F490A

DIGITAL INDICATOR

OPERATION MANUAL

09OCT2019REV.1.05

UNIPULSE

Introduction

Thank you very much for purchasing our digital indicator F490A. For good performance, and proper and safe use of the F490A, make sure to carefully read this operation manual and properly understand the contents of it before use. Also, carefully store this operation manual so that it can be referred to at any time.

Precautions and requests for use

● Power source

- For an external power source, use a dedicated AC adapter (optionally available).
  We shall provide no guarantee if any other external power source than the dedicated AC adapter is used.
- In the case of using batteries, the F490A operates on four AA alkaline batteries or nickel metal hydride batteries.
  Insert the batteries in their proper plus and minus orientation.

● Operation temperature, storage temperature, and humidity

- The operation temperature range of this product is -10 to 40 ℃.
  There is no influence in internal operation though the reaction of LCD may become slow at the low temperature .(less than 0℃)
  Store the product in the range of -20 to 70 ℃.
  However, avoid long-time storage at high temperatures.
  The humidity is 80%RH or less (non-condensing, non-freezing).

Safety Precautions

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

In this operation manual, precautions we would like you to always follow are described below and are divided into ⚠ WARNING and ⚠ CAUTION for safe use of the F490A. Precautions indicated here are important matters related to safety. Please use the F490A after understanding the descriptions properly.

⚠ WARNING

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

⚠ CAUTION

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

⚠ WARNING

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

- Using this product as it is in an abnormal condition, such as smoke or abnormal odor, may lead to fire or electric shocks.
  Immediately turn off the power, make sure that no more smoke comes out, and then ask your distributor for repair.
  Never repair by yourself as this is dangerous.
- If you drop or damage this product, turn off the power of the F490A.
  Using it as it is may lead to fire or electric shocks.
- Do not touch the F490A with wet hands, or splash it with water.
- Doing so may lead to fire or electric shocks.
- For an external power source, never use other things than a dedicated AC adapter. Doing so may lead to fire.
- Do not insert or drop foreign matter, such as metals or flammable materials, in the opening of the F490A. Doing so may lead to fire, electric shocks, or failure.
- Never disassemble or modify the F490A. Doing so may lead to fire, electric shocks, or failure.(We may not accept repairing disassembled or modified equipment.)
- Do not place containers filled with liquid, such as a vase, flowerpot, cup, cosmetics, or chemicals, on or at the side of the F490A.
  If it spills over or enters inside, it may lead to fire, electric shocks, or failure.
- Do not damage, work on, forcibly bend, pull, or twist the wiring of the F490A.
  Also, if a heavy object is placed on it or it is heated, the wiring will be damaged, leading to fire or electric shocks.

⚠ CAUTION

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

- Do not place any heavy object on the F490A.
  If it goes off balance and falls, this may lead to injury.
- Do not touch the connector terminals with sweaty hands.
  Doing so may lead to not only failure, such as poor contact, but also electric shocks.
- Although the F490A is factory-shipped with consideration given to sufficiently absorbing shocks, breakage may result if shocks are applied when the packaging materials are reused for transportation.

RoHS-compliant Product

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

What is RoHS?

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

CONTENTS

M E M O

1 OUTLINE

1-1. Contents of the package

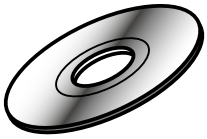
The packaging box contains the following.
Be sure to check them before use.

F490A body ・・・1

F490A operation manual ・・・1

AA-type alkaline battery ・・・4

Sensor connector ・・・1



CD-ROM ・・・1

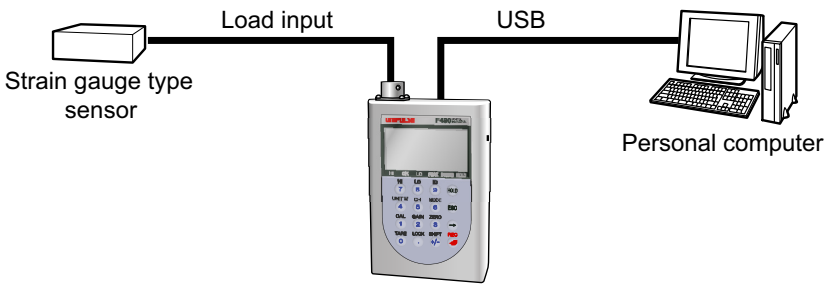
The following are optionally available.

- USB cable
- Dedicated adapter

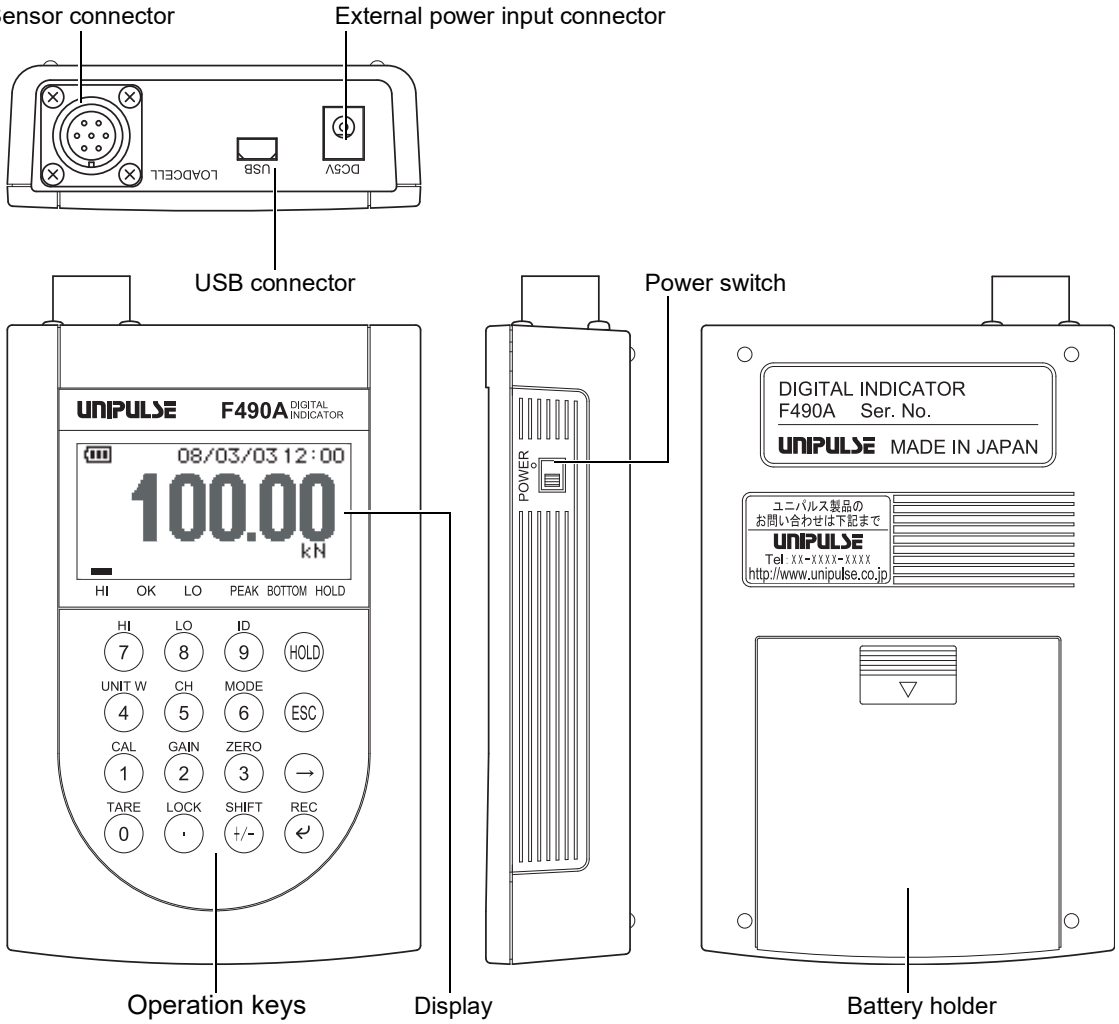
Request

The included batteries are samples. Their usable time may be short.

1-2. About connectable devices



1-3. Part names and functions



Display

The following three types of display will appear.

1) Data display (numerical value)
2) Graph display
3) Record data display

For details of each screen, see "1-5.Explanation and key operation of each screen" on page 5.

Operation keys

These keys are used to make various settings and to command operations.

(0) ~ (9): Numerical keys to carry out settings.
Also, direct movement is carried out from the data display screen to each setting item.
Setting items are assigned as follows:

(0):Tare subtraction
(1):Equivalent input calibration
(2):Span calibration

(3):Zero calibration (one-touch zero)

(4):Unit weight setting

(5):Measure channel selection

(7):Upper limit setting

(8):Lower limit setting

(9):Identification

Go to other setting items than the above from the mode setting assigned to the (6) key.

(.): Decimal point input key.
Also, movement is made from the data display screen to the set value lock screen.

(+/−): Sign input key.
It also functions as a shift key.

(HOLD): Key to hold load value. The operation differs according to the setting of the hold function.
For details, see "7.HOLD FUNCTION" on page 36.

(ESC): Escape key to stop operation or return to the previous screen.
Also, switching is carried out between the numerical display, graph display, and record data display.

(→): Arrow key to move the cursor or to switch screens in the case where there are two or more selection items.
Movement in the opposite direction is carried out by pressing this key and the shift key at the same time.

(⏎): Enter key to determine a set value.
It is also used as a record key to record data.The operation differs according to the setting of the record function.
For details, see"9.RECORD FUNCTION" on page 45.

Power switch

Use this switch to turn ON/OFF the power of the F490A.

Sensor connector

This is a connector to connect a strain gauge type sensor. The adaptable plug is TAJIMI ELECTRONICS PRC03-12A10-7M (an accessory) or its equivalent. The applied voltage is 3V DC, and the current is within 35mA.

External power input connector

This is a jack to connect a dedicated AC adapter to the F490A.
The dedicated AC adapter is optionally available.

USB connector

This is an interface for connection with a personal computer (PC). In the case of USB connection, the F490A operates on bus power. The USB cable is optionally available.

Battery holder

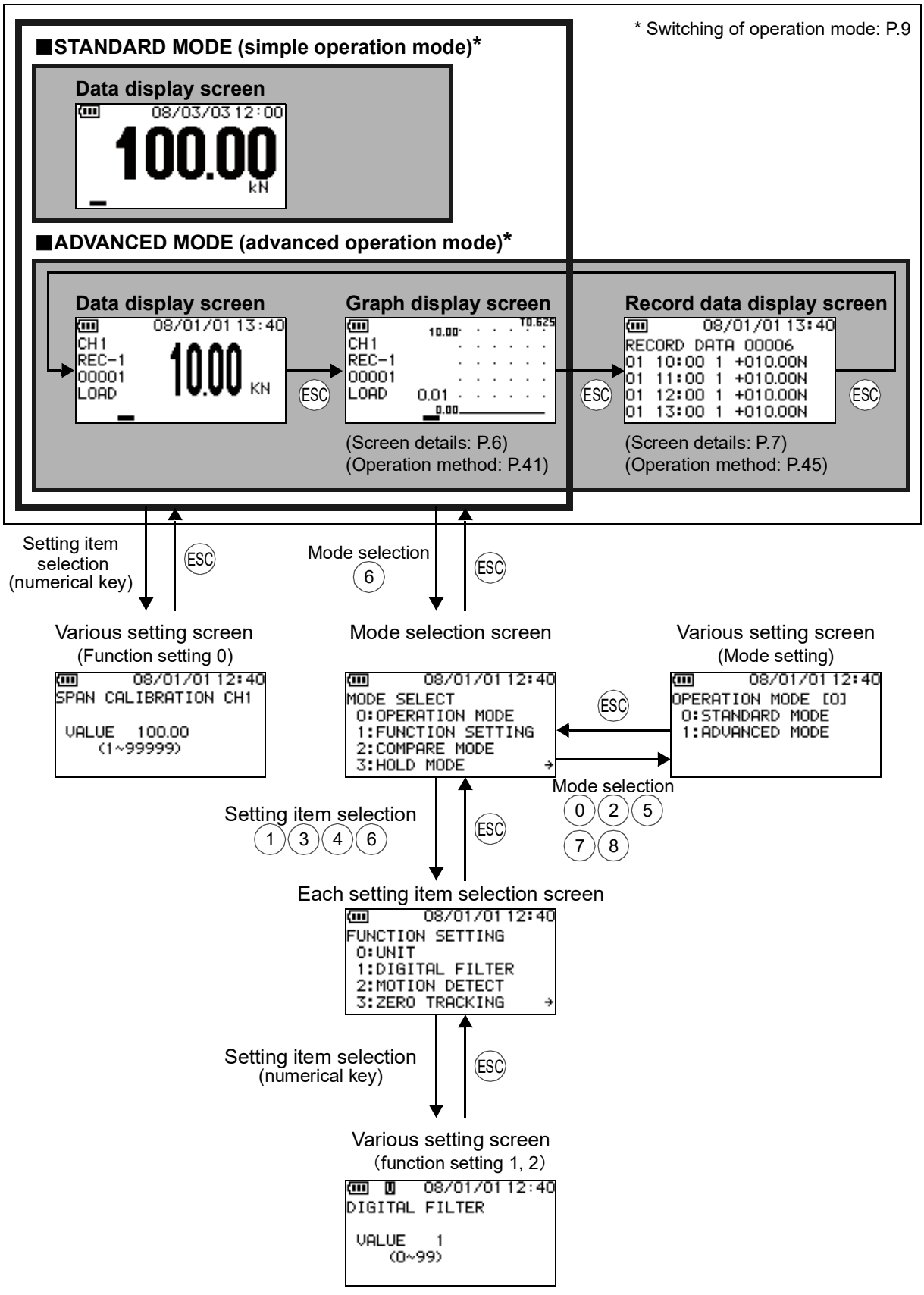
This is a holder for the use of four AA alkaline batteries or AA nickel metal hydride batteries as a power source.

Chapter 1

OUTLINE

1-4. Screen configuration

Main screen



1-5. Explanation and key operation of each screen

■Main screen

In STANDARD MODE (simple operation mode)

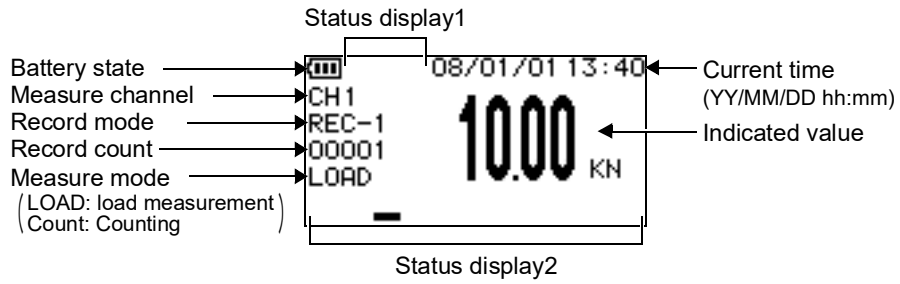
Only the data display is available.

In ADVANCED MODE (advanced operation mode)

The data display, graph display, and record data display are available.
Switch between the data display, graph display, and record data display with the (ESC) key.
Each time the (ESC) is pressed, switching is done as data display screen → graph display screen → record data display screen.

Move to each setting screen by pressing the corresponding numerical key from the data display screen and graph display screen.

Data display



Status display1

R: Recording

A: Using AC adapter (In USB connection, priority is given to USB display.)

U: In USB connection

N: Writing in nonvolatile memory (Do not turn off the power.)

B: Internal backup battery low
Replace the backup battery because its capacity has dropped.

Status display2

HI:	Lights when the indicated value is larger than the upper limit set value.
OK:	Lights when the indicated value is in the range between the upper limit set value or less and the lower limit set value or more.
LO:	Lights when the indicated value is smaller than the lower limit set value.
PEAK:	Lights in peak-to-peak hold, and blinks when the peak value data is updated.
BOTTOM:	Lights in peak-to-peak hold, and blinks when the bottom value data is updated.
HOLD:	Lights when the indicated value is in a hold state.

* In STANDARD MODE (simple operation mode), the channel, record mode, and record count are not displayed.

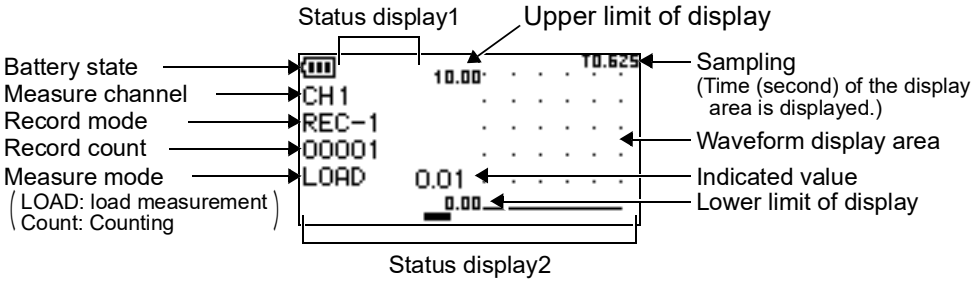
Battery state

: The battery is full.

: The remaining battery level is low.

: The battery has run out. Replace it.

Graph display



The X-axis and Y-axis widths can be changed by the following operation.

Change of the lower limit of the Y-axis

1. Press the (0) key while pressing the (+/-) (SHIFT) key.

2. Since the value blinks, carry out setting with the numerical keys.

3. After inputting a value, determine it with the (↵) key.

* The lower limit cannot be set beyond the upper limit.

Change of the upper limit of the Y-axis

1. Press the (7) key while pressing the (+/-) (SHIFT) key.

2. Since the value blinks, carry out setting with the numerical keys.

3. After inputting a value, determine it with the (↵) key.

* The upper limit cannot be set below the lower limit.

Change of the X-axis width

1. Press the (9) key while pressing the (+/-) (SHIFT) key.

2. Since the value blinks, carry out setting with the (→) key.

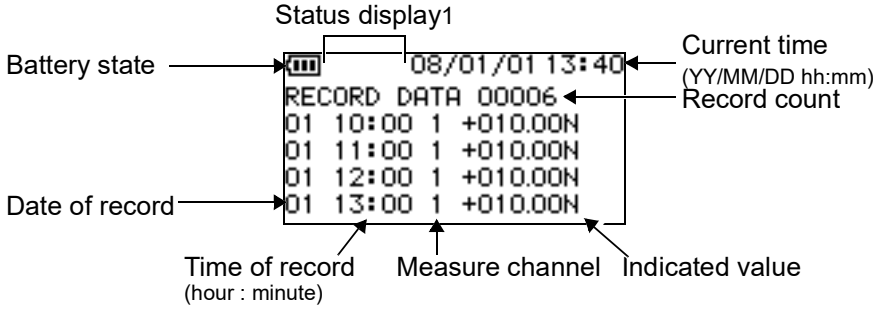
The value changes as 0.625→1.25→2.5→3.75→5→6.25→7.5→8.75→10→11.25 seconds.

(It can also be changed directly with the numerical keys. (0) key: 0.625, (1) key: 1.25 … (9) key: 11.25)

3. After selecting a value, determine it with the (↵) key.

* For the X-axis width, set the time from end to end on display.

Record data display



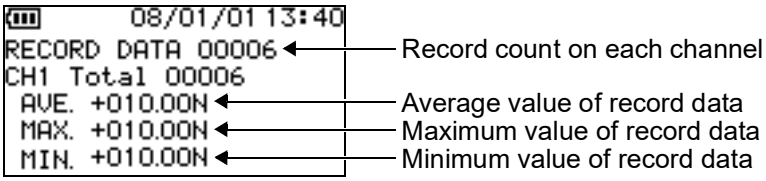
The latest record data are displayed.

