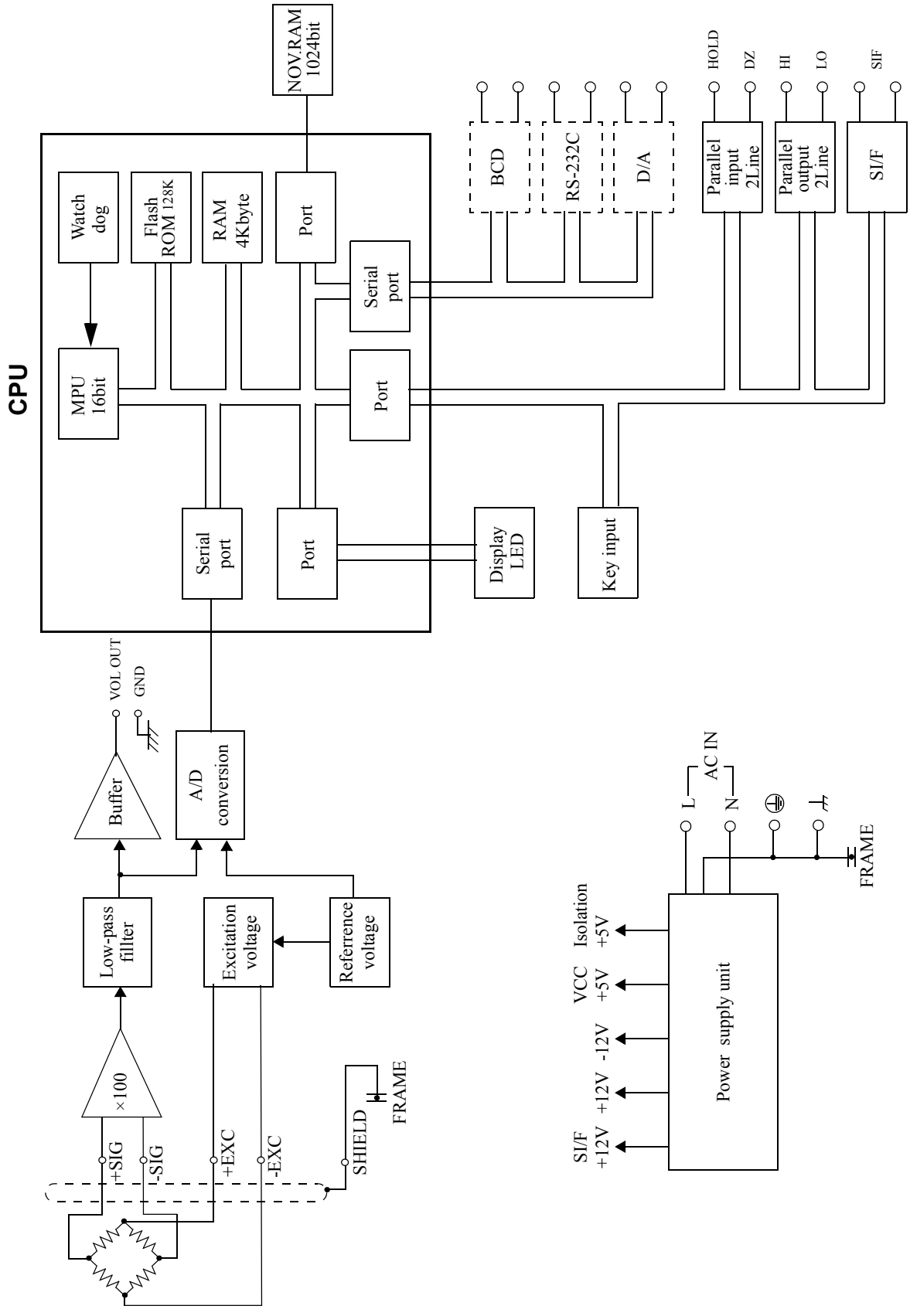
keys held down.

The initialization follows the self-check.

