

## Vibration-Resistant Weighing Indicator

# AD-4410

- Powerful vibration-cancelling function  
(High Performance Digital Filter)
- High speed sampling (100 times/second)/high accuracy
- Circuits equipped with powerful noise reduction
  - Accurate linear correction function using high-order equations
  - Average holding function



**NEW FEATURES**

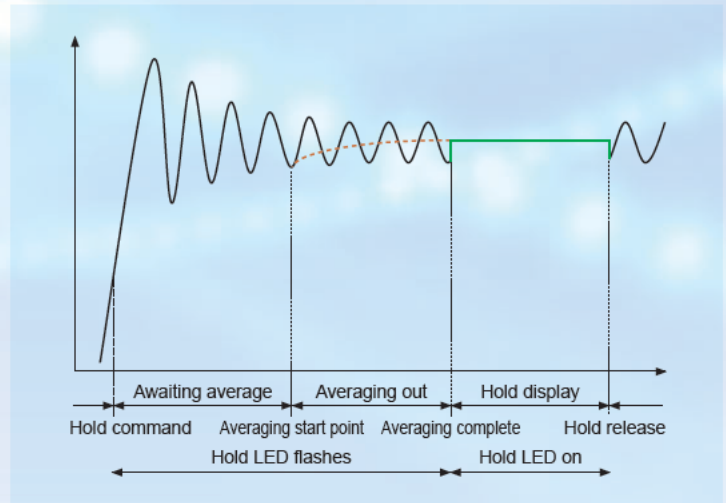
# AD-4410

We've Added some Brand-New Functions!

**NEW FEATURE**

## Average Holding Function

This function allows averaging a specified interval of data and holding it. This mode is convenient for situations where reliable data cannot be taken even when the High Performance Digital Filter is used, like when measuring the weight of a restless animal or something that is fluctuating in weight. In addition to the average holding function, normal hold and peak hold functions can also be selected. The hold start point can be selected based on one's needs, for example, using an external signal, using the F key on the front, or timing it to when the zero band has been exceeded.

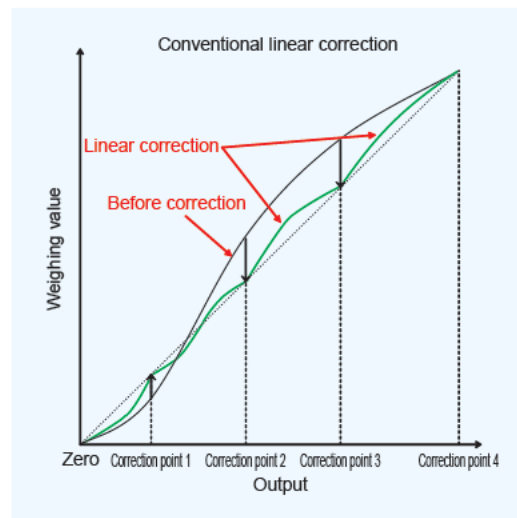
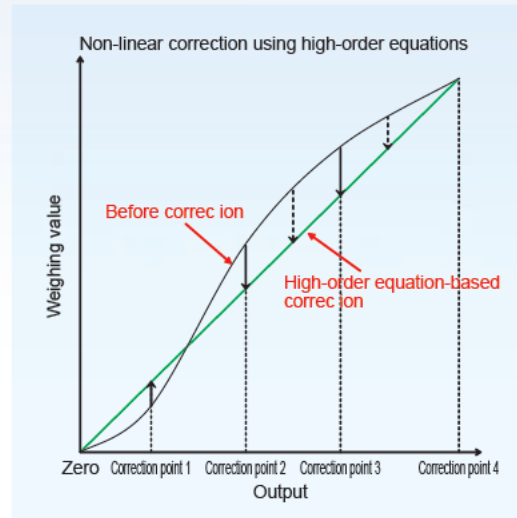
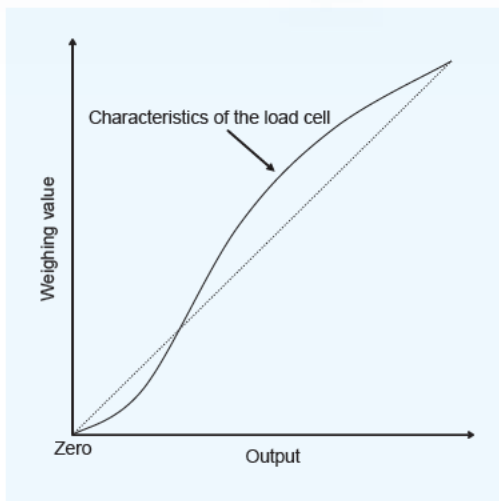