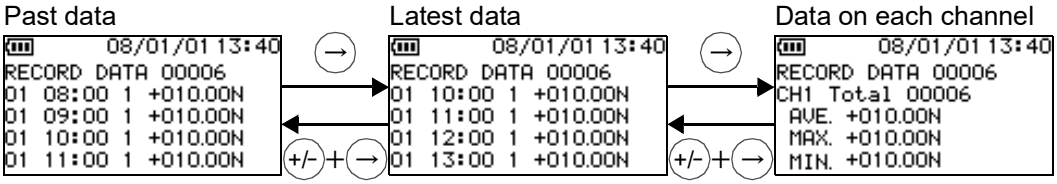
Up to 4 pieces of data can be checked on one screen.

The past data can be checked with the (+/-) (SHIFT) key + (→) key.

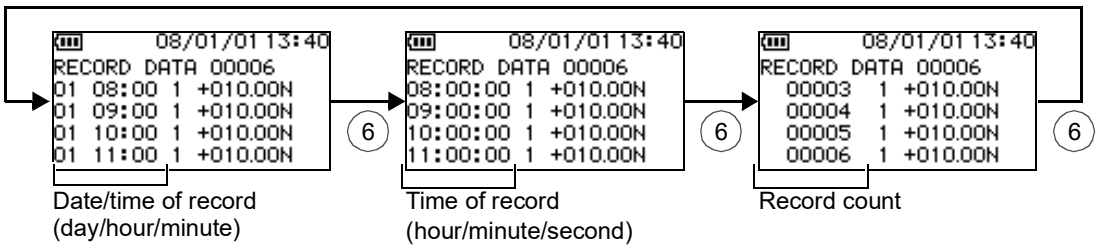
Also, you can return from old data to new data with the (→) key.

From the latest data, the average value, maximum value, and minimum value on each channel can be checked with the (→) key.





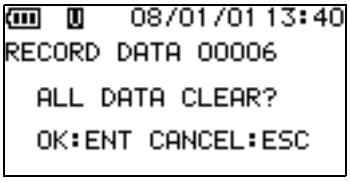
The display of the date/time of record can be changed by pressing the (6) key.



Deletion of record data

Delete record data by pressing the (.) key on the record data display screen.

Since the confirmation screen appears, press the (↵) key to execute deletion, or press the (ESC) key not to delete the data.



⚠ CAUTION

Deletion of data clears all data.
Do it carefully because the deleted data cannot be restored.

■Setting screen

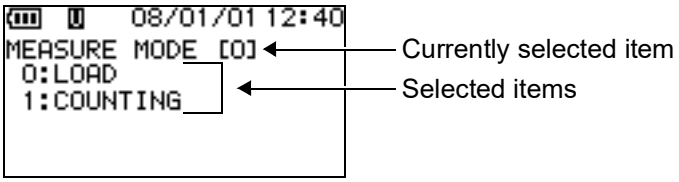
A setting screen appears for each setting, which can be changed by pressing the ⏎ key after confirming the current setting.

Since settings cannot be changed if the lock is on, release the lock before change. For how to release the lock, see "6-13.Set value LOCK" on page 33.

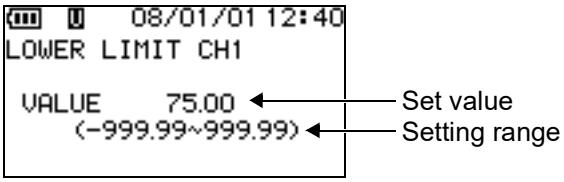
Set value input screen

There are three types of set value inputs as follows.

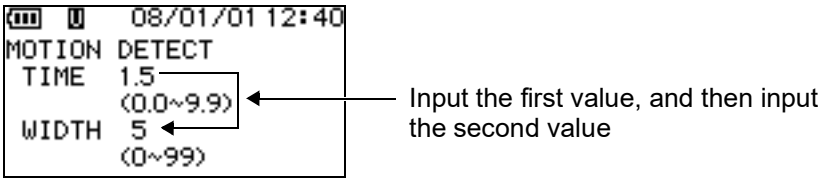
①Selection from setting items



②Input of a value

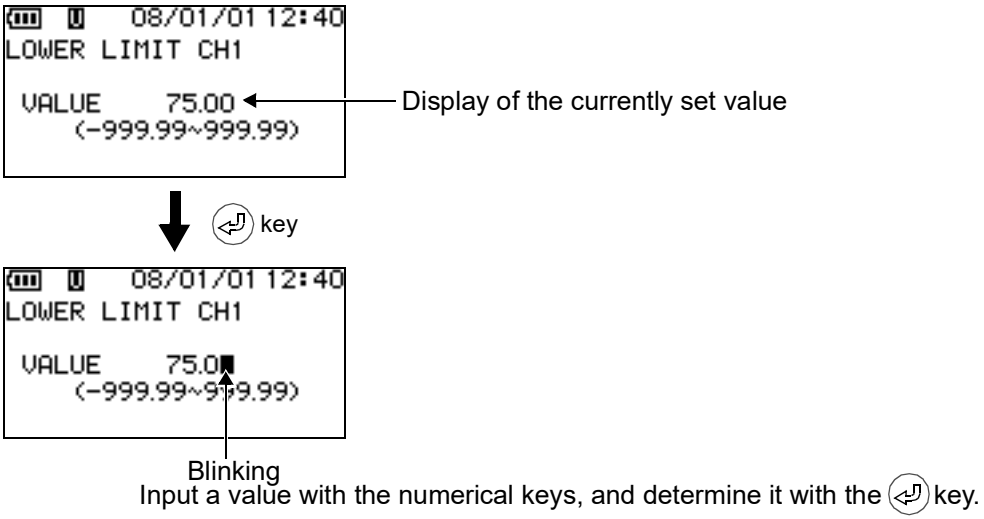


③Input of two values .



Change screen

Example) Lower limit setting



Press the ⏎ key to change, or press the ESC key not to change.

■Mode setting

1. Press the (6) key from the data display screen (numerical, graph) to display the mode setting screen.
2. After this, select a desired setting item with the corresponding numerical key, and carry out setting referring "■Setting screen" on page 8.

■Function setting 1 / function setting 2

1. Press the (6) key from the data display screen (numerical, graph) to display the mode setting screen.
2. Select function setting 1 with the (1) key.
   Select function setting 2 with the (4) key.
3. After this, select a desired setting item with the corresponding numerical key, and carry out setting referring to "■Setting screen" on page 8.

Point

If no operation is performed for approximately 1 minute after the start of setting, the setting mode will be canceled, and you will return to the set value display.

1-6. Operation mode

The F490A is provided with the STANDARD MODE (simple operation mode) in which a strain gauge type sensor is connected and the indicated value is numerically displayed, and the ADVANCED MODE (advanced operation mode) in which graph display and recording can be performed.

STANDARD MODE (simple operation mode)

Only the items necessary for load measurement are displayed, and simple measurement can be made.

ADVANCED MODE (advanced operation mode)

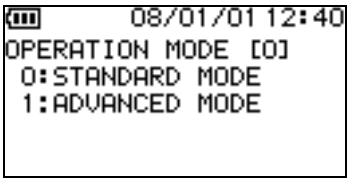
In addition to load measurement, the following can be performed: graph display, recording, display of the quantity of measuring objects (counting), etc.

■Operation mode setting

Change the operation mode by the following procedure.

1. Display the operation mode setting screen with the (6) key → (0) key from the data display screen.
2. Press the (↵) key to enter the input mode.
3. Select an operation mode with the corresponding numerical key, and determine it with the (↵) key.

   0: STANDARD MODE (simple operation mode)
   1: ADVANCED MODE (advanced operation mode)



Point

For the functions that can be handled in STANDARD MODE (simple operation mode), see "3-2.Setting value list" on page 14.

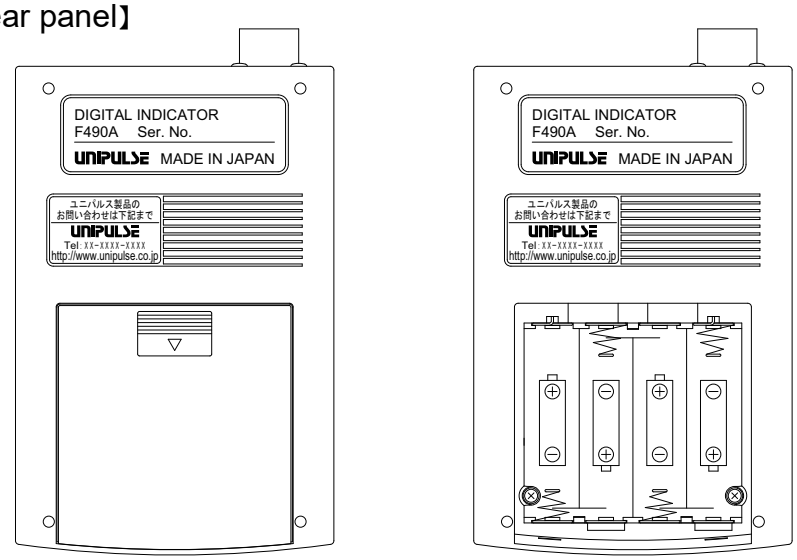
2 CONNECTION

2-1. Power source

■Internal batteries

Use AA alkaline batteries or AA nickel metal hydride batteries.
The included batteries are samples. Their usable time may be short.

【Rear panel】



Request

Please note the polarity (＋/－), and set the battery correctly.

■External power source

It can be used by connecting a dedicated AC adapter that is optionally available. Do not connect anything other than the dedicated AC adapter.

Power supply voltage DC+5V (center plus, EIAJ#2)

■USB bus power drive

In the case of USB connection, the F490A operates on bus power.

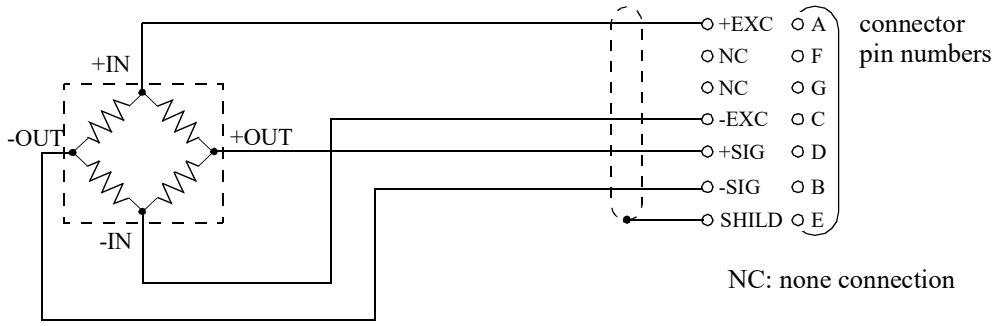
■Priority of power

If there are two or more power supply sources, the order of priority is as follows:

AC adapter > USB bus power > Internal batteries

2-2. Sensor connector

- 4 wire sensor connection



Request

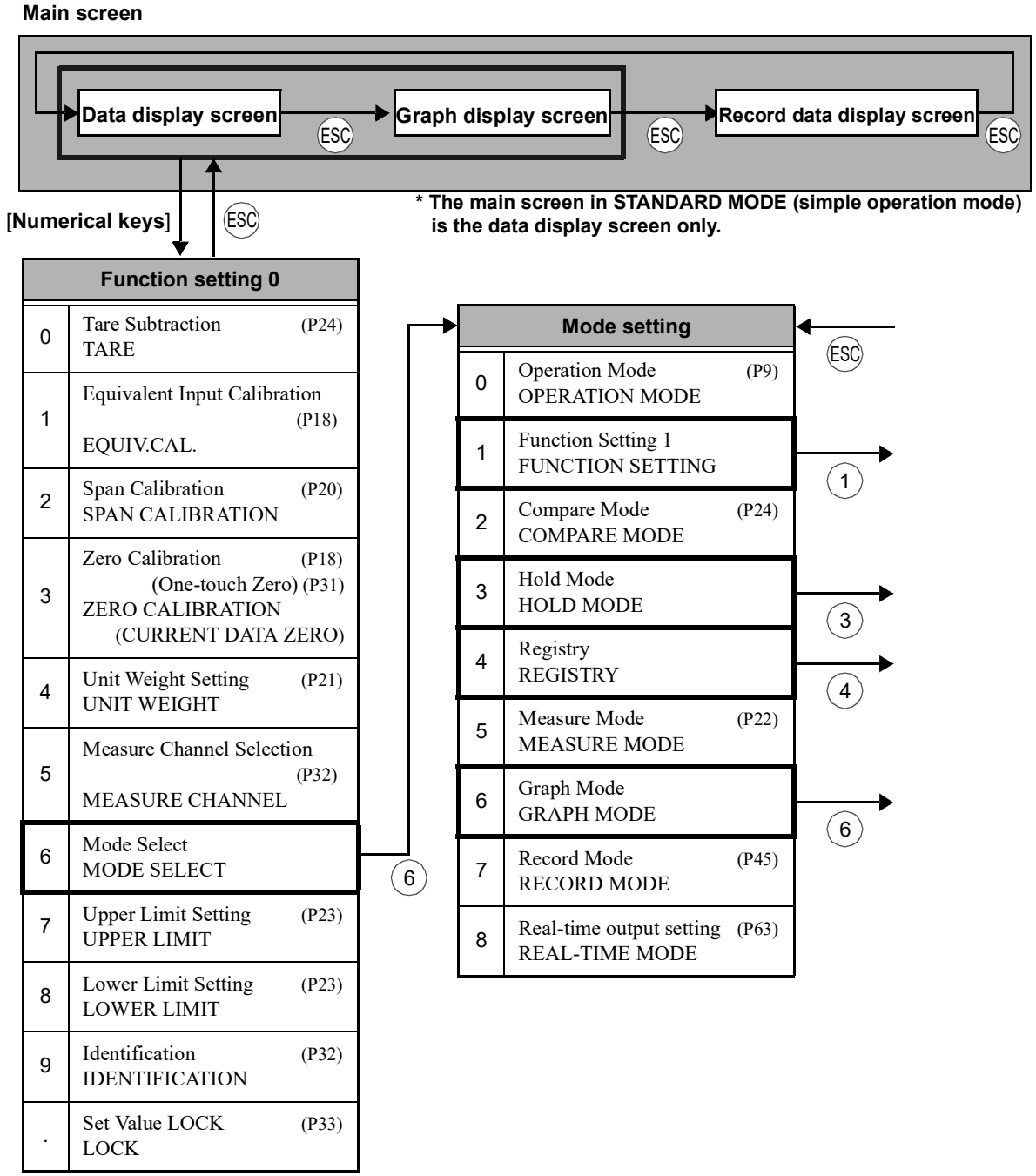
Connect nothing to the NC pins (F and G).

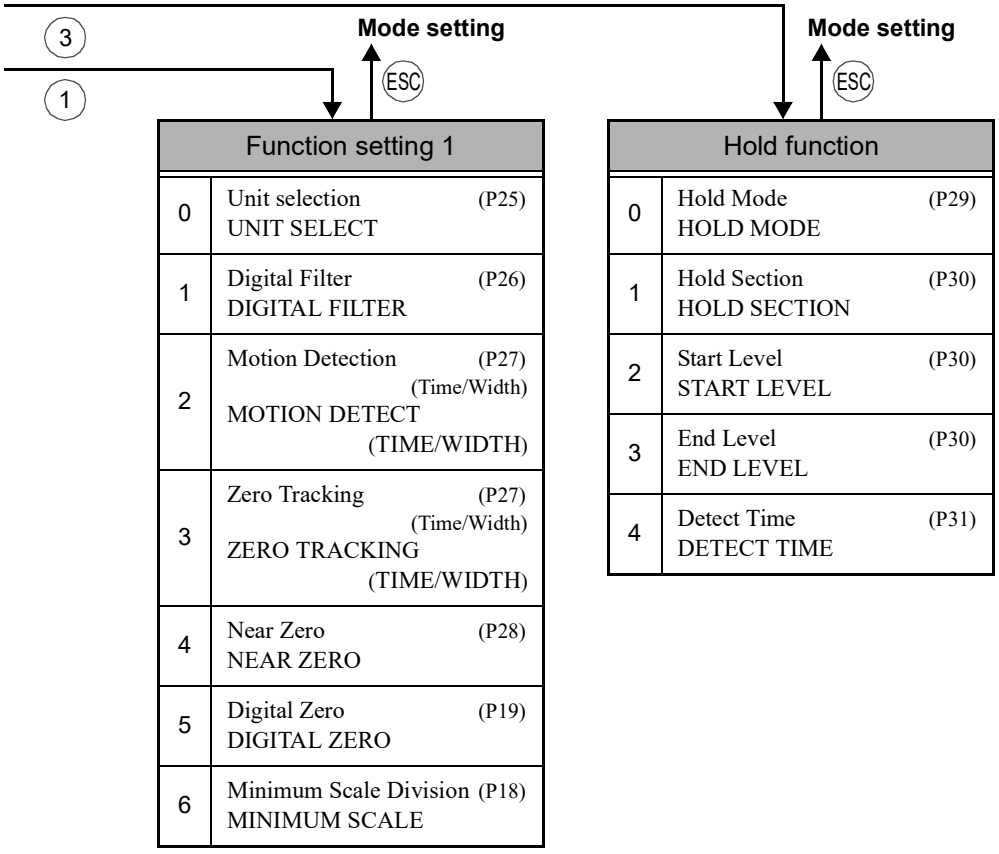
■Strain gauge type sensor cable colors

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.

3 SETTING PROCEDURE

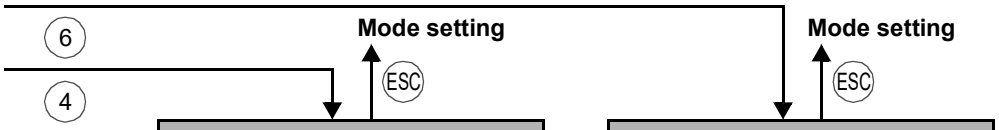
3-1. Setting composition





Function setting 1	
0	Unit selection (P25) UNIT SELECT
1	Digital Filter (P26) DIGITAL FILTER
2	Motion Detection (P27) (Time/Width) MOTION DETECT (TIME/WIDTH)
3	Zero Tracking (P27) (Time/Width) ZERO TRACKING (TIME/WIDTH)
4	Near Zero (P28) NEAR ZERO
5	Digital Zero (P19) DIGITAL ZERO
6	Minimum Scale Division (P18) MINIMUM SCALE

Hold function	
0	Hold Mode (P29) HOLD MODE
1	Hold Section (P30) HOLD SECTION
2	Start Level (P30) START LEVEL
3	End Level (P30) END LEVEL
4	Detect Time (P31) DETECT TIME



Function setting 2	
0	Date/Time (P33) DATE/TIME
1	Buzzer (P34) BUZZER
2	Back Light (P34) BACK LIGHT
3	Auto Off Time (P35) AUTO OFF TIME
4	Version Display (P35) VERSION
5	Memory Check (P69) MEMORY CHECK
6	Initialize (P69) INITIALIZE

Graph function	
0	Sampling (P43) SAMPLING
1	Trigger Mode (P43) TRIGGER MODE
2	Trigger Edge (P43) TRIGGER EDGE
3	Trigger Level (P44) TRIGGER LEVEL
4	Pre-trigger (P44) PRETRIGGER

3-2. Setting value list

■ Function setting0

	Setting item	Initial value	Each ch	Set value lock	Calibration value lock	Standard mode
0	TARE	0	◎	◎		
1	EQUIVALENT INPUT CALIBRATION	3.000／100.00	◎		◎	◎
2	SPAN CALIBRATION	100.00	◎		◎	◎
3	ZERO CALIBRATION (CURRENT DATA ZERO)	0	◎		◎*	◎
4	UNIT WEIGHT	1／1.00	◎	◎		
5	MEASURE CHANNEL	1		◎		◎
6	MODE SELECT					
7	UPPER LIMIT	75.00	◎	◎		◎
8	LOWER LIMIT	25.00	◎	◎		◎
9	IDENTIFICATION	00000000		◎		
.	SET VALUE LOCK	ON／ON				◎

* One-touch zero operation results while calibration value lock is on.