Initialization Sequence

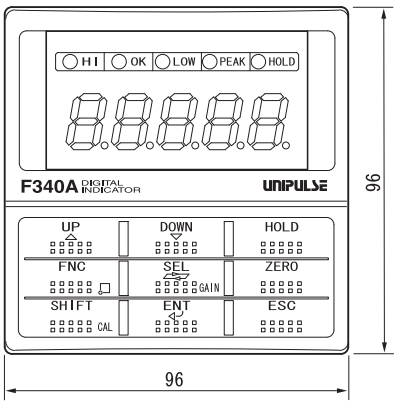


13-3. F340A Block Diagram

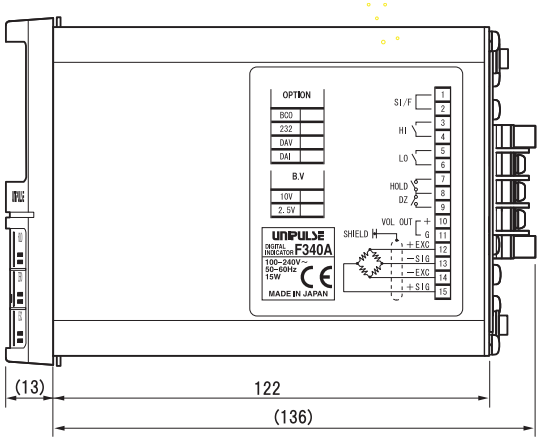


14. DIMENSIONS

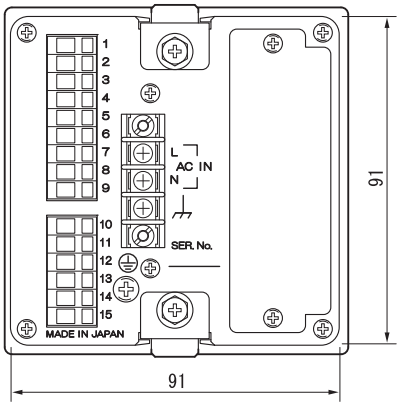
Unit: mm



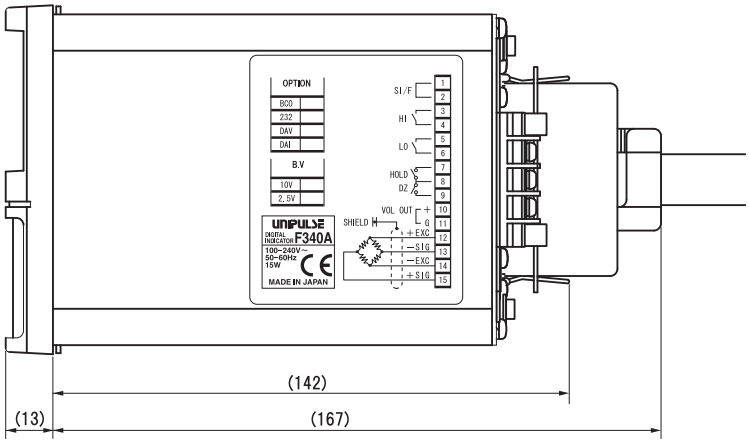
(Front)



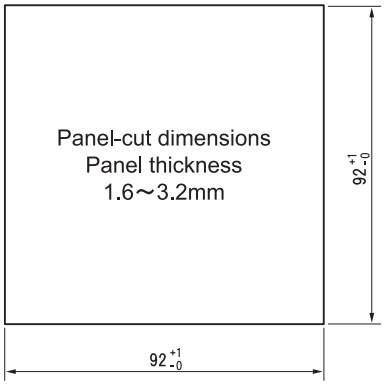
(Side)



(Real)



(Side (with BCD Output connector))