**NEW FEATURE**

**Industry First**

## Non-Linear Correction Using High-Order Equations

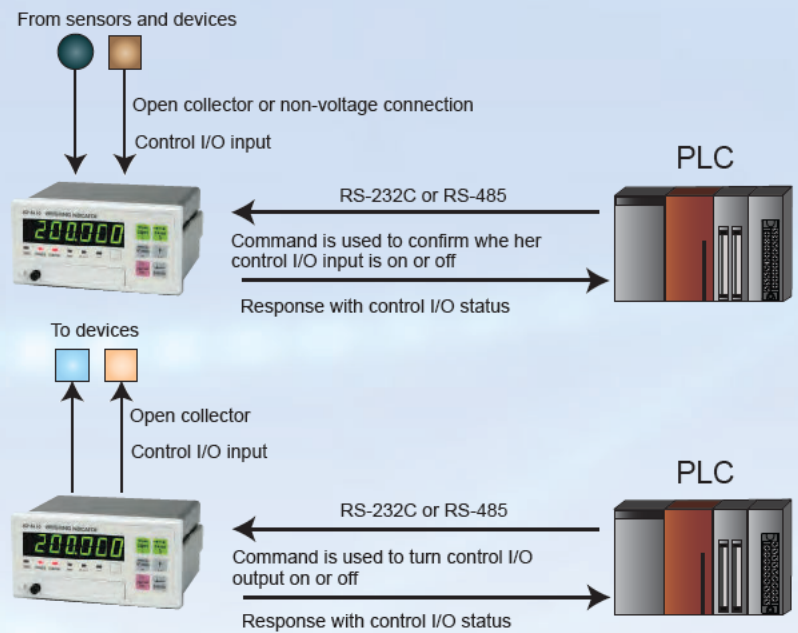
Due to the nature of weighing instruments, sometimes linear deviation can occur even if zero and span calibration are carried out. This correction function minimizes those linearity deviations. Up until now, linear correction has been commonly used, but AD-4410 corrects linearity deviations that linear correction can't compensate for by using high-order curves, enabling more accurate weighing.



## NEW FEATURE

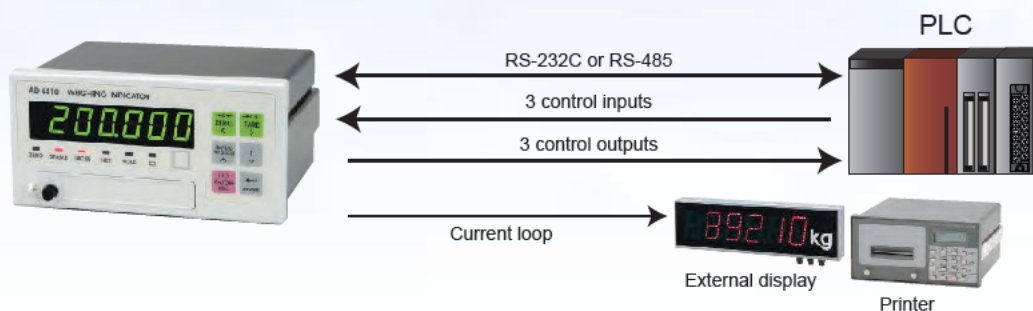
### User Input, User Output

The AD-4410 has 3 input points and 3 output points for its control I/O. Users can select what functions to assign to the control I/O. We've put in two new functions: user input and user input/output. User input/output can be used for whatever purpose the user wishes. One could turn on certain output terminals using RS-232C or RS-485 commands, or confirm certain Input/output terminals' situations using the front panel's  display. For example, it would be useful in a situation where you want to monitor photosensor input using PC or PLC, but there's no readable input port available.