■ Function setting1

	Setting item	Initial value	Each ch	Set value lock	Calibration value lock	Standard mode
0	UNIT SELECT	kN	◎		◎	◎
1	DIGITAL FILTER	4		◎		◎
2	MOTION DETECT (TIME/WIDTH)	1.5／5		◎		◎
3	ZERO TRACKING (TIME/WIDTH)	0.0／0		◎		◎
4	NEAR ZERO	1.00	◎	◎		◎
5	DIGITAL ZERO	0.00	◎	◎		◎
6	MINIMUM SCALE	1	◎		◎	◎

■ Function setting2

	Setting item	Initial value	Each ch	Set value lock	Calibration value lock	Standard mode
0	DATE/TIME			◎		◎
1	BUZZER	ON		◎		◎
2	BACK LIGHT	60 seconds		◎		◎
3	AUTO OFF TIME	3 minutes		◎		◎
4	VERSION					◎
5	MEMORY CHECK					◎
6	INITIALIZE			◎		◎

■ Mode setting

	Setting item	Initial value	Each ch	Set value lock	Calibration value lock	Standard mode
0	OPERATION MODE	0		◎		
1	FUNCTION SETTING 1					
2	COMPARE MODE	0		◎		◎
3	HOLD MODE			◎		◎
4	REGISTRY					
5	MEASURE MODE	0		◎		
6	GRAPH MODE			◎		
7	RECORD MODE	0		◎		
8	REAL-TIME OUTPUT SETTING	0		◎		

■ Hold function

	Setting item	Initial value	Each ch	Set value lock	Calibration value lock	Standard mode
0	HOLD MODE	0		◎		◎
1	HOLD SECTION	0		◎		◎
2	START LEVEL	1.00		◎		◎
3	END LEVEL	1.00		◎		◎
4	DETECT TIME	1.0second		◎		◎

■ Graph function

	Setting item	Initial value	Each ch	Set value lock	Calibration value lock	Standard mode
0	SAMPLING	0		◎		
1	TRIGGER MODE	0		◎		
2	TRIGGER EDGE	0		◎		
3	TRIGGER LEVEL	50.00		◎		
4	PRE-TRIGGER	0		◎		

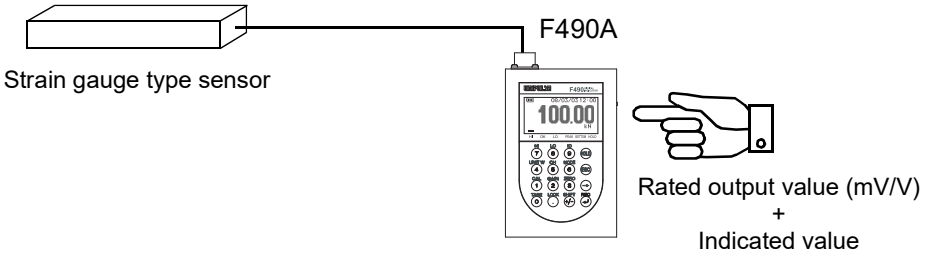
Initial value: Factory-shipped value and condition.
Set value lock/Calibration value lock: Change of set values is prohibited by lock setting.

4 CALIBRATION PROCEDURE

Operation of matching the F490A to a strain gauge type sensor is called "calibration."
For the F490A, there are two methods of calibration.

Equivalent input calibration

Calibration is performed without an actual load by key-inputting the rated output value (mV/V) and the indicated value (rated capacity) of the strain gauge type sensor.
Even if an actual load cannot be applied, calibration can be easily performed.

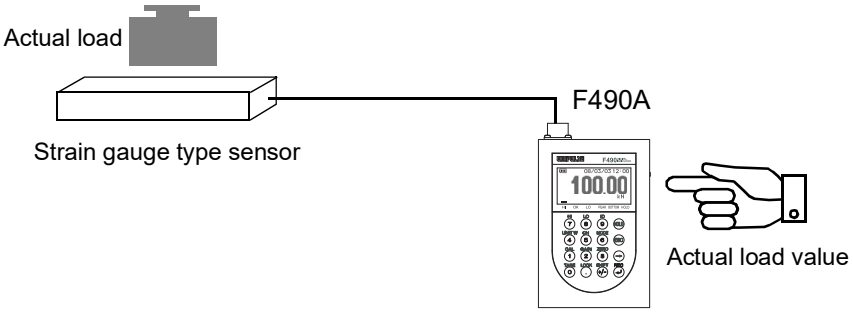


Point

A data sheet is attached to a strain gauge type sensor at the time of purchase. Input the rated capacity value and the rated output value described on the data sheet to the F490A.

Actual load calibration

Calibration is performed by applying a load to the strain gauge type sensor and key-inputting the load value. Accurate calibration can be performed.



Point

As calibration, either actual load calibration or equivalent input calibration can be performed, but actual load calibration is more accurate. Perform actual load calibration if an actual load can be applied.

4-1. Equivalent input calibration procedure

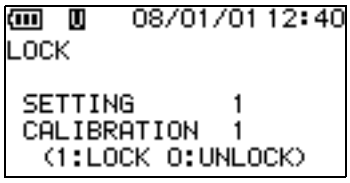
Perform equivalent input calibration by the following procedure.

Set value lock release	Release the set value lock that prohibits calibration.
↓	
Measure channel selection	Set the channel to perform calibration.
↓	
Minimum scale division setting	Set the minimum value of digital change.
↓	
Equivalent input calibration	Set the rated output value and indicated value of the strain gauge type sensor.
↓	
Zero calibration	Set the zero point.
↓	
Digital zero setting	Set when no zero point can be taken such as in the case of absolute pressure.
↓	
Set value lock	Prohibit calibration to prevent misoperation.

Request

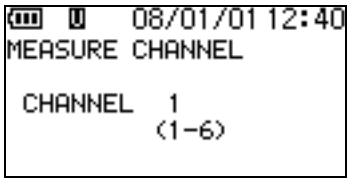
When calibration is performed, the previous calibration values are lost and cannot be restored.
Make sure to keep the set value lock on except when performing calibration.

Calibration value lock release



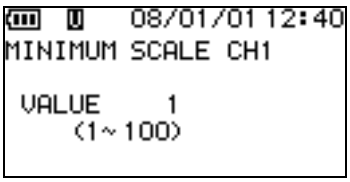
1. Press the (.) key from the data display screen.
2. Press the (↵) key to enter the input mode.
3. Since the item “SETTING” blinks, then press the (0) key→ (↵) key to set “UNLOCK” for making ke the item "CALIBRATION" flash.
   Select "UNLOCK" with the (0) key, and determine it with the (↵) key.
4. Return to the data display screen with the (ESC) key.

Measure channel selection



1. Press the (5) key from the data display screen.
2. Press the (↵) key to enter the input mode.
3. Since the numerical part blinks, select a measure channel with the corresponding numerical key (1 - 6)(*), and determine it with the (↵) key.
   * Before a version 1.02, it can select to 4ch.
4. Return to the data display screen with the (ESC) key.

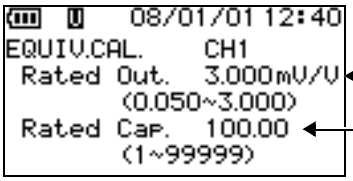
Minimum scale division setting (omissible if there is no change)



1. Press the (6) key → (1) key from the data display screen to enter the function setting 1 screen, and display the minimum scale division setting screen with the (6) key.
2. Press the (↵) key to enter the input mode.
3. Since the numerical part blinks, input the value of the minimum scale division with the numerical keys, and determine it with the (↵) key.
4. Return to the data display screen by pressing the (ESC) key three times.

Equivalent input calibration

1. Press the (1) key from the data display screen.

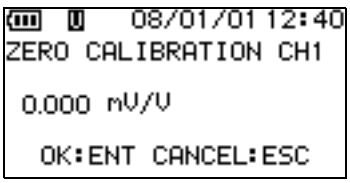


Rated output (0.050～3.000mV/V)

Indicated value at the rated output (00001～99999)
The decimal point position is changeable.

2. Press the (↵) key to enter the input mode.
3. Input the rated output value of the sensor with the numerical keys, and go to the indicated value setting with the (↵) key.
   Input the indicated value with the numerical keys and the decimal point key, and determine it with the (↵) key.
   The data display screen is returned automatically.

Zero calibration



1. Press the (3) key from the data display screen.
   (The currently input load (mV/V) is displayed.)
2. Bring the sensor into no-load condition, and press the (↵) key.The data display screen is returned automatically.

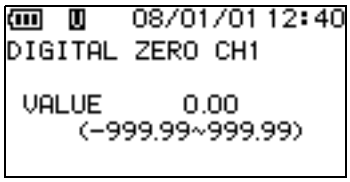
Point

The zero calibration range is -2.0mV/V to +2.0mV/V.

Digital zero setting

By this function, a predetermined value is subtracted from the indicated value. By digital zero setting, the value obtained by subtracting the digital zero set value from the indicated value is displayed. Use this when no zero point can be registered in equivalent input calibration such as in the case of absolute pressure.

1. Press the (6) key → (1) key from the data display screen to enter the function setting 1 screen, and display the digital zero setting screen with the (5) key.



2. Press the (↵) key to enter the input mode.

3. Since the numerical part blinks, input the value of the digital zero with the numerical keys, and determine it with the (↵) key.

4. Return to the data display screen by pressing the (ESC) key three times.

* Upon completion of calibration, make sure to turn on the set value lock.

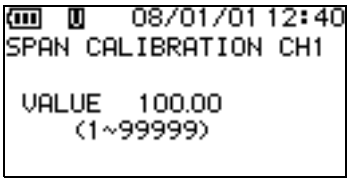
4-2. Actual load calibration procedure

Perform actual load calibration by the following procedure.

Set value lock release	Release the set value lock that prohibits calibration.
↓	
Measure channel selection	Set the channel to perform calibration.
↓	
Minimum scale division setting	Set the minimum value of digital change.
↓	
Zero calibration	Set the zero point of the strain gauge type sensor.
↓	
Span calibration	Set the span (gain) point of the strain gauge type sensor.
↓	
Set value lock	Prohibit calibration to prevent misoperation.

Set value lock release, measure channel selection, minimum scale division setting, and zero calibration are the same as those in equivalent input calibration.

Span calibration



1. Press the (2) key from the data display screen.
2. Press the (↵) key to enter the input mode.
3. Apply an actual load to the sensor, input the value of the actual load with the numerical keys and the decimal point key, and determine it with the (↵) key. The data display screen is returned automatically.

* Upon completion of calibration, make sure to turn on the set value lock.

Point

The span calibration range is more than 0.05mV/V and 3.0mV/V or less from the point which carried out zero calibration.
(However, the signal input range is -3.0mV/V to +3.0mV/V.)

The decimal point position is changeable.
Please set the decimal point at the position of hope together with the numerical keys.

4-3. Calibration error

If an error occurs during calibration, the error is displayed.
If such an error is displayed, take measures against the error, and perform calibration again.
For details of each error, see "12-1.Over scale & error displays" on page 68.

5 MEASURE MODE

The F490A is provided with a load measurement mode in which the value output from the strain gauge type sensor is displayed, and a counting mode in which the quantity obtained by [net weight ÷ unit weight] is displayed.
The counting mode is valid in ADVANCED MODE (advanced operation mode).

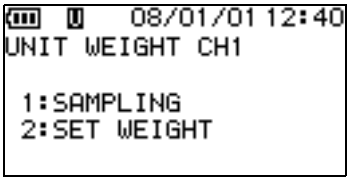
5-1. Counting mode setting

To display the quantity in the counting mode, it is necessary to register the weight per sample. (Unit weight setting)

Set the unit weight by the following procedure.

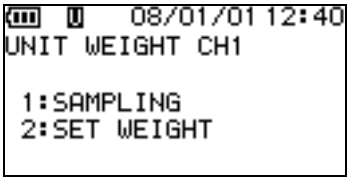
1. Press the (4) key from the data display screen to enter the unit weight setting screen.

2. Press the (1) key for registering the weight with actual measuring objects, or the (2) key if the unit weight is already known to register the unit weight.



For registering the weight with actual measuring objects

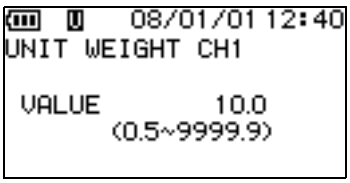
1. Set samples the quantity of which is known on the scale.
The quantity of samples can be from 1 to 100, but setting as many samples as possible results in more accurate sampling.



2. Input the quantity, and determine it with the (↵) key.

For key-inputting the unit weight

1. Input the known weight with the numerical keys, and determine it with the (↵) key.
(The decimal point position cannot be changed from the setting carried out at the time of calibration.)

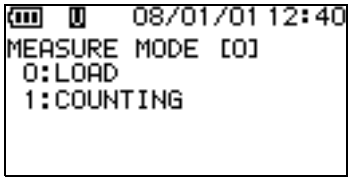


Point

Sampling operation cannot be performed if the unit weight (weight per sample) is not the minimum scale division × 5 or more.

5-2. Display switching

Switch the display between load measurement mode and counting mode by the following procedure.



1. Display the measure mode setting screen with the (6) key → (5) key from the data display screen.
2. Press the (↵) key to enter the input mode.
3. Select a measure mode with the corresponding numerical key, and determine it with the (↵) key.

   0: Load measurement mode（LOAD）
   1: Counting mode（COUNTING）

Point

In counting mode, the fractional part is rounded off.

6 SETTING OF FUNCTIONS

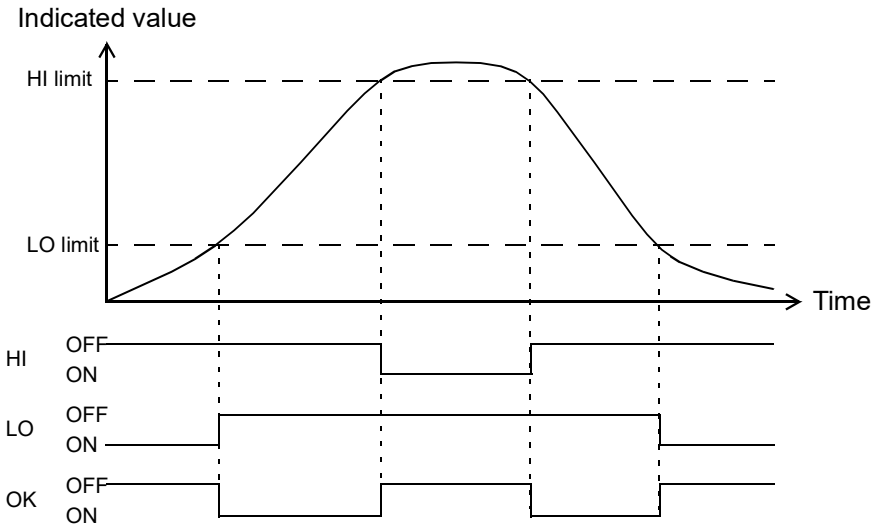
6-1. Upper limit/lower limit

The HI status indicator lights when the indicated value exceeds the set upper limit, and the LO status indicator lights when it falls below the set lower limit.

〈HI/LO ON conditions〉

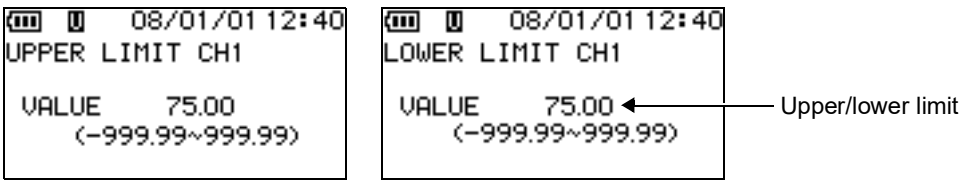
- HI : Indicated value＞Upper limit set value
- LO : Indicated value＜Lower limit set value
- OK : Lower limit set value≦Indicated value≦Upper limit set value

●Upper/lower limit operation



■Upper limit / lower limit setting

1. Press the (7) key (upper limit) or (8) key (lower limit) from the data display screen.



2. Press the (↵) key to enter the input mode.

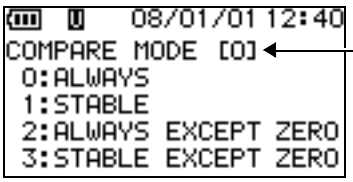
3. Input the upper limit or lower limit with the numerical keys, and determine it with the (↵) key.

6-2. Compare mode

Set the conditions to make upper/lower limit comparison.

■Compare mode setting

1. Display the compare mode setting screen with the (6) key → (2) key from the data display screen.



2. Press the (↵) key to enter the input mode.

3. Select an item with the corresponding numerical key, and determine it with the (↵) key.

0: Comparison is always made.（ALWAYS）
1: Comparison is made at stable-time.（STABLE）
2: Comparison is always made except near zero.（ALWAYS EXCEPT ZERO）
3: Comparison is made at stable-time except near zero.（STABLE EXCEPT ZERO）

Point

Data to be compared are load values. Be aware that if measurement is made in measure mode - counting mode, no comparison is made with display values.

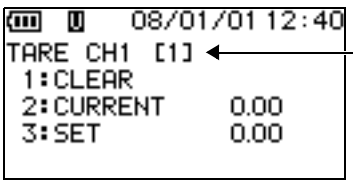
The compare mode has a close relationship with near zero and motion detection. For details, see "6-8.Near zero" on page 28, "6-6.Motion detection" on page 26.

6-3. Tare setting

The F490A has a tare subtraction function to display net weight by setting tare weight.
For the tare subtraction function, the following two modes are available: the current weight value is taken as tare weight in one mode, and the input weight value is taken as tare weight in the other mode.

■Tare weight setting

1. Press the (0) key from the data display screen to enter the tare setting screen.



2. Press the (↵) key to enter the input mode.

3. Select a processing item.

1: Tare subtraction is not performed.（CLEAR）
2: The current value is taken as tare weight.（CURRENT）
3: The input value is taken as tare weight.（SET）

Not to perform tare subtraction:
Press the (1) key, and determine it with the (↵) key.

To take the current value as tare weight:
Set an object to set tare on the scale, press the (2) key, and determine it with the (↵) key.

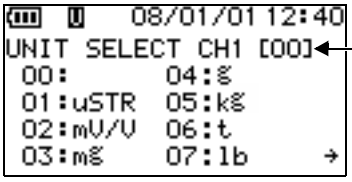
To take the input value as tare weight:
Press the (3) key, input tare weight with the numerical keys, and determine it with the (↵) key.

6-4. Unit selection

Select a unit with respect to input.

■Unit setting

1. Enter the function setting 1 screen with the (6) key → (1) key from the data display screen, and display the unit selection screen with the (0) key.



2. Press the (↵) key to enter the input mode.

3. Select a unit with the corresponding numerical keys, and determine it with the (↵) key.

List for unit selection

00		12	kN	24	tm	36	kg/cm^2	48	l/h	60	kHz
01	µSTR	13	MN	25	tcm	37	mmHg	49	kg/s	61	MHz
02	mV/V	14	dyn	26	µPa	38	m/s^2	50	kg/h	62	rpm
03	mg	15	kdyn	27	mPa	39	G	51	t/s	63	%
04	g	16	µNm	28	Pa	40	Gal	52	kg/m^3	64	pcs
05	kg	17	mNm	29	hPa	41	µm	53	m/s	65	count
06	t	18	Nm	30	kPa	42	mm	54	km/h	66	pulse
07	lb	19	kNm	31	MPa	43	m	55	cm^3		
08	oz	20	MNm	32	GPa	44	km	56	m^3		
09	µN	21	kNcm	33	N/m^2	45	m^3/s	57	ml		
10	mN	22	kgm	34	kN/m^2	46	m^3/h	58	l		
11	N	23	kgcm	35	kN/cm^2	47	l/s	59	Hz		

Point

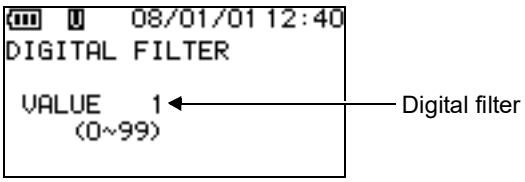
Unit setting is for display and recording. It has no effect on the indicated value.

