High Performance Digital Filter

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

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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.

Can be Calibrated in an Environment with Vibrations

Can be Calibrated in an Environment with Vibrations

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 any 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 cancellation can be found after just a few tries.

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The AD-4410 has 3 input points and 3 output points for its control I/O. Users can select which functions to assign to the control I/O. With just one function, users can select input and input/output. Input/output can be for whatever purpose the user wishes. One could limit on certain output terminals using RS-232C or RS-485 commands, or confirm certain input/output terminals using the front panel display. For example, it would be useful in situations where you want to monitor photovoltaic input using PLC or PC, but there’s no available input port available.

Extensive Connectivity

Control I/O, RS-232C, and current loop can all come standard. RS-445 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.

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 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 Function: When the balance is calibrated using weights and the area where measurement takes place is flat, entering the gravity acceleration cannot correct for inconsistencies.

Dual Range: By setting two weighing ranges, scaling the scale display, and weighing data output functionality are built-in.

High-order equation-based non-linear correction using high-order equations. AD-4410 corrects linearity deviations that linear correction can’t compensate for by using high-order curves, enabling more accurate weighing.

High-performance digital filter (HPDF) for measuring objects that are fluctuating in weight. HPDF can be used for situations where reliable data cannot be taken even with linear correction and weighing. HPDF with averaging hold is used for weighing unstable objects, while HPDF with peak hold is used for weighing while raising and lowering, weighing while inducing vibration, and weighing while vibrating.

Weighing unstable objects

Using HPDF with averaging hold

Weighing while raising and lowering

Dual Range

Using HPDF with peak hold

Weighing while vibrating

Weighing while vibrating

Simple checkerweigher

It measures weight using an optical sensor, and if the measured weight is within a certain range, it will output. This function can be used in situations where you need to set a peak hold function that turns on and is released by a limit.

Example of use of the vibration-eliminating High Performance Digital Filter (HPDF)
**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 weighing the weight of a moving object or something that is fluctuating in weight.

In addition to the average holding function, normal hold and peak hold functions can also be added. This hold start point can be selected based on one’s needs. For example, using an external signal using the 10 key on the front, or timing it to when the zero band has been exceeded.

**New Feature! 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 restrains those linear deviations. Up until now, linear correction has been commonly used, but AD-4410 corrects linear deviations that linear correction can’t compensate for by using high-order curves, enabling more accurate weighing.

**New Feature! 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.

**New Feature! Comparator Function**

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

**New Feature! 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 fluctuations, constantly maintaining gross weight at zero. Power On-Zero Function: Automatically zero moves to zero when power is switched on.

Gravity Acceleration Correction: When the strain gauge was calibrated using weights and at the area where measurement is performed, the zero and span values are far apart, entering the gravity acceleration cannot be compensated for.

Dual Range: By setting two weighing ranges and changing the scale interval displayed, you can create a multi-reach instrument.

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

- **Weighing while inducing vibration**
  - Using HPDF with averaging hold
  - Weighing while raising and lowering
  - Weighing while mixing
  - Simple checkweigher

- **Weighing unstable objects**
  - Using HPDF with peak hold
  - body weight measurement of animals resting without targeting

**RS-232C Comes Standard with Optional RS-485 and RS-485 Functionality**

Data can be transmitted at high speed and commands essential to weighing can be sent.

**From sensors and devices**

- RS-232C or RS-485

**To devices**

- PLC

**RS-232C or RS-485**

- 3 control inputs
- Open collector
- Non-voltage connection
- Control I/O input

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

### Average Holding Functions

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 moving 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 key on the front, or timing it when the zero band has been exceeded.

### Non-linear correction using high-order equations

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

### Extensive Connectivity

Control I/O, RS-232C, and current loop can 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. Control I/O, RS-232C, and current loop all come standard, RS-485 and the second RS-232C channel are options.

### Comparator Function

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

### 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-sets that range.

Zero Tracking Function: Automatically tracks gross weight fluctuations, constantly maintaining gross weight at zero.

Gravity Acceleration Correction: When the area where the balance was calibrated using weights and the area where measurement takes place are far apart, entering the gravity acceleration cannot be ignored.

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

- **Weighing while inducing vibration**
  - Using AD-4410 with HPDF: Weighing while raising and lowering.
  - Using PC or PLC: Using HPDF with peak hold.
  - Simple checkweigher: A mechanical device measures an object with no contact. It is used to check if a certain object is a specific size.

- **Weighing unstable objects**
  - Using AD-4410 with HPDF: Weighing while raising and lowering.
  - Using PC or PLC: Using HPDF with peak hold.

- **Weighing while raising and lowering**
  - Using PC or PLC: Using HPDF with peak hold.

- **Body weight measurement of animals**
  - Using AD-4410 with HPDF: Weighing while raising and lowering.
  - Using PC or PLC: Using HPDF with peak hold.

- **Weighing unstable objects**
  - Using PC or PLC: Using HPDF with peak hold.

- **Weighing while vibrating**
  - Using AD-4410 with HPDF: Weighing while raising and lowering.
  - Using PC or PLC: Using HPDF with peak hold.

- **Simple checkweigher**
  - A mechanical device measures an object with no contact. It is used to check if a certain object is a specific size.

### Using HPDF

- **Weighing while raising and lowering**
  - Using AD-4410 with HPDF: Weighing while raising and lowering.
  - Using PC or PLC: Using HPDF with peak hold.

- **Body weight measurement of animals**
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- **Simple checkweigher**
  - A mechanical device measures an object with no contact. It is used to check if a certain object is a specific size.
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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 conducting weighing while applying vibrations, once an extremely difficult task, is now possible.

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High Performance Digital Filter

- High accuracy
- High speed sampling (100 times/second)/high accuracy
- Accurate linear correction function using high-order equations
- Average holding function

Specifications

- Digital unit
  - Display elements: 7-segment 6-digit green LED
  - Weighing display: Character height of 14.6mm 7-segment 6-digit green LED
- Analog unit
  - Input sensitivity
  - A/D conversion method

Vibration-Resistant Weighing Indicator

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

AD4410

Vibration-Resistant Weighing Indicator

- Powerful vibration-cancelling function
- High speed sampling (100 times/second)/high accuracy
- Circuits equipped with powerful noise reduction
- Average holding function

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