### Extensive Connectivity

Control I/O, RS-232C, and current loop all come standard, RS-485 and the second RS-232C channel are options. There are 3 input and 3 output points, and you can freely select from 13 types of input functions and 18 types of output functions.



### Comparator Function

One can establish an upper and lower limit, and use the control I/O output to output HI, OK, or LO.

### RS-232C Comes Standard with Optional RS-232C/RS-485 Functionality

Data can be transmitted at high speed and commands essential to weighing can be sent. Control commands such as hold point commencement and release, setting commands such as upper and lower limits, and weighing data uptake functionality are built-in.

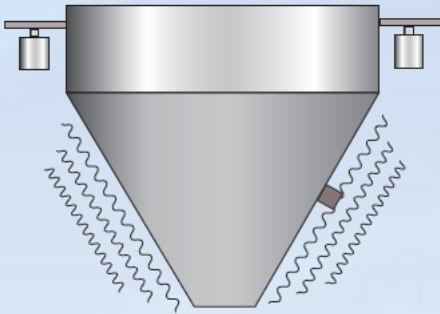
### Additional Functions

- Zero Band Detection Function**—— This function allows setting a zero band, so that gross weight or net weight will be adjusted to zero within that range.
- Zero Tracking Function**—— Automatically tracks gross weight zero fluctuations, constantly maintaining gross weight at zero.
- Power On-Zero Function**—— Automatically sets gross weight to zero when power is switched on.
- Gravity Acceleration Correction**—— When the area the balance was calibrated using weights at and the area where measurement takes place are far apart, entering the gravity acceleration can correct for inconsistencies.
- Dual Range**—— By setting two weighing ranges and changing the scale interval displayed, you can create a multi-interval instrument.

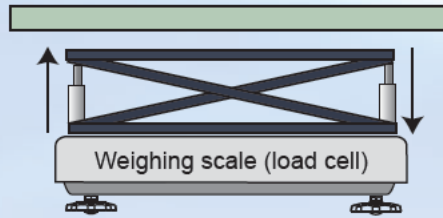
## Example of use of the vibration-eliminating High Performance Digital Filter (HPDF)

### Using HPDF

- Weighing while inducing vibration



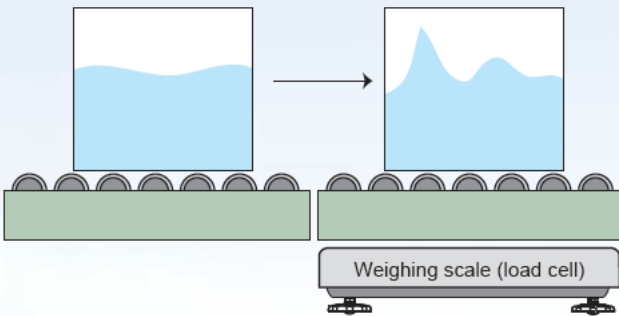
- Weighing while raising and lowering



### Using HPDF with averaging hold

- Weighing unstable objects

When containers with liquids are moved on a rolling conveyor with built-in weighing scale, the moment of inertia transferred after stopping the movement means the liquid inside will take a long time to settle and weighing cannot be performed for some time. However, if HPDF with averaging hold is used weighing can be performed instantly. Furthermore, if comparator output is used, the scale can immediately judge whether the measurement is within or outside range and output judgement.



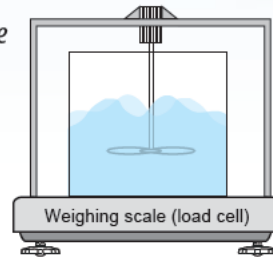
- Body weight measurement of animals moving about vigorously



- Weighing unstable objects



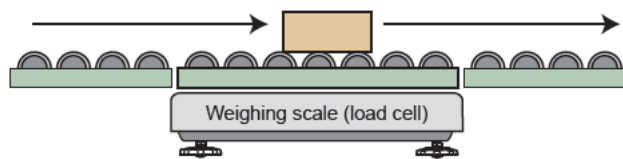
- Weighing while mixing



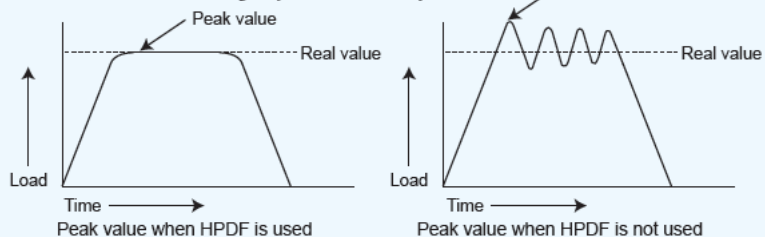
### Using HPDF with peak hold

- Simple checkweigher

A checkweigher (which measures an object while it continues to move) can be created. When the weight exceeds a value outside the zero band, the peak hold function starts, and is released by a timer.