6-5. Digital filter

This functions to suppress fluctuations in the indicated value by moving average of A/D-converted data. The moving average count can be set up to 99. As the moving average count increases, the indicated value becomes stable, but the response becomes slow. On the other hand, as the count decreases, the response becomes fast, but the indicated value easily fluctuates.

■Setting of digital filter

1. Enter the function setting 1 screen with the (6) key → (1) key from the data display screen, and display the digital filter setting screen with the (1) key.



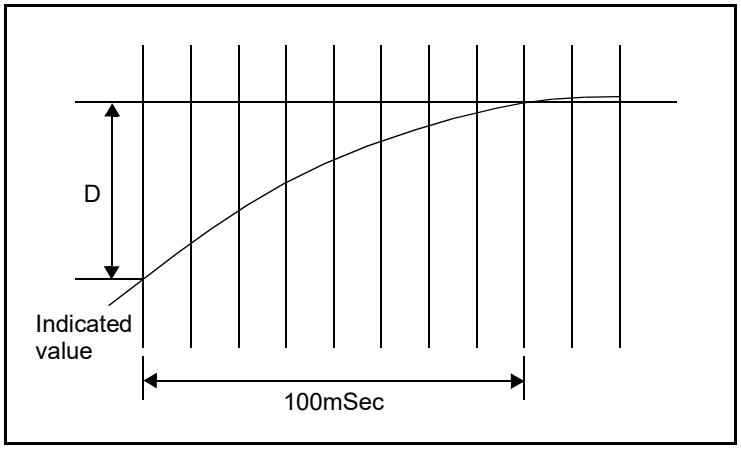
2. Press the (↵) key to enter the input mode.

3. Input a digital filter value with the numerical keys, and determine it with the (↵) key.

6-6. Motion detection

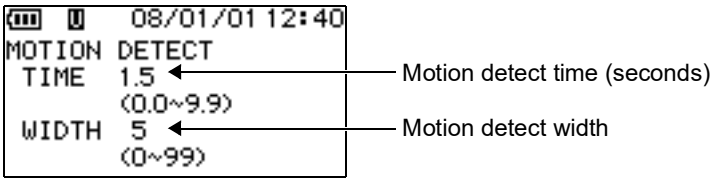
Set parameters for detection of stability. If the variation width (D) of the indicated value becomes the set width or less and the state continues for the set time or more, the indicted value is regarded as stable.When stability is detected, the digital filter (fixed at 32) is automatically inserted to suppress fluctuations in the indicated value. This stable-time digital filter is different from the digital filter in operation mode.

＊D is the difference between the current indicated value and 100ms-old indicated value.



■Setting of motion detect

1. Enter the function setting 1 screen with the (6) key → (1) key from the data display screen, and display the motion detection setting screen with the (2) key.



2. Press the (↵) key to enter the input mode.

3. Input the time with the numerical keys, and go to the width setting with the (↵) key. Input the width with the numerical keys, and determine it with the (↵) key.

* Even if you change either of the settings, set the time and width, and determine them with the (↵) key.

Point

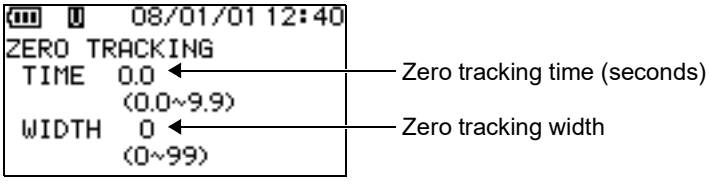
Stability is not detected when the time is 0.0 sec. and the width counts 00.
Also, the digital filter at stable-time is always OFF.

6-7. Zero tracking

This functions to automatically correct slow zero drifts and micro zero point movements made due to measuring waste, etc.

■Setting of zero tracking

1. Enter the function setting 1 screen with the (6) key → (1) key from the data display screen, and display the zero tracking setting screen with the (3) key.



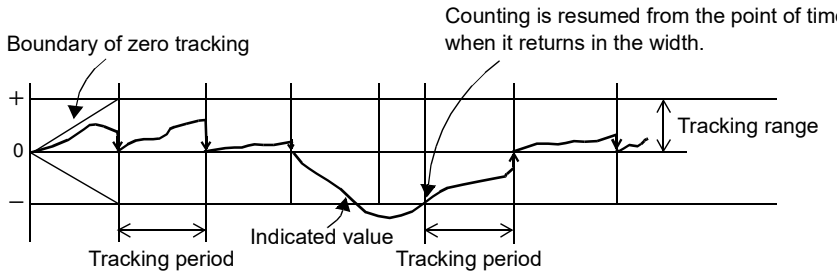
2. Press the (↵) key to enter the input mode.

3. Input the time with the numerical keys, and go to the width setting with the (↵) key. Input the width with the numerical keys, and determine it with the (↵) key.

* Even if you change either of the settings, set the time and width, and determine them with the (↵) key.

Point

- Zero tracking is the function to reset indicated value to zero automatically when the state remaining the zero point drift within the zero tracking range continues more than set period.
- Zero tracking period must be set between 0.1 ~ 9.9 second and its range must be set between 1 ~ 99 using 1/4 resolution interval of indicated value. For instance, 02 corresponds to 0.5 and 12 corresponds to 3 of indicated value. Zero tracking range is not proportional to the Minimum scale division regardless of the setting state of Minimum scale division. Zero tracking does not work if you set the period to 0.0 sec. and range to 00.



⚠ CAUTION

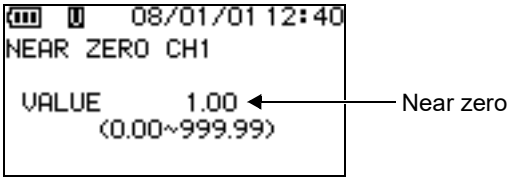
Since zero tracking works from the point where the indicated value is zero, it does not work if the indicated value has already exceeded the tracking band. Take a zero point again by one-touch zero or zero calibration.

6-8. Near zero

This functions to detect that the indicated value is near zero.

■Setting of near zero

1. Enter the function setting 1 screen with the (6) key → (1) key from the data display screen, and display the near zero setting screen with the (4) key.



2. Press the (↵) key to enter the input mode.

3. Input a near zero value with the numerical keys, and determine it with the (↵) key.

6-9. Hold function

The F490A is provided with the following four hold modes and three data hold section settings.

Hold modes（MODE）

- Sample hold: A desired point is held.
- Peak hold: The maximum value (peak value) in the positive direction of the input signal is held.
- Bottom hold: The maximum value (bottom value) in the negative direction of the input signal is held.
- Peak-to-peak hold: The difference (width) between the bottom value and peak value of the input signal is displayed.

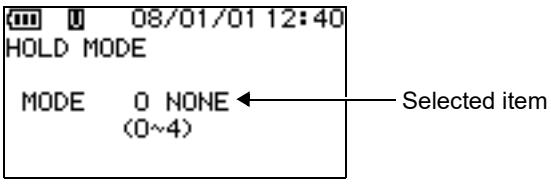
Data hold sections（SECTION）

- All: All data are monitored between the time when the (HOLD) key is pressed and the time when the (HOLD) key is pressed again.
- Level: Data are monitored between the time when the indicated value passes the start level and the time when it passes the end level.
  After passing of the end level, the indicated value is waited for to pass the start level again.
- Level+Time: Data are monitored for the set time after the indicated value passes the start level. After monitoring for the set time, the indicated value is waited for to pass the start level again.

* If the hold mode is sample hold setting, data hold sections are ignored.
  For the function of each hold mode, see "7.HOLD FUNCTION" on page 36.

■Setting of Hold mode（MODE）

1. Enter the hold function setting screen with the (6) key → (3) key from the data display screen, and display the hold mode setting screen with the (0) key.



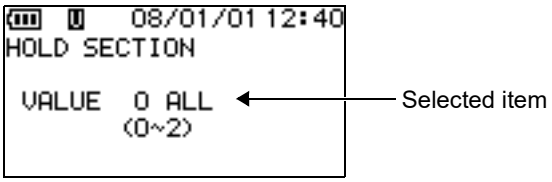
2. Press the (↵) key to enter the input mode.

3. Select an item with the corresponding numerical key, and determine it with the (↵) key.

0: Hold function off （NONE）
1: Sample hold（SAMPLE）
2: Peak hold（PEAK）
3: Bottom hold（BOTTOM）
4: Peak-to-peak hold（P-P）

■Setting of Data hold section（SECTION）

1. Enter the hold function setting screen with the (6) key → (3) key from the data display screen, and display the data hold section setting screen with the (1) key.



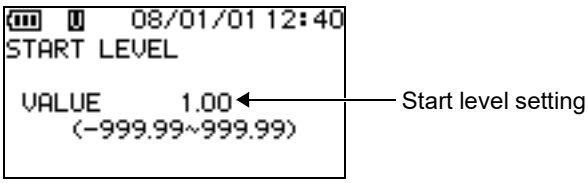
2. Press the (↵) key to enter the input mode.

3. Select an item with the corresponding numerical key, and determine it with the (↵) key.

0: All（ALL）
1: Level（LEVEL）
2: Level＋Time（LEVEL＋TIME）

■Setting of Start level（START LEVEL）

1. Enter the hold function setting screen with the (6) key → (3) key from the data display screen, and display the start level setting screen with the (2) key.

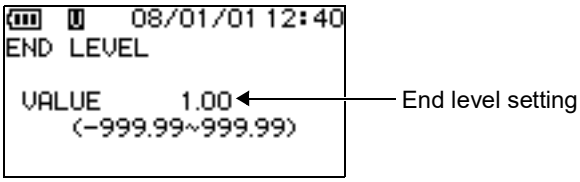


2. Press the (↵) key to enter the input mode.

3. Input a value with the numerical keys, and determine it with the (↵) key.

■Setting of End level（END LEVEL）

1. Enter the hold function setting screen with the (6) key → (3) key from the data display screen, and display the end level setting screen with the (3) key.

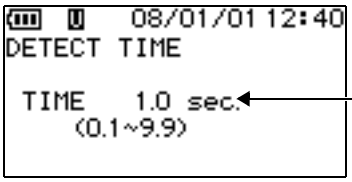


2. Press the (↵) key to enter the input mode.

3. Input a value with the numerical keys, and determine it with the (↵) key.

■Setting of Detect time（DETECT TIME）

1. Enter the hold function setting screen with the (6) key → (3) key from the data display screen, and display the detect time setting screen with the (4) key.



2. Press the (↵) key to enter the input mode.

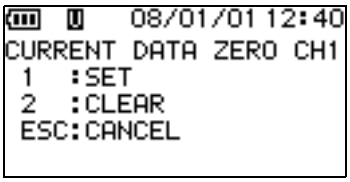
3. Input a value with the numerical keys, and determine it with the (↵) key.

6-10.One-touch zero

This functions to zero the indicated value by one-touch key operation.

■How to operate one-touch zero

1. Press the (3) key from the data display screen.



To zero the currently input value, press the (1) key.
To clear (invalidate) the currently set zero data, press the (2) key.
To cancel operation, press the (ESC) key.

Point

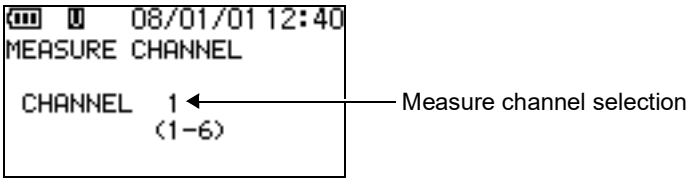
One-touch zero works when the calibration value lock is on.
If the calibration value lock is off, zero calibration operation will be performed.

6-11. Measure channel selection

This functions to switch the indicted value by calling a desired channel as up to 6 channels of calibration values are stored.

■Measure channel selection

1. Press the (5) key from the data display screen to enter the measure channel selection screen.



2. Press the (↵) key to enter the input mode.

3. Select a channel (1 - 6)(*) with the corresponding numerical key, and determine it with the (↵) key.

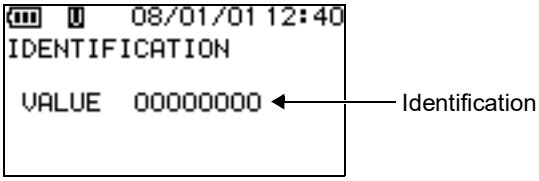
* Before a version 1.02, it can select to 4ch.

6-12. Identification

Set the identification of the F490A.
Each device can be identified.

■Identification

1. Press the (9) key from the data display screen to enter the identification screen.



2. Press the (↵) key to enter the input mode.

3. Input an identification with the numerical keys, and determine it with the (↵) key.
In addition to the numerical keys, the following settings can be carried out.

(+/-) key: " - " (hyphen)
(.) key: " " (space)

Point

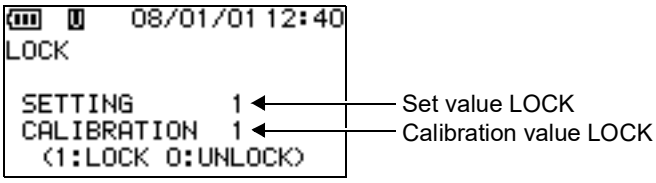
The identification is recorded at the head of record data. Number of character for identification is eight.

6-13. Set value LOCK

This functions to prohibit change of settings for prevention of change of set values and calibration values by misoperation.

■Set value LOCK setting

1. Press the (.) key from the data display screen to enter the set value LOCK setting screen.



2. Press the (↵) key to enter the input mode.

3. Select the item "SETTING" (set value) with the (0) key or (1) key, and go to the item "CALIBRATION" (calibration value) with the (↵) key. Select the calibration value lock with the (0) key or (1) key, and determine it with the (↵) key.

0: Unlocked state

1: Locked state

* Even if you change either of the settings, carry out both settings, and determine them with the (↵) key.

Point

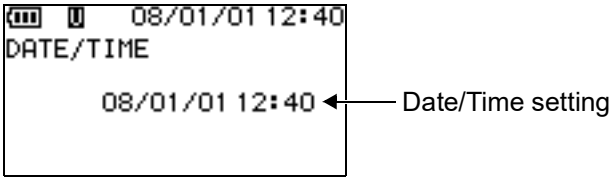
For the setting items locked by the set value lock and calibration value lock, see "3-2.Setting value list" on page 14.

6-14. Date/Time

Set the date/time of the F490A.

■Date/Time setting

1. Enter the function setting 2 screen with the (6) key → (4) key from the data display screen, and display the date/time setting screen with the (0) key.



2. Press the (↵) key to enter the input mode.

3. Input year, month, day, hour, and minute with the numerical keys, and determine it with the (↵) key. At this time, 00 seconds is indicated.

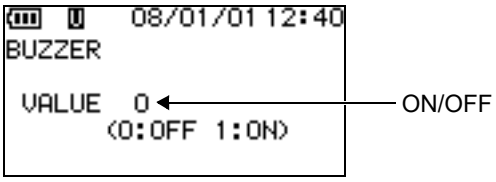
For year, input the last two digits.

6-15. Buzzer

Set the buzzer sound.
* The buzzer is key click sound.

■Buzzer setting

1. Enter the function setting 2 screen with the (6) key → (4) key from the data display screen, and display the buzzer setting screen with the (1) key.



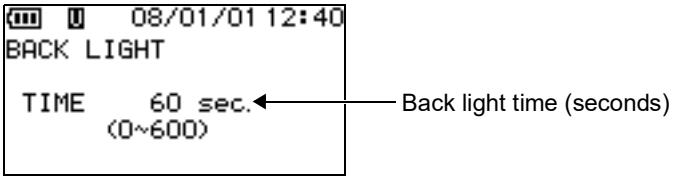
2. Press the (↵) key to enter the input mode.
3. Select ON ((1))/OFF ((0)) with the corresponding numerical key, and determine it with the (↵) key.

6-16.Back light

The back light is made to light for a predetermined time after the key is pressed. Set this time.

■Back light setting

1. Enter the function setting 2 screen with the (6) key → (4) key from the data display screen, and display the back light setting screen with the (2) key.



2. Press the (↵) key to enter the input mode.
3. Input the back light time with the numerical keys, and determine it with the (↵) key.

Point

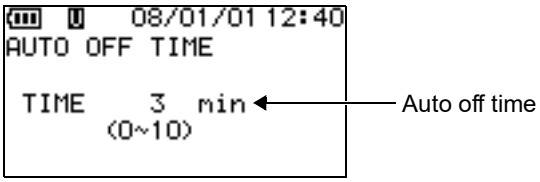
If the time is set at 0 seconds, the back light is always on.
The back light time setting relates to the battery life.
If the back light time is set long, the battery life becomes short.
If the back light time is longer than auto off time (see "6-17.Auto off time" on page 35), auto off function is performed first.

6-17.Auto off time

The F490A makes a transition to a low-power-consumption state if no operation is performed for a predetermined time.

■Auto off time setting

1. Enter the function setting 2 screen with the (6) key → (4) key from the data display screen, and display the auto off setting screen with the (3) key.



2. Press the (↵) key to enter the input mode.

3. Input the auto off time with the numerical keys, and determine it with the (↵) key.

Point

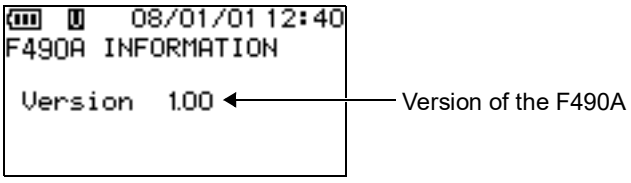
If the time is set at 0 minutes, a low-power-consumption state is not brought about.
Also, during USB connection with PC, while an external power source is used, and in the middle of recording, a low-power-consumption state is not brought about.
To return from a low-power-consumption state, turn off the power and then turn it on again, or press any key on the F490A.

6-18.Version display

The version of the F490A can be checked.

■Version check

1. Enter the function setting 2 screen with the (6) key → (4) key from the data display screen, and display the version display screen with the (4) key.



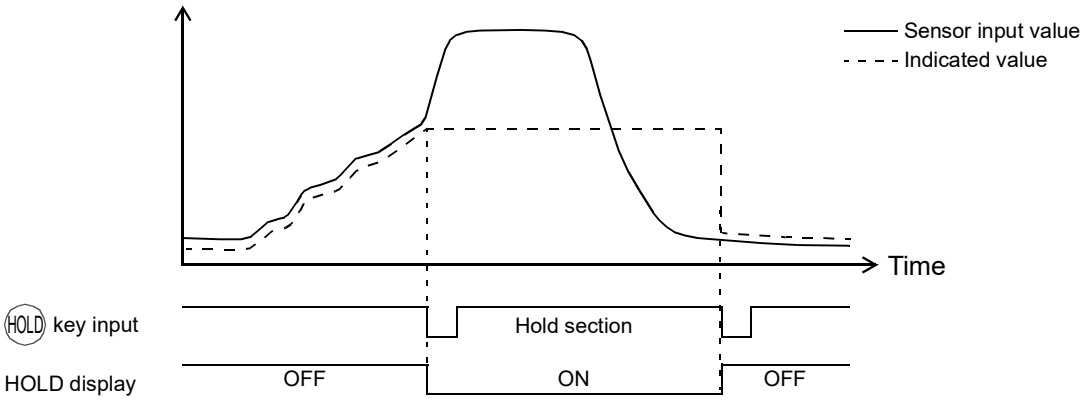
7 HOLD FUNCTION

The hold function works on data display and graph display.
Perform each hold operation by using the HOLD key.

7-1. Sample hold

A desired point of the input signal is held.