15. SPECIFICATIONS

15-1. Analog Section

Excitation voltage	DC 10V±10%
	DC 2.5V±10%
	Output current of max 30mA
	Changable by setting key Pad
Signal input range	－ 3.0 to +3.0mV/V
Analog input signal sensitivity	1μV/count (at excitation voltage 10V)
Accuracy	Non-linearity : < 0.02%FS (of 3mV/V input)
	Zero drift : < 0.5μV/ ℃
	Gain drift : < 25ppm/ ℃
A/D converter	100 times /sec. Resolution: 16 bits (binary)
Analog filter	4Hz, 10Hz, 100Hz (Initial), 3 k Hz
	Changable by setting key pad

Peak hold function (high-speed analog hold system)

Operation response speed: Approx. 1kHz

(Sin wave : 3mV/V input, Analog Filter.3kHz)

Accuracy : < 0.1%FS

Reset time : < 50μS

15-2. Indicator Section

Indicator	Numeric display (5 digits), 15mm in height, red LED	
	Numeric	5digits± 8.8.8.8.8.
	Indicatid value	－ 19999 to 19999
	Decimal point	Selectable (0 , 0.0 , 0.00 , 0.000)
Items	Status	HI, OK, LOW, PEAK, HOLD
		Red LED 5
	Count	3, 6, 13, 25times/sec. Selectable

15-3. Setting Section

Items

Calibration: Zero/Span calibration (actual load calibration, equivalent input calibration)
High limit value, Low limit value, High/Low limit comparison mode, Hysteresis, Digital offset, Near zero, Digital filter, Analogfilter, Motion detect, Zero tracking, Hold mode, Automatic printing, Hold value printing, LOCK, Scale division, Display frequency, Excitation Voltage, BCD data update rate, RS-232C, D/A converter setting, D/A converter fullscael setting.

15-4. External Signals

High limit relay, Low limit relay
AC spec. : Rating is 250V AC and 0.5A.
DC spec. : Rating is 30V DC and 0.5A.
Analog monitor output, Hold signal input, Digital zero signal input.

15-5. Interface

SI/F output

15-6. Option

BCD Parallel data output	(BCO)
RS-232C Interface	(232)
D/A Converter (voltage output)	(DAV)
D/A Converter (current output)	(DAI)

15-7. General Specifications

Power voltage	- AC spec: 100V to 240V AC (＋ 10% － 15%) [Free power supply 50Hz/60Hz] - DC spec: 12V to 24V DC (±15%) (Depending on the request at the time of order)
Power consumption	- AC spec: 15W max. - DC spec: 15W max.
Rush current (Typ)	20A, 2.5 msec.: 100V AC mean load state (ordinary temperature, at cold-start time) 40A, 2.5 msec.: 200V AC mean load state (ordinary temperature, at cold-start time)
Ambient conditions	Temperature: Operation － 10 to ＋ 40 ℃ Storage － 40 to ＋ 80 ℃ Humidity: < 85％RH (non-condensation)
Dimensions	96W×96H×135D (mm) (excluding protrusions)
Panelcutout dimension	92×92 $^{+1}_{-0}$ (mm)
Weight	Approx.0.9kg

15-8. Accessories

AC spec

- AC power cord 1
- Mini screwdriver for terminal block connection. . . .1
- Ferrite core. 2
- 3P - 2P conversion adapter 1
- BCD Output connector . . . . . .1 (when BCD option is supplied)
- F340A operational manual 1

About the power cord

The power cord 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 cord authorized in the country when you use this product outside Japan.

DC spec

- Mini screwdriver for terminal block connection. . . .1
- Ferrite core. 1
- BCD Output connector . . . . . .1 (when BCD option is supplied)
- F340A operational manual 1

16. CONFORMITY TO EC DIRECTIVES

The F340A digital indicator is a product that complies with EC Directives (based on the European Community Council) included with CE mark.