When HPDF is used, as the effects of vibration are eliminated, the peak value can be taken as the weight of the measured object.



If comparator output is used, the scale can immediately judge whether the measurement is within or outside range and output judgement.



# High Performance Digital Filter

Featuring the Newly Developed High-Performance Digital Filter (HPDF) for Environments with Vibration Issues



## Powerful Vibration Cancelling Feature

The High-Performance Digital Filter provides high accuracy/high speed weighing in environments with vibration problems.

The AD-4410 greatly reduces the costs and maintenance required for anti-vibration equipment since it copes with vibrations without requiring many mechanical measures. What's more, conducting weighing while applying vibrations, once an extremely difficult task, is now possible. The High-Performance Digital Filter only requires one setting. For this reason, optimal settings for vibration cancelling can be found after just a few tries.

## Can be Calibrated in an Environment with Vibrations

Until now, to conduct calibration, sources of vibration had to be completely stopped, or calibration had to be conducted on weekends or holidays when machines are not active. However, even in an environment with vibrations, the AD-4410 can be calibrated at any point, so costs incurred from stopping production or calibrating on weekends or holidays will disappear.



# AD-4410

A Weighing Indicator that Can Be Used in an Environment with Vibrations

## Specifications

### ■ Analog unit

|                             |                                                                                                                                                                      |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input sensitivity           | Over 0.15 $\mu$ V/d (d=minimum division)                                                                                                                             |
| Zero adjustment range       | -35mV to +35mV (-7mV/V to +7mV/V)                                                                                                                                    |
| Load cell excitation        | DC5V $\pm$ 5%, 120mA<br>Remote sensing function included<br>Up to 8 load cells (350 $\Omega$ ) can be connected                                                      |
| Temperature coefficients    | Zero; $\pm$ 0.02 $\mu$ V/ $^{\circ}$ C (Typ.)<br>$\pm$ 0.1 $\mu$ V/ $^{\circ}$ C (Max.)<br>Span; $\pm$ 3ppm/ $^{\circ}$ C (Typ.)<br>$\pm$ 15ppm/ $^{\circ}$ C (Max.) |
| Nonlinearity                | 0.005% of F.S.                                                                                                                                                       |
| Input noise                 | Less than 0.3 $\mu$ Vp-p                                                                                                                                             |
| Maximum measurement voltage | -35mV to +35mV (-7mV/V to +7mV/V)                                                                                                                                    |
| Input impedance             | Over 10M $\Omega$                                                                                                                                                    |
| A/D conversion method       | Delta-sigma modulation                                                                                                                                               |
| Internal resolution         | Approx. 16,000,000                                                                                                                                                   |
| Display resolution          | 999,999d (less than 20,000d recommended)                                                                                                                             |
| Sampling rate               | 100 times/sec.                                                                                                                                                       |
| Calibration                 | Actual load calibration or digital span calibration not using actual load                                                                                            |

### ■ Digital unit

|                          |                                                                                                                                                                                                   |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display elements         | Weighing display:<br>7-segment 6-digit green LED<br>Character height of 14.6mm<br>Polarity display: 1 green LED<br>Situational display: 6 red LEDs                                                |
| Measurement data display | Display switchable between net and gross weight<br>Display range: 0 to 999,999d<br>(Select between 1, 2, 5, 10, and 50 for minimum division "d")<br>Units: Affix a "g", "kg", or "t" unit sticker |
| Status display           | ZERO, STABLE, GROSS, NET, HOLD and a light which can be given a custom function by the user                                                                                                       |