- Operation of the sample hold

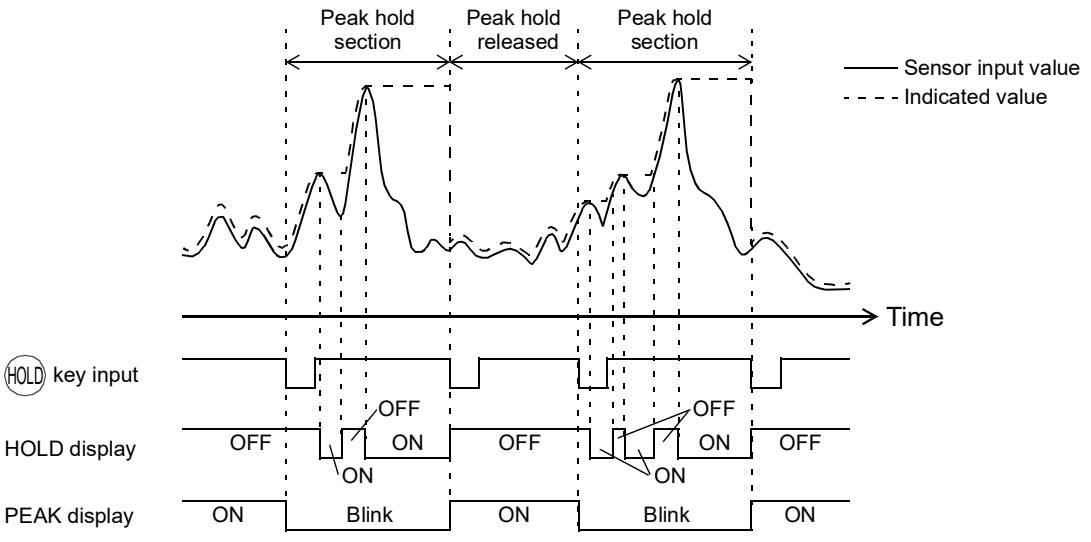


The indicated value of the time when the HOLD key is pressed is held.
It is released by pressing the HOLD key again.

7-2. Peak hold

The maximum value (peak value) in the positive direction of the input signal is held.

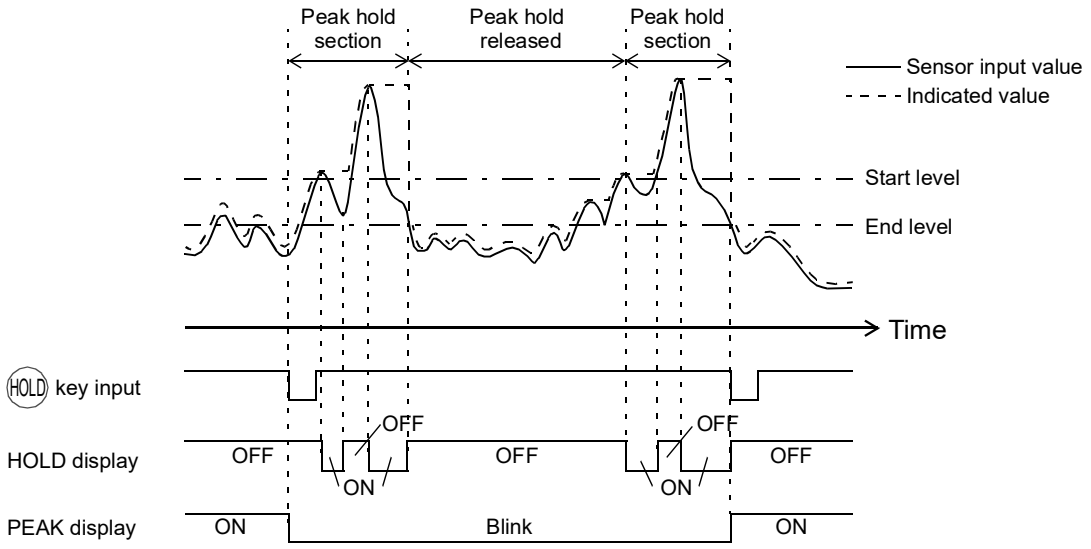
- Operation of the peak hold (Hold section setting: All)



The maximum value after the HOLD key is pressed is held.

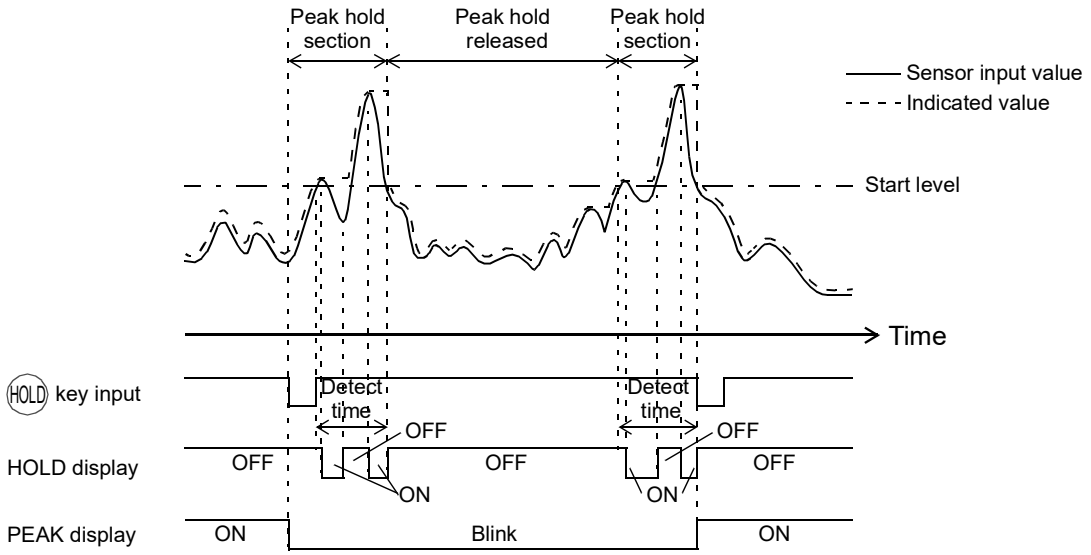
It is released by pressing the HOLD key again.

- Operation of the peak hold (Hold section setting: Level)



After the HOLD key is pressed, when the indicated value exceeds the start level from below it, hold operation starts. After that, the maximum value is held until it falls below the end level. After falling below the end level, the indicated value and the start level are compared again.
The hold operation is stopped by pressing the HOLD key again.

- Operation of the peak hold (Hold section setting: Level＋Time)

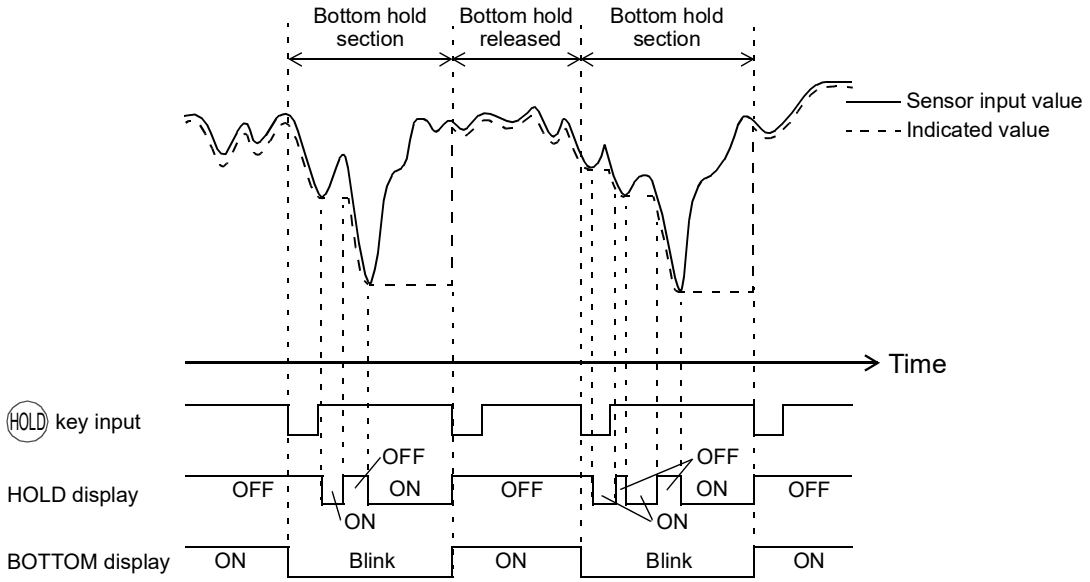


After the HOLD key is pressed, when the indicated value exceeds the start level from below it, hold operation starts. After that, the maximum value is held for the set detect time. After a lapse of the detect time, the indicated value and the start level are compared again.
The hold operation is stopped by pressing the HOLD key again.

7-3. Bottom hold

The maximum value (bottom value) in the negative direction of the input signal is held.

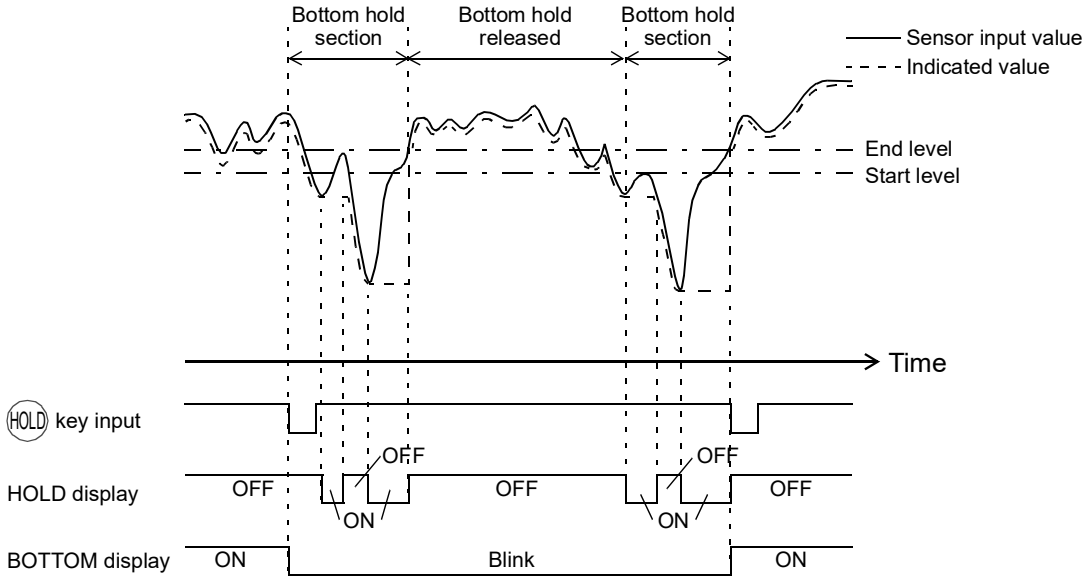
- Operation of the bottom hold (Hold section setting: All)



The minimum value after the HOLD key is pressed is held.

It is released by pressing the HOLD key again.

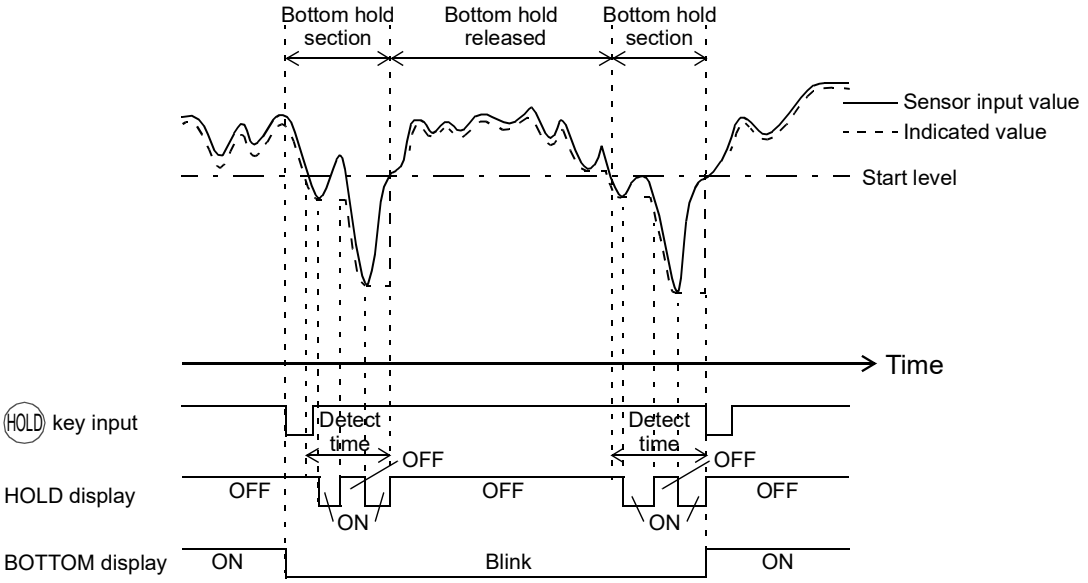
- Operation of the bottom hold (Hold section setting: Level)



After the HOLD key is pressed, when the indicated value falls below the start level from above it, hold operation starts. After that, the minimum value is held until it exceeds the end level. After exceeding the end level, the indicated value and the start level are compared again.

The hold operation is stopped by pressing the HOLD key again.

- Operation of the bottom hold (Hold section setting: Level＋Time)

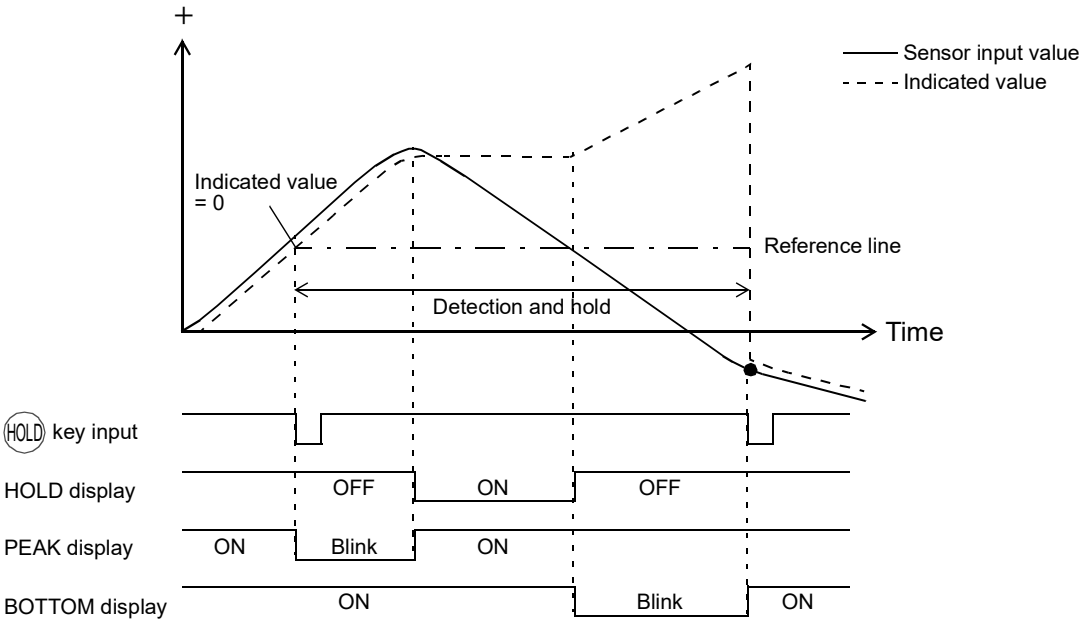


After the HOLD key is pressed, when the indicated value falls below the start level from above it, hold operation starts. After that, the minimum value is held for the set detect time. After a lapse of the detect time, the indicated value and the start level are compared again.
The hold operation is stopped by pressing the HOLD key again.

7-4. Peak-to-peak hold

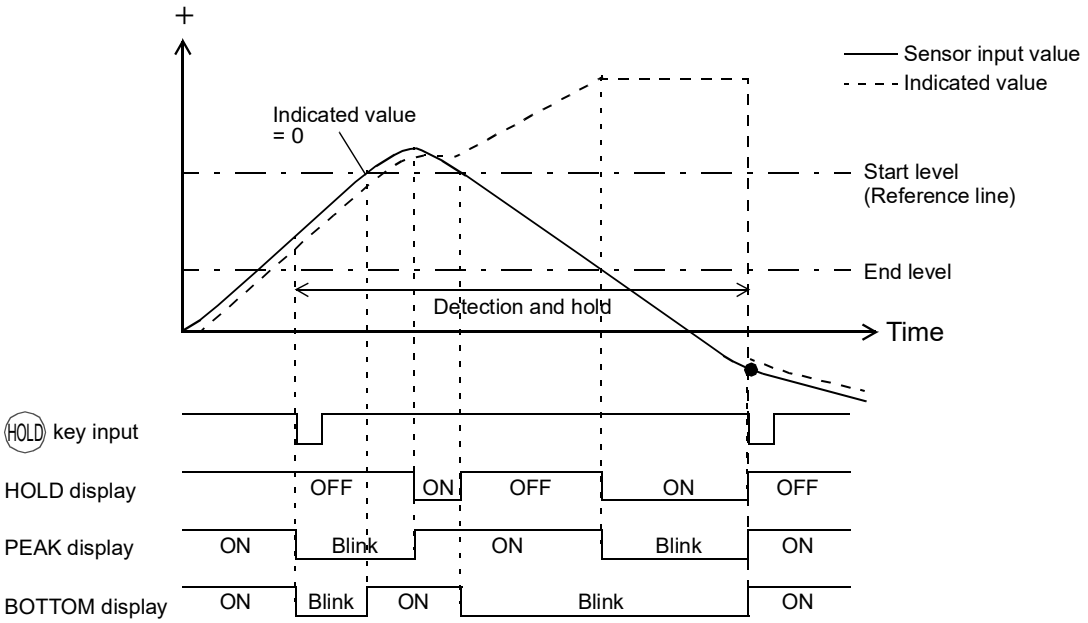
The difference (width) between the peak value and bottom value of the input signal is held.

- Operation of the peak-to-peak hold (Hold section setting: All)



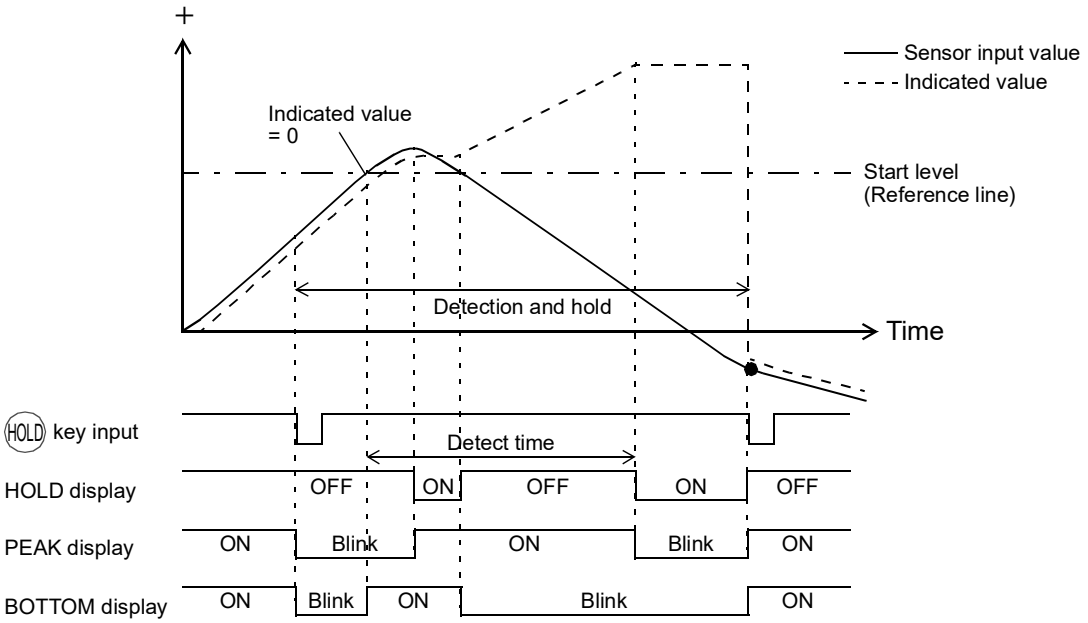
By taking the input value of the time when the HOLD key is pressed as a reference value, the maximum difference of the input value is held as an indicated value.
The hold operation is stopped by pressing the HOLD key again.