- Low Voltage Directive EN61010-1:2010 (Overvoltage category II, Pollution degree 2)
  EN62311:2008 (test distance: 0cm)

- EMC Directive
  EN61326-1:2006
  EN55011:2009, A1:2010 Group1, ClassA
  EN61000-3-2:2006, A1:2009, A2:2009
  EN61000-3-3:2008
  EN61000-4-2:2009
  EN61000-4-3:2006, A1:2008, A2:2010
  EN61000-4-4:2004, A1:2010
  EN61000-4-5:2006
  EN61000-4-6:2009
  EN61000-4-8:2010
  EN61000-4-11:2004

The combination of the main unit of the F340A and a lightning surge protector conforms to EN61000-4-5 (lightning surge immunity) in the EMC Directives.
Refer to " Connection of Lightning serge protector" on page 89 for information regarding lightning surge protector connection.

When installing, attention should be given to the following.

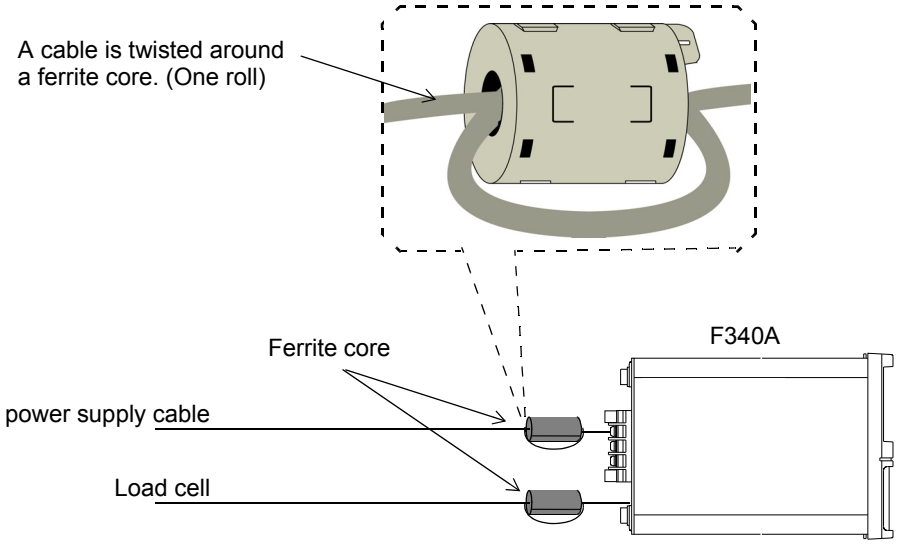
1. Since the F340A is defined as an open type (built-in equipment), be sure to install the F340A and fix to a panel or the like for use.

2. 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.

3. Use shielded cables for others (load cell, external I/O, option).

Attachment of a ferrite core

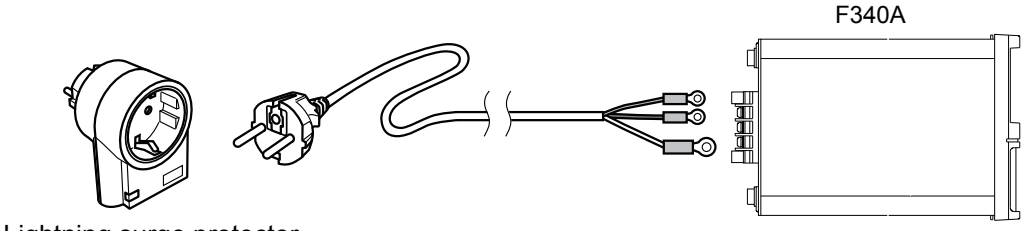
It is necessary to twist a power supply cable and sensor cables, such as a load cell, around an attached ferrite core. (Common to AC spec. and DC spec.)



Connection of Lightning serge protector

The F340A main body conforms to EMC directive EN61000-4-5 (lightning surge immunity) in combination with the lightning surge protector.

● AC Spec.