### ■ External output components

|                              |                                                                                                                                                      |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard serial output (ch1) | RS-232C 9-pin Dsub (male)                                                                                                                            |
| Standard serial output (ch2) | 20mA current loop signal<br>(For connection with A&D peripherals)                                                                                    |
| Control I/O                  | 3-point input function selection<br>(Non-voltage connection point or open collector)<br>3-point output function selection<br>(open collector output) |
| Modbus-RTU                   | Supported with RS-232C (included as standard) or RS-232C/RS-485 (optional).                                                                          |

### ■ Basic specifications

|                                    |                                                                                     |
|------------------------------------|-------------------------------------------------------------------------------------|
| Power source voltage               | AC100V to 240V 50/60Hz                                                              |
| Power consumption                  | Approx. 10VA                                                                        |
| Operating temperature and humidity | -10 $^{\circ}$ C to 40 $^{\circ}$ C/85%RH or less<br>(Condensation must be avoided) |
| Dimensions                         | 144(W) $\times$ 72(H) $\times$ 125(D) mm<br>(Protrusions included, cable excluded)  |
| Panel cut dimensions               | 138 $\times$ 68 mm                                                                  |
| Dust/water protection              | The IP65 display when mounted into a panel<br>(Using included rubber packing)       |
| Weight                             | Approx. 800g                                                                        |

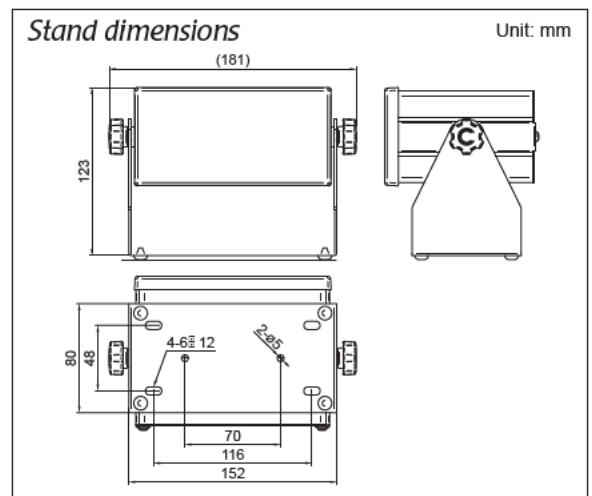
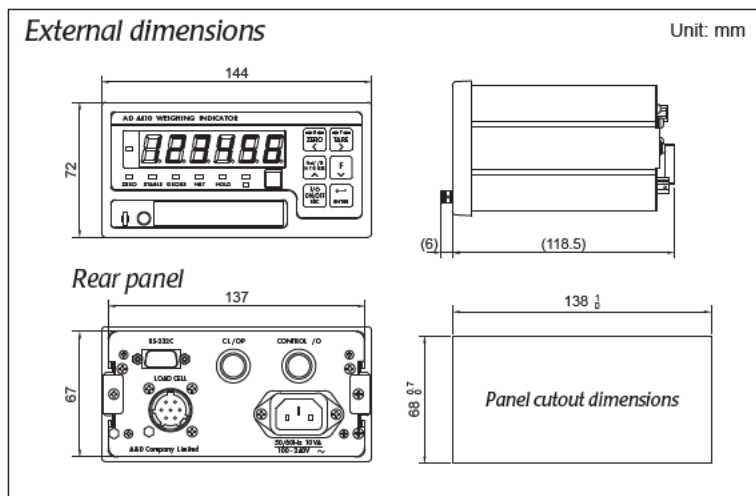
### ■ Options

|       |                                         |
|-------|-----------------------------------------|
| OP-03 | RS-485 (attached to ch2) DIN connector  |
| OP-04 | RS-232C (attached to ch2) DIN connector |
| OP-11 | Stand                                   |

Note: Only 1 OP-03 or OP-04 can be attached, when OP is attached 20mA current loop will become unusable.

### ■ Standard accessories

Instruction manual, 7-pin DIN connector, 8-pin DIN connector, load cell connector, power cable, rubber packing, capacity plate, unit stickers  
Note: Please prepare an RS-232C connector for standard serial output (ch1).  
A straight cable will be used when connecting to PC or PLC.



Appearance and/or specifications subject to change for improvement without notice.

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