- Operation of the peak-to-peak hold (Hold section setting: Level)



After the HOLD key is pressed, when the indicated value passes the start level (downward or upward), hold operation starts. After that, the hold operation continues until the indicated value passes the end level (in the direction opposite to passing the start level). After passing the end level, it is monitored that the indicated value passes the start level with the hold data displayed.
The hold operation is stopped by pressing the HOLD key again.

- Operation of the peak-to-peak hold (Hold section setting: Level＋Time)



After the HOLD key is pressed, when the indicated value passes the start level (downward or upward), hold operation starts. After that, the hold operation continues for the set detect time. After a lapse of the detect time, it is monitored that the indicated value passes the start level with the hold data displayed.
The hold operation is stopped by pressing the HOLD key again.

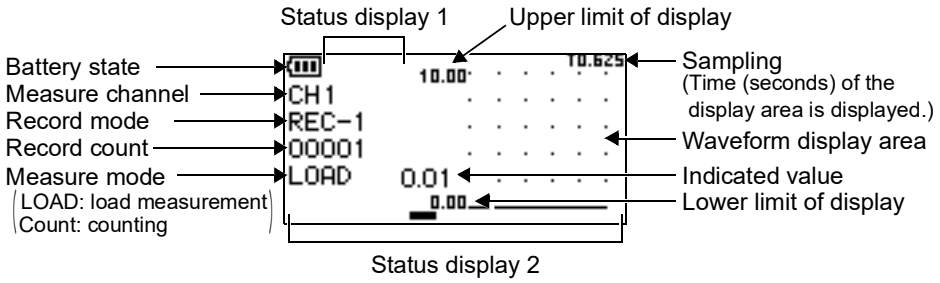
8 GRAPH

《only in ADVANCED MODE (advanced operation mode) mode》

(For switching of operation mode, see "1-6.Operation mode" on page 9)

The F490A is provided with the function of graphically displaying input data.
Here, settings relating to graph display are described.

8-1. Graph screen (For switch screens, see "1-4.Screen configuration" on page 4)



8-2. X-axis (sampling) setting

The time axis of the graph is displayed at the upper right of the screen.
This represents the time from end to end of the graph display area.

■Setting method

1. Press the (9) key while pressing the (+/-) (SHIFT) key on the graph display screen.

2. Since the time axis display part blinks, select an item with the (→) key or corresponding numerical key.
With the (→) key, the value changes as 0.625→1.25→2.5→3.75→5→6.25→7.5→8.75→10→11.25.
It can also be changed directly with the numerical keys.

(0): 0.625	(4): 5	(8): 10
(1): 1.25	(5): 6.25	(9): 11.25
(2): 2.5	(6): 7.5	
(3): 3.75	(7): 8.75	

3. After selecting a value, determine it with the (↵) key.

8-3. Y-axis (upper/lower limit display) setting

The Y-axis range is displayed at the top and bottom of the center of the screen.
The display range can be set.

■Setting method

1. Perform the following operation on the graph display screen.
   Upper limit: Press the (7) key while pressing the (+/−) (SHIFT) key.
   Lower limit: Press the (0) key while pressing the (+/−) (SHIFT) key.
2. Since the value blinks, set with the numerical keys.
3. After inputting a value, determine it with the (↵) key.

Point

The available setting range is -99999 to +99999.
The decimal point position is the same as that of the indicated value.
Such settings cannot be carried out that the upper limit falls below the lower limit.

8-4. Other settings

There are two methods of graph display as follows:

AUTO: The input value is always updated and displayed.
NORMAL: Graph display appears when the set trigger point (indicated value) is passed.

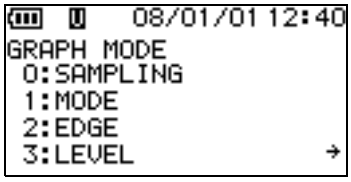
For capturing in NORMAL mode, several settings are required.

■Setting items

- Sampling rate
- Mode
- Edge
- Level
- Pre-trigger count

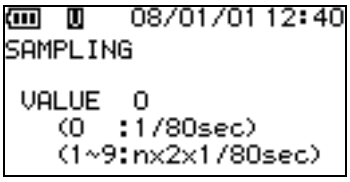
■Setting method

1. Display the graph mode setting screen with the (6) key → (6) key from the data display screen.
2. Set the sampling rate, mode, edge, level, and pre-trigger count.



Sampling rate

Set the X-axis (time axis).



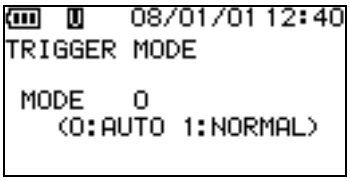
1. Display the sampling rate setting screen with the (0) key.
2. Press the (↵) key to enter the input mode.
3. Select a sampling rate with the corresponding numerical key, and determine it with the (↵) key.

Point

This operation is the same as setting the X-axis on the graph display screen.

Mode setting

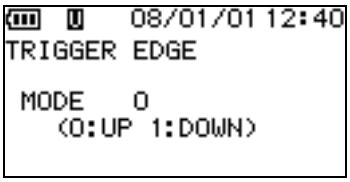
Set the graph plotting method.



1. Display the trigger mode setting screen with the (1) key.
2. Press the (↵) key to enter the input mode.
3. Select a mode with the corresponding numerical key, and determine it with the (↵) key.
   0: AUTO mode
   1: NORMAL mode

Edge setting

Set whether to detect data at the rising edge or falling edge in NORMAL mode.



1. Display the trigger edge setting screen with the (2) key.
2. Press the (↵) key to enter the input mode.
3. Select an edge detection method with the corresponding numerical key, and determine it with the (↵) key.
   0: Rising edge
   1: Falling edge

Point

Rising edge:

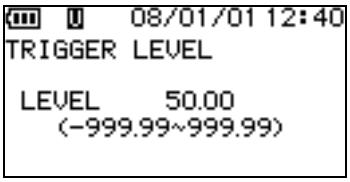
State in which the indicated value exceeds the level set value from below it.

Falling edge:

State in which the indicated value falls below the level set value from above it.

Level setting

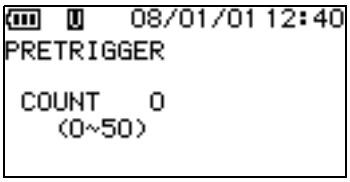
Set the indicated value of data to be detected in NORMAL mode.



1. Display the trigger level setting screen with the (3) key.
2. Press the (↵) key to enter the input mode.
3. Input a detection level with the numerical keys, and determine it with the (↵) key.

Pre-trigger count

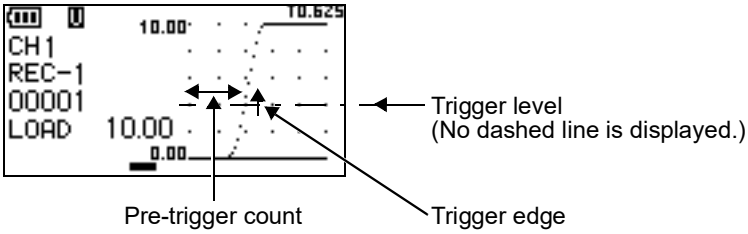
Set the count of previous data to trigger-detected data to be displayed in NORMAL mode.



1. Display the pre-trigger count setting screen with the (4) key.
2. Press the (↵) key to enter the input mode.
3. Input a pre-trigger count with the numerical keys, and determine it with the (↵) key.

■Example of operation in NORMAL mode

Edge: Rising edge
Trigger level: 4.00
Pre-trigger count: 20



9 RECORD FUNCTION

《only in ADVANCED MODE (advanced operation mode) mode》

(For switching of operation mode, see "1-6.Operation mode" on page 9)

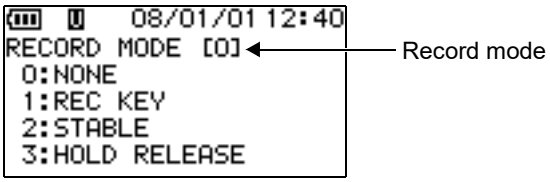
The F490A is provided with the function of recording data in the internal memory.
For the record function, the following five modes are available:

- Record when the (REC) key is pressed
- Record when stability is detected
- Record hold value at hold-release time
- Record at regular intervals
- Record graph data

9-1. Record mode

(For switch screens, see "1-4.Screen configuration" on page 4)

1. Display the record mode setting screen with the 6 key → 7 key from the data display screen.



2. Press the key to enter the input mode.

3. Select an item with the corresponding numerical key, and determine it with the key.

0: No record function
1: Record when the (REC) key is pressed
2: Record when stability is detected
3: Record hold value at hold-release time
4: Interval record
5: Graph record

For interval record, set the interval time.
Select the interval time from 12.5msec (1/80 seconds) / 1 second / 2 seconds / 5 seconds / 10 seconds / 30 seconds / 1 minute.

9-2. Record data

Data are stored in the F490A as a file.
By connecting with PC through USB, it is automatically recognized as a mass storage device on the PC side, which becomes a drive having one file.

File name:	F490A.CSV
Format:	CSV format (text data)
Amount of recordable data:	20000

The following six items of data are recorded:

・Record count ・Date of record ・Time of record ・Measure channel ・Indicated value ・Unit

9-3. Record data format

1st line F490 RECORD DATA[CR][LF](18 byte)
2nd line ID,="00000000"[CR][LF](16 byte)
3rd line COUNT,DATE,TIME,CH,DATA,UNIT[CR][LF](30 byte)
4th line and following record data

00001,08/02/25,17:00:00,1,+016.67,kN

1st to 5th byte	Record count
6th byte	"," (comma)
7th to 14th byte	Date of record (YY/MM/DD)
15th byte	"," (comma)
16th to 23rd byte	Time of record (hh:mm:ss)
24th byte	"," (comma)
25th byte	Measure channel
26th byte	"," (comma)
27th to 33rd byte	Indicated value
34th byte	"," (comma)
35th to 40th byte	Unit
41st byte	CR (0x0d)
42nd byte	LF (0x0a)

Point

The first line is "F490 RECORD DATA", because it keeps compatibility with F490.

9-4. Record data clear

Record data are maintained by the backup battery even if the power is turned off.
Data are deleted only by operating the F490A.
There are two methods of clearing record data.

- Deletion of the immediately preceding data
- Deletion of all data

How to delete the immediately preceding data

1. Press the (+/-) key and (↵)(REC) key at the same time on the data display screen.
   By this operation, the immediately preceding data is deleted.
   This operation is valid when the record mode is (↵)(REC) KEY.

How to delete all data

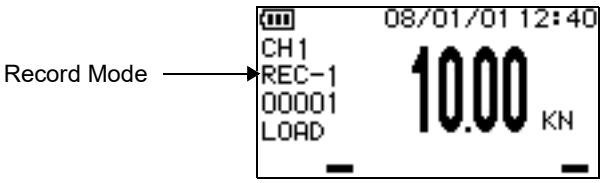
1. Press the (.) key on the record data display screen.
2. Since the data clearing confirmation screen appears, press the (↵) key for execution, or press the (ESC) key for cancellation.

⚠ CAUTION

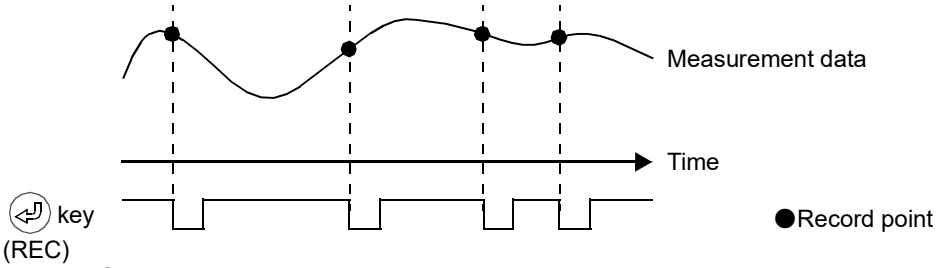
Deleted data cannot be restored. Delete it carefully.

9-5. Record mode

The record mode is displayed on the data display screen.

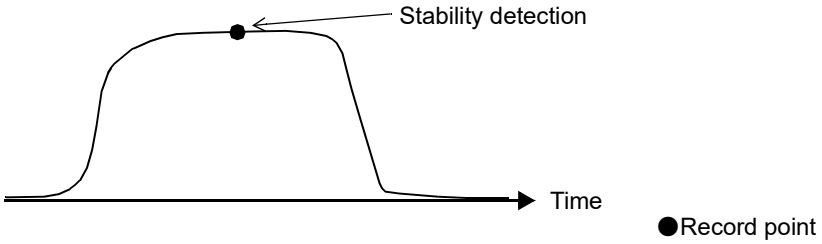


■Record when the (REC) key is pressed



When the (REC) key is pressed, the "R" mark lights.

■Record when stability is detected

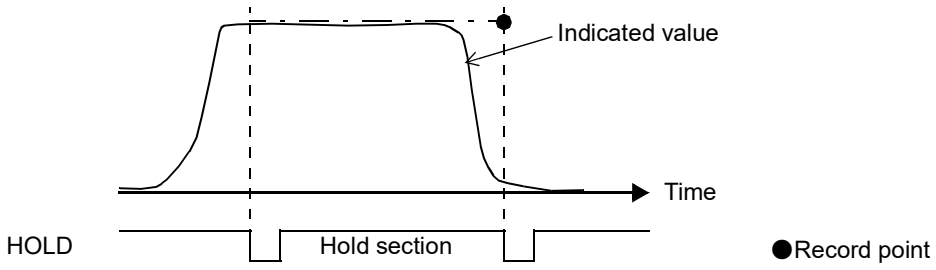


Set the parameters for stability detection by motion detection.
When stability is detected, the "R" mark lights.

Point

Within the near zero range, no recording is performed even if stability is detected.

■Record hold value at hold-release time

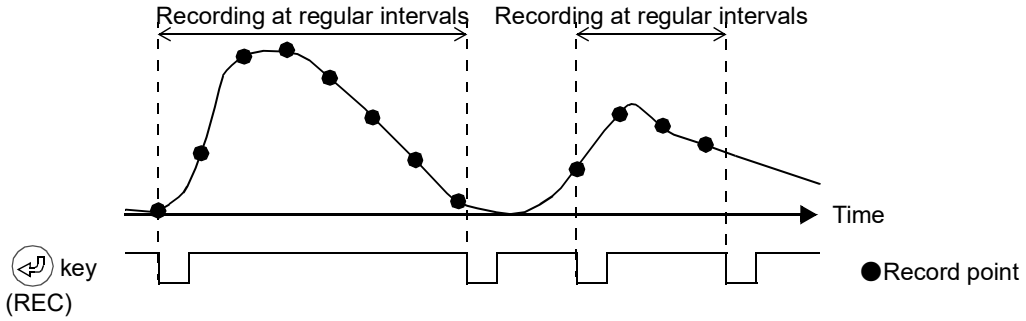


At hold-release time, the "R" mark lights.
If the hold mode is peak, bottom, or peak-to-peak, and the hold section setting is level or level+time, recording is performed when each hold operation is released (the end level is passed or after a lapse of the detect time).

■Interval record

Data are recorded at regular intervals.

Start and end recording with the (REC) key.



The "R" mark lights between the time when recording is started with the (REC) key and the time when recording is ended with the (REC) key.

■Graph record

Graphically displayed data are recorded.

When the graph display mode is AUTO:

The same movement as interval record is made.

However, the record interval depends on the X-axis setting of graph setting.

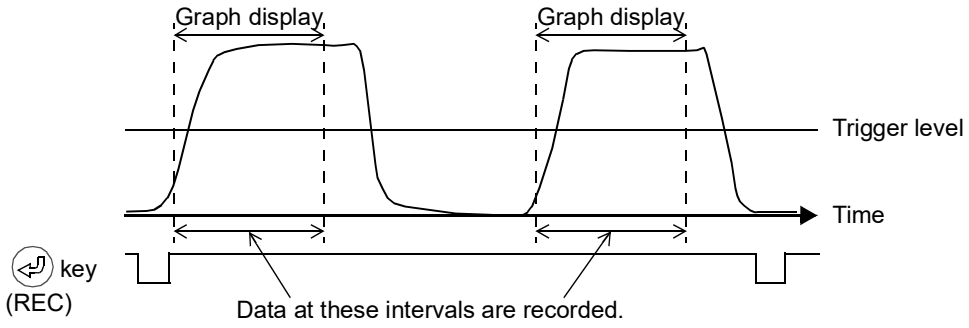
Relationship between the X-axis setting and record interval

X-axis setting	Record interval	X-axis setting	Record interval
0.625	12.5ms	6.25	125ms
1.25	25ms	7.5	150ms
2.5	50ms	8.75	175ms
3.75	75ms	10	200ms
5	100ms	11.25	225ms

When the graph display mode is NORMAL:

Recording is performed at the time of graph display as it is triggered.

Start and end recording with the (REC) key.



The "R" mark lights between the time when recording is started with the (REC) key and the time when recording is ended with the (REC) key.

10 USB INTERFACE

10-1. Communication specifications

■Standard

Compliant with USB Ver. 1.1 (full speed)

■Class

Mass storage class and communication class

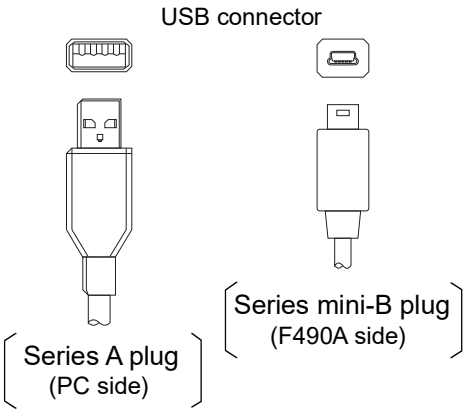
■Applicable models

AT compatibles having a USB port

■OS

Windows 7
Windows 10

* Windows 7 and Windows 10 are trademarks of Microsoft Corporation in the U.S.



■Connector

Mini-B type

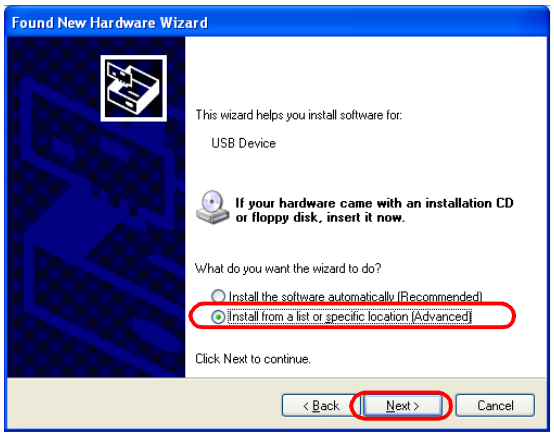
10-2. Connection

Connect the F490A and PC with a USB cable.
If they are newly connected, the driver designation screen appears on the PC. Carry out settings properly according to the instructions given on the PC.

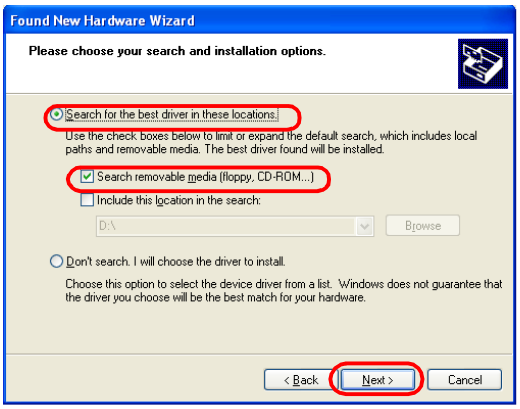
PC side setting

When the F490A is connected to the PC, the following screen appears. (First time only. However, some PCs may require settings from USB port to USB port.)