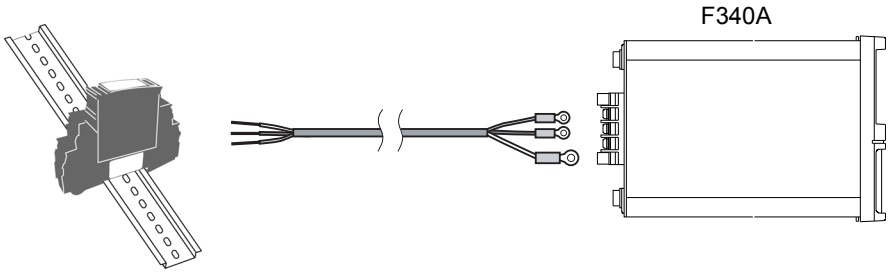


Lightning surge protector

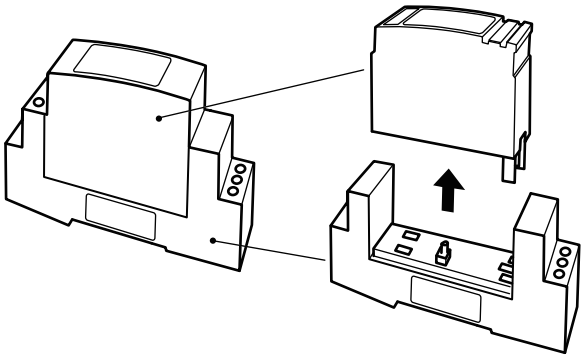
The cable of the EU outlet shape is required for connection of lighting serge protect. (Option)

No lightning surge protector is included as a standard. It is optionally available (TSU01) in combination with a 250V AC high-voltage cable in EU outlet form (See below: Standard product in Europe). For details, contact our sales department.

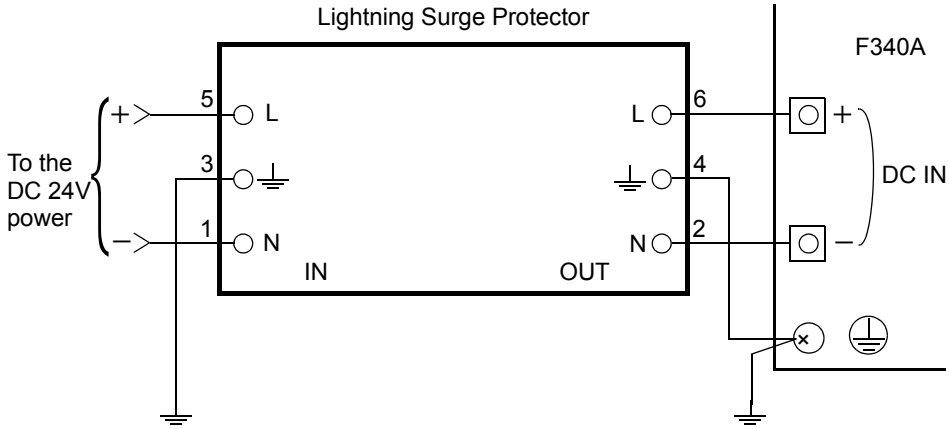
● DC Spec.



Lightning surge protector



[Connect]



No lightning surge protector is included as a standard.

It is optionally available (TSU03).

For details, contact our sales department.

Unipulse Corporation

International Sales Department

9-11 Nihonbashi Hisamatsu-cho, Chuo-ku, Tokyo 103-0005
Tel: +81-3-3639-6120 Fax: +81-3-3639-6130

www.unipulse.tokyo/en/

□	Head Office:	9-11 Nihonbashi Hisamatsu-cho, Chuo-ku, Tokyo 103-0005
□	Technical Center:	1-3 Sengendainishi, Koshigaya, Saitama 343-0041
□	Nagoya Sales Office:	TOMITA Bldg. 2-5 Ushijima-cho, Nishi-ku, Nagoya 451-0046
□	Osaka Sales Office:	Sumitomo Seimei Shin Osaka Kita Bldg. 4-1-14 Miyahara, Yodogawa-ku, Osaka 532-0003
□	Hiroshima Sales Office:	Hiroshima Dai-ichi Seimei OS Bldg. 1-2-21 Matoba-cho, Minami-ku, Hiroshima 732-0824