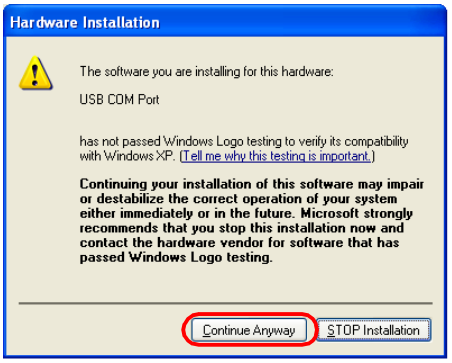
Select "Install from a list or specific location," and click "Next."



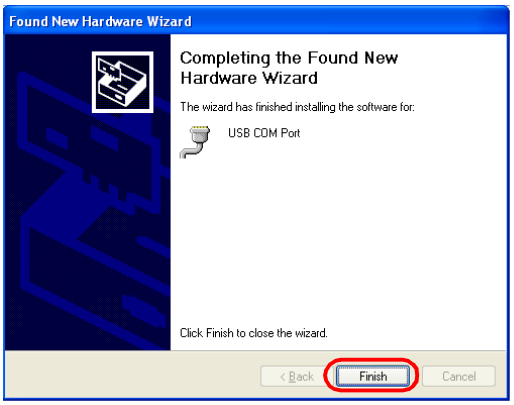
Insert the included CD-ROM in the CD drive.
Select "Search for the best driver in these locations," check "Search removable media," and click "Next."



Since the screen on the right-hand side appears in the middle of driver installation, click "Continue."



Upon successful completion of driver installation, the screen on the right-hand side appears. Click "Finish."



10-3.File operation

Open the folder by using My computer or Explorer, and refer to the data in the F490A. Since the data is in CSV format, it can be referred to as it is by spreadsheet software, such as Excel, by double-clicking the file.
For saving the file on the hard disk on the PC side, it can be easily transferred by drag and drop.
Since the file on the F490A side is read-only, the data cannot be deleted and the disk cannot be formatted from the PC side.
Delete the data by key operation on the F490A side.

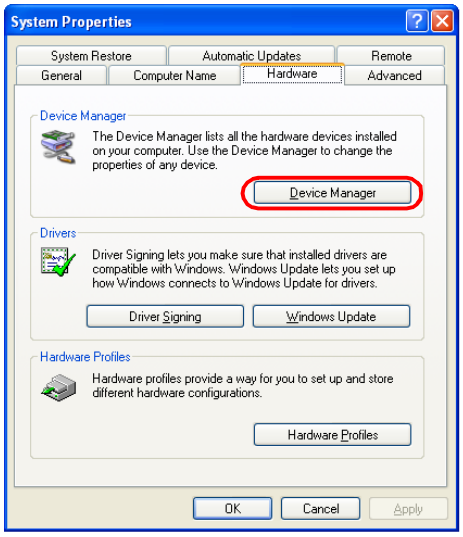
10-4. Virtual COM port

Not only can the file be referred to, but also the set values can be read and write by terminal software through USB.
Communication is performed by commands from the PC side.

How to check the port

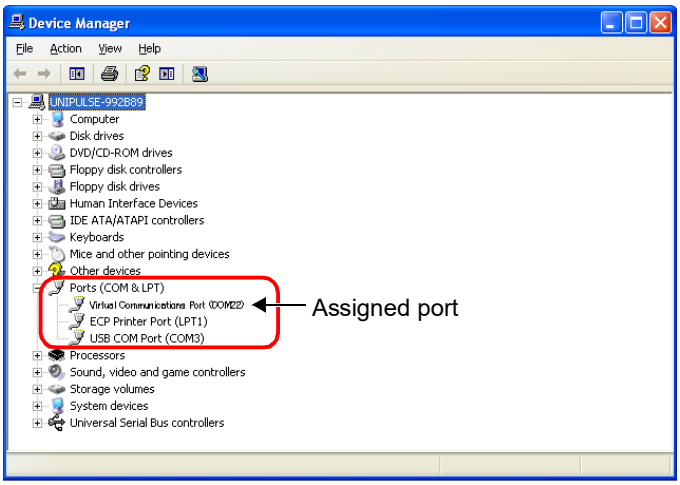
The port can be checked by Device Manager.

Select My Computer → (Right-click) → Properties to display the properties of the system.



Click Device Manager.

Develop ports (COM & LTP) and check.
In this example, port 22 is assigned.



List of communication commands

1	RA	Indicated value read	31	W12	Motion detection (time) setting write
2	RB	Status read	32	W13	Motion detection (width) setting write
3	R05	Measure channel read	33	W14	Zero tracking (time) setting write
4	R07	Upper limit setting read	34	W15	Zero tracking (width) setting write
5	R08	Lower limit setting read	35	W16	Near zero setting write
6	R10	Unit selection read	36	W17	Digital zero write
7	R11	Digital filter setting read	37	W18	Minimum scale division write
8	R12	Motion detection (time) setting read	38	W20	Operation mode setting write
9	R13	Motion detection (width) setting read	39	W22	Compare mode setting write
10	R14	Zero tracking (time) setting read	40	W23	Hold mode setting write
11	R15	Zero tracking (width) setting read	41	W25	Measure mode setting write
12	R16	Near zero setting read	42	W27	Record mode setting write
13	R17	Digital zero read	43	W28	Real-time mode setting write
14	R18	Minimum scale division read	44	W29	Set value lock setting write
15	R20	Operation mode setting read	45	W31	Hold section setting write
16	R22	Compare mode setting read	46	W32	Hold start level setting write
17	R23	Hold mode setting read	47	W33	Hold end level setting write
18	R25	Measure mode setting read	48	W34	Hold detect time setting write
19	R27	Record mode setting read	49	CC	One-touch zero
20	R28	Real-time mode setting read	50	CD	One-touch zero clear
21	R29	Set value lock setting read	51	C00	Zero calibration
22	R31	Hold section setting read	52	C01	Actual load calibration
23	R32	Hold start level setting read	53	C02	Equivalent input calibration
24	R33	Hold end level setting read	54	T00	Tare subtraction clear
25	R34	Hold detect time setting read	55	T01	Tare subtraction (current value)
26	W05	Measure channel write	56	T02	Tare subtraction (set value)
27	W07	Upper limit setting write	57	U00	Unit weight setting (sampling)
28	W08	Lower limit setting write	58	U01	Unit weight setting (known weight setting)
29	W10	Unit selection write	59	TIME	Time read/setting
30	W11	Digital filter setting write	60	DAT	Record data output
			61	REC	(REC) key-equivalent operation

Communication format

Indicated value read

PC	R	A	CR								
F490A	R	A	+	1	0	.	0	0	0	CR	LF

Status read

PC	R	B	CR								
F490A	R	B	0	0	0	0	0	0	0	CR	LF

Indicated value hold 0:OFF 1:ON (F490A 3rd 0)
Indicated value stable 0:OFF 1:ON (F490A 4th 0)
Indicated value near zero 0:OFF 1:ON (F490A 5th 0)
Reserve (F490A 6th 0)
HI signal 0:OFF 1:ON (F490A 7th 0)
OK signal 0:OFF 1:ON (F490A 8th 0)
LO signal 0:OFF 1:ON (F490A 9th 0)

Measure channel selection

Read out

PC	R	0	5	CR							
F490A	R	0	5	0	0	0	0	0	1	CR	LF

Write in

PC	W	0	5	0	0	0	0	0	2	CR	
F490A (In normal condition)	W	0	5	0	0	0	0	0	2	CR	LF

fixed at 0 (F490A 4th–8th 0)
Measure channel selection (F490A 9th 2)

F490A (In abnormal condition)	N	G	*	CR	LF

Upper limit setting

Read out

PC	R	0	7	CR							
F490A	R	0	7	+	0	7	5	0	0	CR	LF

Write in

PC	W	0	7	+	1	0	0	0	0	CR	
F490A (In normal condition)	W	0	7	+	1	0	0	0	0	CR	LF

Signed 5-digit setting with no decimal point (F490A 4th–8th)

F490A (In abnormal condition)	N	G	*	CR	LF

Lower limit setting

Read out

PC	R	0	8	CR							
F490A	R	0	8	+	0	2	5	0	0	CR	LF

Write in

PC	W	0	8	+	0	0	0	0	0	CR	
F490A (In normal condition)	W	0	8	+	0	0	0	0	0	CR	LF

Signed 5-digit setting with no decimal point

F490A (In abnormal condition)	N	G	*	CR	LF

Unit selection

Read out

PC	R	1	0	CR							
F490A	R	1	0	0	0	0	0	2	4	CR	LF

Write in

PC	W	1	0	0	0	0	0	0	1	CR	
F490A (In normal condition)	W	1	0	0	0	0	0	0	1	CR	LF

fixed at 0 — Set value (2-digit)

F490A (In abnormal condition)	N	G	*	CR	LF

Digital filter setting

Read out

PC	R	1	1	CR							
F490A	R	1	1	0	0	0	0	0	0	CR	LF

Write in

PC	W	1	1	0	0	0	0	1	0	CR	
F490A (In normal condition)	W	1	1	0	0	0	0	1	0	CR	LF

fixed at 0 — Set value (2-digit)

F490A (In abnormal condition)	N	G	*	CR	LF

Motion detection (time) setting

Read out

PC	R	1	2	CR							
F490A	R	1	2	0	0	0	0	0	0	CR	LF

Write in

PC	W	1	2	0	0	0	0	1	0	CR	
F490A (In normal condition)	W	1	2	0	0	0	0	1	0	CR	LF

fixed at 0 — Set value (2-digit)

F490A (In abnormal condition)	N	G	*	CR	LF

Motion detection (width) setting

Read out

PC	R	1	3	CR							
F490A	R	1	3	0	0	0	0	0	0	CR	LF

Write in

PC	W	1	3	0	0	0	0	1	0	CR	
F490A (In normal condition)	W	1	3	0	0	0	0	1	0	CR	LF

fixed at 0 — Set value (2-digit)

F490A (In abnormal condition)	N	G	*	CR	LF

Zero tracking (time) setting

Read out

PC	R	1	4	CR							
F490A	R	1	4	0	0	0	0	0	0	CR	LF

Write in

PC	W	1	4	0	0	0	0	1	0	CR	
F490A (In normal condition)	W	1	4	0	0	0	0	1	0	CR	LF

fixed at 0 — Set value (2-digit)

F490A (In abnormal condition)	N	G	*	CR	LF

Zero tracking (width) setting

Read out

PC	R	1	5	CR							
F490A	R	1	5	0	0	0	0	0	0	CR	LF

Write in

PC	W	1	5	0	0	0	0	1	0	CR	
F490A (In normal condition)	W	1	5	0	0	0	0	1	0	CR	LF

fixed at 0 — Set value (2-digit)

F490A (In abnormal condition)	N	G	*	CR	LF

Near zero setting

Read out

PC	R	1	6	CR							
F490A	R	1	6	0	0	2	5	0	0	CR	LF

Write in

PC	W	1	6	0	0	0	0	0	0	CR	
F490A (In normal condition)	W	1	6	0	0	0	0	0	0	CR	LF

fixed at 0 — Unsigned 5-digit setting with no decimal point

F490A (In abnormal condition)	N	G	*	CR	LF

Digital zero setting

Read out

PC

R	1	7	CR

F490A

R	1	7	+	0	0	0	0	0	CR	LF

Write in

PC

W	1	7	+	0	0	1	0	0	CR

F490A

W	1	7	+	0	0	1	0	0	CR	LF

(In normal condition)

Signed 5-digit setting with no decimal point

F490A

N	G	*	CR	LF

(In abnormal condition)

Minimum scale division setting

Read out

PC

R	1	8	CR

F490A

R	1	8	0	0	0	0	0	0	CR	LF

Write in

PC

W	1	8	0	0	0	1	0	0	CR

F490A

W	1	8	0	0	0	1	0	0	CR	LF

(In normal condition)

fixed at 0 Set value (3-digit)

F490A

N	G	*	CR	LF

(In abnormal condition)

Operation mode setting

Read out

PC

R	2	0	CR

F490A

R	2	0	0	0	0	0	0	0	CR	LF

Write in

PC

W	2	0	0	0	0	0	0	1	CR

F490A

W	2	0	0	0	0	0	0	1	CR	LF

(In normal condition)

fixed at 0 Set value (1-digit)
0: STANDARD MODE (simple operation mode)
1: ADVANCED MODE (advanced operation mode)

F490A

N	G	*	CR	LF

(In abnormal condition)

Compare mode setting

Read out

PC	R	2	2	CR							
F490A	R	2	2	0	0	0	0	0	0	CR	LF

Write in

PC	W	2	2	0	0	0	0	0	1	CR	
F490A (In normal condition)	W	2	2	0	0	0	0	0	1	CR	LF

fixed at 0

Set value (1-digit)
0: Always
1: Stable
2: Always except near zero
3: Stable except near zero

F490A (In abnormal condition)	N	G	*	CR	LF

Hold mode setting

Read out

PC	R	2	3	CR							
F490A	R	2	3	0	0	0	0	0	0	CR	LF

Write in

PC	W	2	3	0	0	0	0	0	1	CR	
F490A (In normal condition)	W	2	3	0	0	0	0	0	1	CR	LF

fixed at 0

Set value (1-digit)
0: None
1: Sample hold
2: Peak hold
3: Bottom hold
4: Peak-to-peak hold

F490A (In abnormal condition)	N	G	*	CR	LF

Hold section setting

Read out

PC	R	3	1	CR							
F490A	R	3	1	0	0	0	0	0	0	CR	LF

Write in

PC	W	3	1	0	0	0	0	0	1	CR	
F490A (In normal condition)	W	3	1	0	0	0	0	0	1	CR	LF

fixed at 0

Set value (1-digit)
0: All
1: Level
2: Level+time

F490A (In abnormal condition)	N	G	*	CR	LF

Hold start level setting

Read out

PC	R	3	2	CR							
F490A	R	3	2	0	0	0	0	0	0	CR	LF

Write in

PC	W	3	2	+	0	0	1	0	0	CR	
F490A	W	3	2	+	0	0	1	0	0	CR	LF

(In normal condition)

Signed 5-digit setting with no decimal point

F490A	N	G	*	CR	LF

(In abnormal condition)

Hold end level setting

Read out

PC	R	3	3	CR							
F490A	R	3	3	0	0	0	0	0	0	CR	LF

Write in

PC	W	3	3	+	0	0	1	0	0	CR	
F490A	W	3	3	+	0	0	1	0	0	CR	LF

(In normal condition)

Signed 5-digit setting with no decimal point

F490A	N	G	*	CR	LF

(In abnormal condition)

Hold detect time setting

Read out

PC	R	3	4	CR							
F490A	R	3	4	0	0	0	0	0	0	CR	LF

Write in

PC	W	3	4	0	0	0	0	1	0	CR	
F490A	W	3	4	0	0	0	0	1	0	CR	LF

(In normal condition)

fixed at 0 Set value (2-digit)

F490A	N	G	*	CR	LF

(In abnormal condition)

Measure mode setting

Read out

PC	R	2	5	CR							
F490A	R	2	5	0	0	0	0	0	0	CR	LF

Write in

PC	W	2	5	0	0	0	0	0	1	CR	
F490A	W	2	5	0	0	0	0	0	1	CR	LF

(In normal condition)

fixed at 0 Set value (1-digit)
0: Load
1: Counting mode

F490A	N	G	*	CR	LF

(In abnormal condition)

Record mode setting

Read out

PC	R	2	7	CR							
F490A	R	2	7	0	0	0	0	0	0	CR	LF

Write in

PC	W	2	7	0	0	0	0	0	1	CR	
F490A (In normal condition)	W	2	7	0	0	0	0	0	1	CR	LF
F490A (In abnormal condition)	N	G	*	CR	LF						

fixed at 0

Record mode
0: None
1: ⏎ (REC) key
2: Stable
3: Hold release
4: Interval
5: Graph

Interval time for interval record
0: 1/80 seconds
1: 1 second
2: 2 seconds
3: 5 seconds
4: 10 seconds
5: 30 seconds
6: 1 minute

Real-time mode setting

Read out

PC	R	2	8	CR							
F490A	R	2	8	0	0	0	0	0	0	CR	LF

Write in

PC	W	2	8	0	0	0	0	0	1	CR	
F490A (In normal condition)	W	2	8	0	0	0	0	0	1	CR	LF
F490A (In abnormal condition)	N	G	*	CR	LF						

fixed at 0

Set value (1-digit)
0: Real-time mode OFF
1: Real-time mode ON

Set value LOCK setting

Read out

PC	R	2	9	CR							
F490A	R	2	9	0	0	0	0	0	0	CR	LF

Write in

PC	W	2	9	0	0	0	0	1	0	CR	
F490A (In normal condition)	W	2	9	0	0	0	0	1	0	CR	LF
F490A (In abnormal condition)	N	G	*	CR	LF						

fixed at 0

Calibration value LOCK 0:OFF 1:ON

Set value LOCK 0:OFF 1:ON

One-touch zero

Execution

PC	C	C	CR		
F490A (In normal condition)	O	K	CR	LF	
F490A (In abnormal condition)	N	G	*	CR	LF

One-touch zero clear

Execution

PC	C	D	CR		
F490A	O	K	CR	LF	

(In normal condition)

F490A	N	G	*	CR	LF

(In abnormal condition)

Zero calibration

Bring the sensor into a no-load condition, and input the following command.

Execution

PC	C	0	0	CR	
F490A	O	K	CR	LF	

(In normal condition)

F490A	N	G	*	CR	LF

(In abnormal condition)

Actual load calibration

Apply an actual load to the sensor, and input the value of the actual load as shown in the following format.

Execution

PC	C	0	1		1	0	0	.	0	0	CR

Indicated value (5-digit with a decimal point)

F490A	O	K	CR	LF	

(In normal condition)

F490A	N	G	*	CR	LF

(In abnormal condition)

Equivalent input calibration

Execution

PC	C	0	2		3	.	0	0	0		1	0	0	.	0	0	CR

Sensor rated output (decimal point position fixed, 4-digit)

Indicated value (5-digit with a decimal point)

F490A	O	K	CR	LF	

(In normal condition)

F490A	N	G	*	CR	LF

(In abnormal condition)

Tare subtraction clear

Execution

PC	T	0	0	CR	
F490A	O	K	CR	LF	

(In normal condition)

F490A	N	G	*	CR	LF

(In abnormal condition)

Tare subtraction (current value)

Set an object to set tare on the sensor, and input the following command.

Execution

PC	T	0	1	CR	
F490A (In normal condition)	O	K	CR	LF	
F490A (In abnormal condition)	N	G	*	CR	LF

Tare subtraction (set value)

Execution

PC	T	0	2		1	0	0	.	0	0	CR
					Tare value (5-digit with a decimal point)						
F490A (In normal condition)	O	K	CR	LF							
F490A (In abnormal condition)	N	G	*	CR	LF						

Unit weight setting

1）Weight registration from actual measuring objects

Set samples the quantity of which is known on the scale, and input the following command.

Execution

PC	U	0	0		0	1	0	CR
					Quantity of samples (001 - 100)			
F490A (In normal condition)	O	K	CR	LF				
F490A (In abnormal condition)	N	G	*	CR	LF			

2）Known unit weight setting

Execution

PC	U	0	1		0	0	1	0	0	CR
					Known unit weight (unsigned 5-digit with no decimal point)					
F490A (In normal condition)	O	K	CR	LF						
F490A (In abnormal condition)	N	G	*	CR	LF					

Time setting

Read out

PC	T	I	M	E	CR	LF														
F490A	T	I	M	E		Y	Y	/	M	M	/	D	D							
									h	h	:	m	m	:	s	s	CR	LF		

Execution

PC	T	I	M	E		Y	Y	/	M	M	/	D	D							
									h	h	:	m	m	:	s	s	CR			
F490A	T	I	M	E		Y	Y	/	M	M	/	D	D							
									h	h	:	m	m	:	s	s	CR	LF		

YY : Last two digits of year
MM : Month
DD : Day
hh : Hour
mm : Minute
ss : Second

Record data output

Record data are output from the command.

Execution

PC	D	A	T	CR																
F490A	F	4	9	0		R	E	C	O	R	D	E		D	A	T	A	CR	LF	
	I	D	,	"	x	x	x	x	x	x	x	x	"	CR	LF					
	C	O	U	N	T	,	D	A	T	E	,	T	I	M	E	,				
						C	H	,	D	A	T	A	,	U	N	I	T	CR	LF	

Followed by record data.

* xxxxxxxx is a set identification.

Point

The first line is "F490 RECORD DATA", because it keeps compatibility with F490.

(REC) key-equivalent command

The same operation as in the case of pressing the (REC) key on the F490A is performed.

Execution

PC	R	E	C	CR
F490A	No response			

Echo setting

After power-on, the F490A does not echo back.

Carry out this setting if echo back is necessary in such a case that commands are input by using terminal software.

Setting

PC	E	C	H	O		O	N	CR		Echo ON setting
PC	E	C	H	O		O	F	F	CR	Echo OFF setting
F490A	E	C	H	O		O	N	CR	LF	Echo ON setting

Point

In the case of echo ON setting, the command prompt ('>') will be displayed.

About NG response

F490A (In abnormal condition)

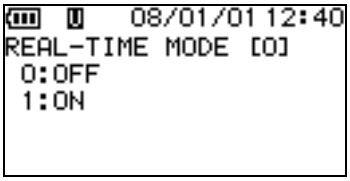
N	G	*	CR	LF

1: LOCK ON
2: Incorrect command length, etc.
3: Input value out of range, etc.

10-5. Real-time mode

The F490A is provided with a mode in which measured data are output in succession on USB.

■Real-time output



1. Display the real-time output setting screen with the (6) key → (8) key from the data display screen.
2. Press the (↵) key to enter the input mode.
3. Select a mode with the corresponding numerical key, and determine it with the (↵) key.
   0: Real-time output OFF
   1: Real-time output ON

■Data format

Data length: 20 bytes fixed

Data:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
D	A	,	*1	,	*2	,	*3	,	*4	,	±	1	0	.	0	0	0	CR	LF

Sign: 11
Indicated value (5 digits + decimal point): 12–17

＊1 O: Overload
S: Stable
M: Unstable
H: Hold
Priority: H＞O＞ (S or M)

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

＊3 H: Upper limit ON
L: Lower limit ON
G: Upper limit and lower limit OFF
N: Upper limit and lower limit ON
F: Comparison OFF
Priority: N＞ (H or L) F＞G

＊4 N: Near zero OFF
Z: Near zero ON

Chapter 11

SPECIFICATIONS

11 SPECIFICATIONS

11-1. Specifications

■Analog Section

Sensor electrical source	3V DC, output current within 35mA	
Signal input range	-3.0～3.0mV/V	
Zero adjustment range	-2.0～2.0mV/V	
Accuracy	Non-linearity:	Within 0.02%/FS (at a 3.0mV/V input)
	Zero drift:	Within 0.3μV/℃ RTI
	Gain drift:	Within 5ppm/℃
A/D converter	Rate:	80 times/sec.
	Resolution:	24bit (binary)　1/30000 with respect to 3.0mV/V
Indicating range	0～±99999	

■Display Section

Display	128×64-dot monochrome LCD
Display value	5-digit, -99999 to +99999, Character height 14mm
Status display	Status display 1: R (Recording) / A (Using AC adapter) / U (In USB connection) / N (Writing in NOV RAM) / B (Backup battery alarm) Status display 2: HI / OK / LO / PEAK / BOTTOM / HOLD

■Setting

- Tare subtraction* / Equivalent input calibration / Span calibration / Zero calibration (one-touch zero) / Unit weight setting* / Measure channel selection / Upper limit setting / Lower limit setting / Identification* / Set value LOCK
- Unit select / Digital filter / Motion detection (time/width) / Zero tracking (time/width) / Near zero / Digital zero / Minimum scale division
- Date/time / Buzzer / Back light / Auto off time / Version display / Memory check / Initialize
- Hold function: Hold mode / Hold section / Start level / End level / Detect time
- Graph function: Sampling* / Trigger mode* / Trigger edge* / Trigger level* / Pre-trigger*
- Operation mode / Compare mode / Measure mode* / Record mode* / Real-time output*

* Cannot be used in STANDARD MODE (simple operation mode).

■Record section

Recording media	Internal memory
Recording method	CSV format (text data)
Record data	ID, record count, date of record, time of record, measure channel, indicated value, unit
Amount of recordable data	20,000

■Hold function

Hold mode:
Sample / Peak / Bottom / Peak-to-peak
Data detect time:
All / Level / Level+time

■Measure mode

Load measurement / counting

■Clock

Display	Year (last two digits), month, day, hour, minute
Accuracy	Lunar inequality 1 minute. (ordinary temperature)

■Interface

USB interface	Communication standard:	Compliant with USB Ver.1.1
	Communication speed:	Full speed
	Class:	Mass-storage and virtual COM port
	OS:	Windows 7, Windows 10

- File operation	The F490A is recognized as a drive, which enables file reference and copying.
- Virtual COM port	Set values can be read and written by terminal software.
- Real-time output	Measured data are output in succession on USB.

■Operation

Power switch	Slide switch 1
Setting keys	Membrane keys (0 ～ 9 , . , +/- , HOLD , ESC , → , ⏎)

■General Performance

Internal power source	AA alkaline batteries or nickel metal hydride batteries (4)
External power source	Dedicated AC adapter (for 100V AC)
Current consumption	Approximately 60mA (When a 120Ω sensor is connected, back light off) Approximately 70mA (When a 120Ω sensor is connected, back light on)

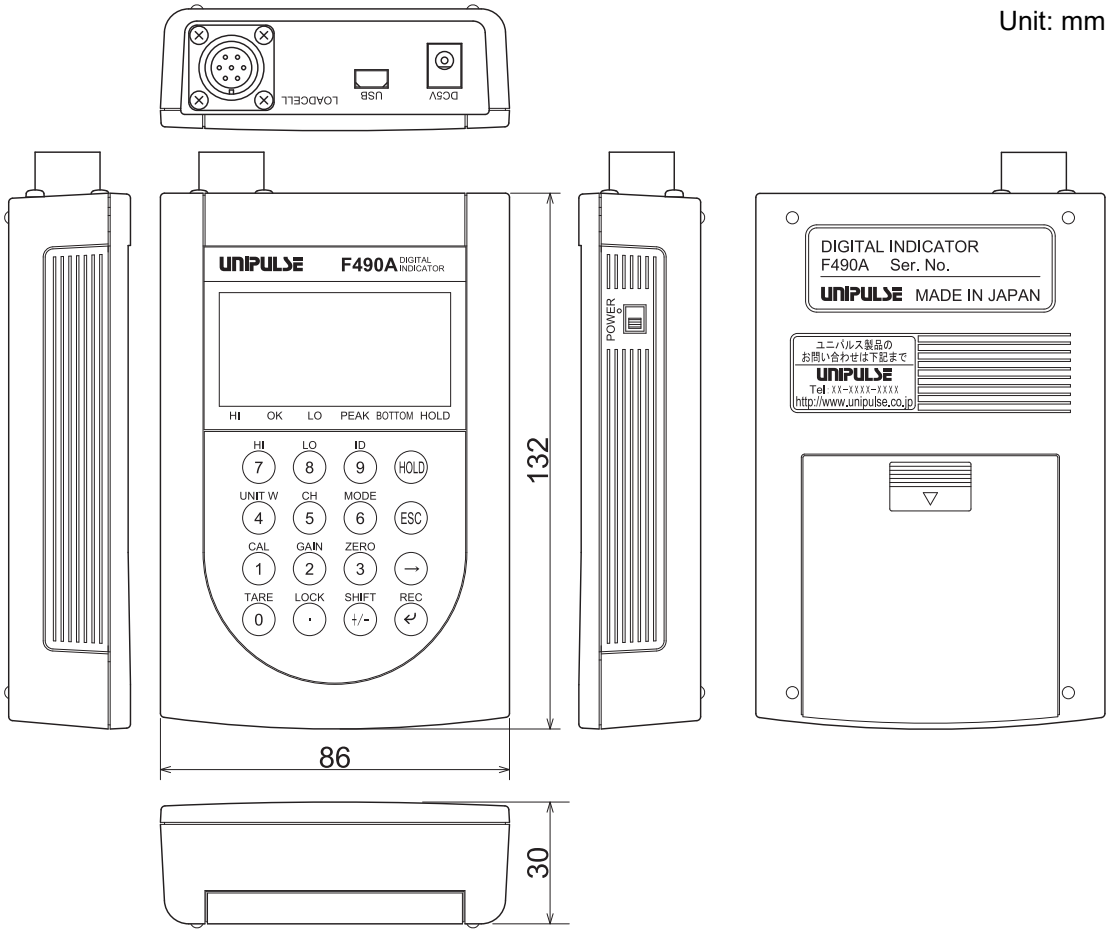
Backup power source	Set values and record data are maintained by the lithium battery (warranty period 5 years or more)	
Continuous use time	When a 350Ω sensor is connected:	Approximately 30 hours (back light off)
	When a 120Ω sensor is connected:	Approximately 12 hours (back light off)
Operation conditions	Temperature: -10 to +40℃ Humidity: 80%RH or less (non-condensing)	
Dimensions	86W×130H×30D (mm) (not including projections)	
Weight	Approximately 380g (including the battery weight approximately 95g)	

■Attachment

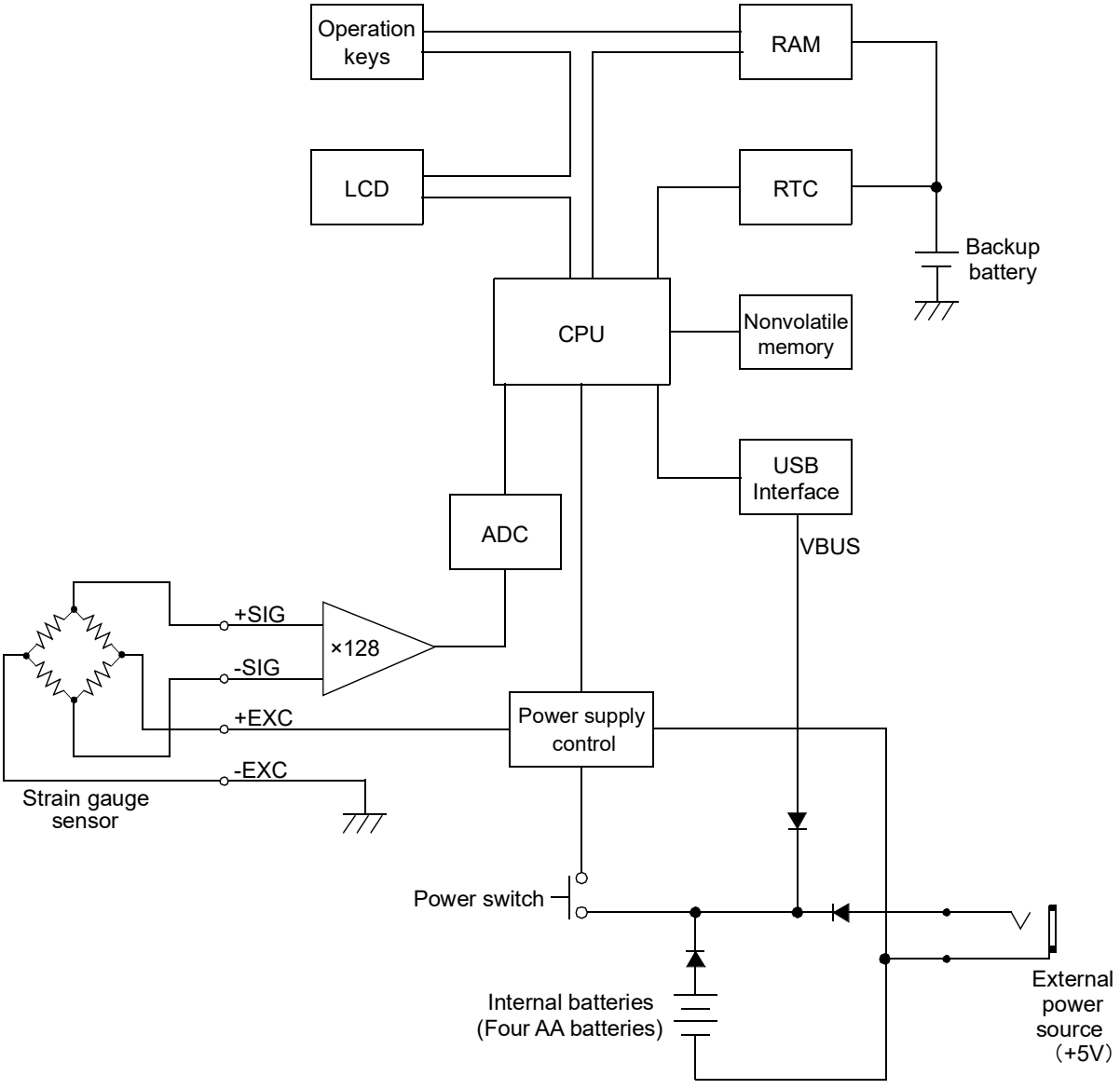
Operation manual 1
AA alkaline battery..... 4
Sensor connector..... 1
CD-ROM 1

11-2. Dimensions

Unit: mm



11-3. Block diagram



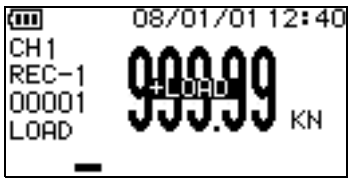
12SUPPLEMENTS

12-1.Over scale & error displays

■Over scale displays

+LOAD: ADC plus over

-LOAD: ADC minus over



The signal from the sensor exceeds the signal input range.

Excessive force may be applied to the sensor. Check the sensor range.

If an overload is not confirmable or the error cannot be reset, broken cable(s), wrong wiring, or sensor failure is thinkable.

+OVER: Display plus over

-OVER: Display minus over

A signal exceeding the display range is input.

An excessive load beyond assumption may be applied to the sensor.

Perform calibration so that the measuring value falls within the range of -99999 to 99999.

■Calibration error displays

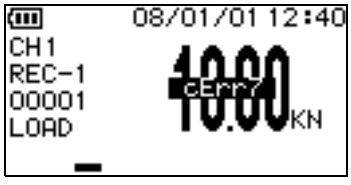
cErr2: Given when the zero point exceeds the calibration range.

The zero point exceeds the calibration range. Check that the sensor does not have an extra load or wrong wiring, and perform calibration again.

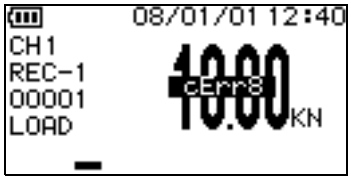
Zero calibration range: -2.0mV/V～+2.0mV/V

cErr6: Given when the sensor output does not reach the span calibration range.

cErr7: Given when the sensor output is on the minus (negative) side.



cErr8: Given when the sensor output is beyond the span calibration range.



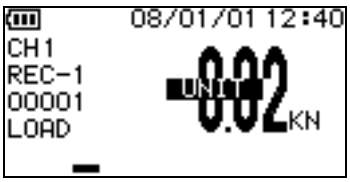
The output (mV/V) of the strain gauge type sensor does not reach the span calibration range.

Check to see if the output of the strain gauge type sensor has reached the span calibration range of the F490A.

Span calibration range: 0.05mV/V or more, 3.0mV/V or less

■Unit weight registration error display

UNIT: Given when the unit weight does not reach the minimum scale division× 5 in unit weight registration.

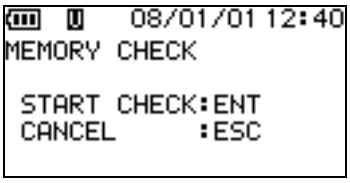


12-2.Memory check and initialization

■Memory check

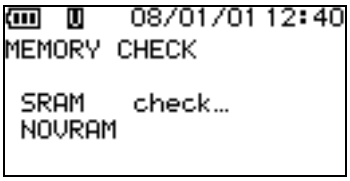
Memory check is to automatically check the internal memory of the F490A for detection of abnormalities.

1. Enter the function setting 2 screen with the (6) key → (4) key from the data display screen, and display the memory check screen with the (5) key.

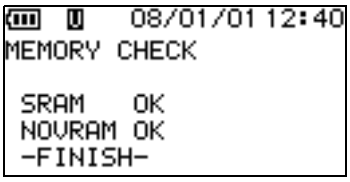


2. Press the (↵) key to execute memory check, or press the (ESC) key to cancel it.

3. Checking is in progress.



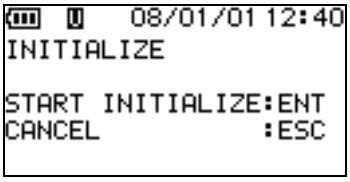
4. Upon completion of checking, the results are displayed.
OK display means normal.



■Initialization

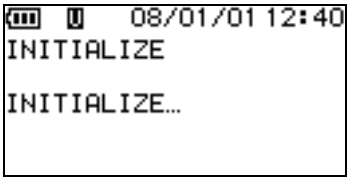
This operation is to rewrite the contents of the internal memory to the factory defaults.
By this operation, calibration values (zero calibration and span calibration) and date/time are not changed, but all the other set values are rewritten to factory-shipped values.

1. Enter the function setting 2 screen with the (6) key → (4) key from the data display screen, and display the initialize screen with the (6) key.

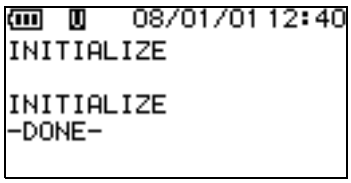


2. Press the (↵) key to perform initialization, or press the (ESC) key to cancel it.

3. Initialization is in progress.



4. Upon completion of initialization, "DONE" is displayed.



⚠ CAUTION

By performing initialization, record data are also cleared.

12-3.Troubleshooting

Trouble	Countermeasures
Assumed values are not indicated.	If a new sensor is connected, calibration is required. Use after performing zero calibration and equivalent input calibration or actual load calibration. Also, the F490A can store up to six calibration values. (Before a version 1.02, it can store up to six.) Check that the sensor and the channel in use correspond.
The power cannot be turned on	The F490A operates on four AA alkaline batteries or nickel metal hydride batteries. Check the orientations of the batteries, and turn on the power.
The screen goes out automatically.	The F490A is provided with a function for making an automatic transition to a low-power-consumption state if no operation is performed. (Auto off) To return from a low-power-consumption state, turn off the power and then turn it on again, or press any key. In the case of not using the auto off function, set the auto off time at 0 min.
No graph is displayed.	STANDARD MODE (simple operation mode) is a factory default. In STANDARD MODE (simple operation mode), graph display and record function do not work. Set the operation mode to ADVANCED MODE (advanced operation mode) before use. (See "1-6.Operation mode" on page 9.)
Recording cannot be performed.	For use of the record function, it is necessary to set the operation mode to ADVANCED MODE (advanced operation mode) (See "1-6.Operation mode" on page 9)and set record mode. Set record mode as usage. Also, the amount of recordable data is 20000. More than 20000 data cannot be recorded. Save the record data once on the PC side, clear the record data on the F490A, and then perform recording.
USB communication cannot be performed.	When the PC and F490A are newly connected, simple settings are necessary on the PC side. (Driver designation) Carry out connection work by following the connection wizard on the PC side.
Cannot be used as a COM port in USB connection.	Start up terminal software with the power of the F490A ON after connection with PC. To reconnect after turning off the power of the F490A in a connected state or removing the cable, disconnect the port on the terminal software side, and then reinsert the cable, and reconnect with the power of the F490A ON.

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