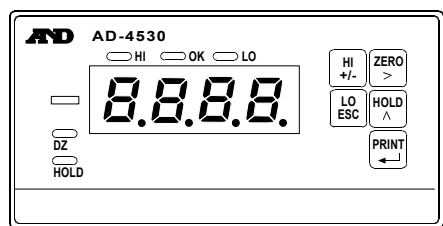


Digital Indicator

Simplified Instruction Manual



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The contents of this manual and the specifications of the instrument covered by this manual are subject to change for improvement without notice.

This is a simplified instruction manual. For a detailed instruction manual, refer to A&D's website. URL: <http://www.aandd.jp/>



1WMPD4002283B

1. BEFORE USE

The digital indicator is a precision instrument. Unpack the digital indicator carefully and confirm that all items are present.

1.1. Precautions Before Use

- Avoid water and moisture.
- Avoid vibration, shock, extremely high temperature and humidity, direct sunlight, dust, and air containing salt or sulfurous gases.
- Avoid places where inflammable gases or vapors are present.
- The operating temperature is -10°C to +40°C.
- A 100 VAC to 240 VAC power source is required. Use a stable power supply free from sudden dropout or noise as they can cause malfunctions. Avoid sharing the power line.
- Keep cables away from power cables and other sources of electrical noise.
- Connect only a non-inductive load of 10 kΩ or more to the analog voltage output terminals.
- Connect only a non-inductive load of 510 Ω or less to the analog current output terminals.
- When connecting long cables to the sensors, keep the cables away from power cables and other sources of electrical noise
- Do not connect the AD-4530 to the power supply before installation is completed. The AD-4530 has no switch to disconnect the power supply.
- Use shielded load cell cables.
- Do not connect too many sensors. Otherwise, instrument damage may occur.

1.2. Precautions During Use

- The AD-4530 is a precision instrument that measures the microvolt output from sensors. Prevent noise sources such as power lines, radios, electric welders or motors from affecting the instrument.
- Do not try to modify the AD-4530.
- In all hold modes, the hold data is saved digitally, so there is no drooping of the value displayed on the display panel or the analog output. Note that the hold function is disabled when the AD-4530 is disconnected from the power supply.

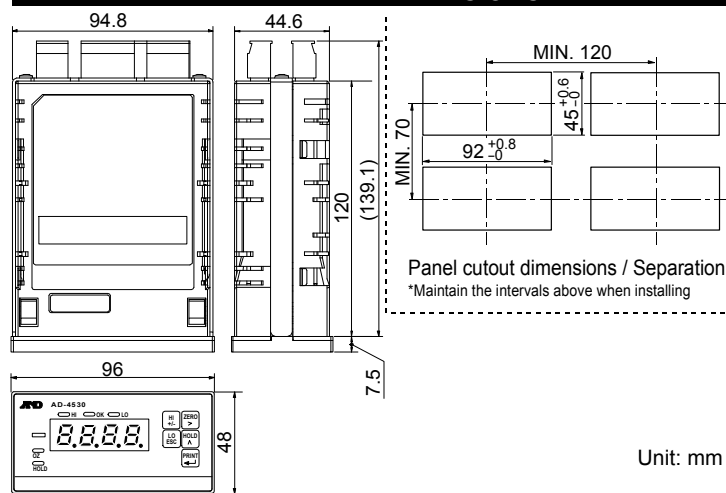
WARNING

- Disconnect from the power supply before removing the cover.
- When removing the cover, make sure that the power is off.

Do not touch the instrument immediately after it is disconnected from the power supply.
 ■ To avoid electrical shock, do not touch the internal part of the instrument within ten seconds after switching the power off.

CAUTION
 Be sure to fasten all the screws completely.
 ■ Loose screws may come off during operation and a short circuit may occur or measurement errors may occur due to noise.

2. EXTERNAL DIMENSIONS



3. GENERAL SPECIFICATIONS

Voltage requirement: 100 VAC to 240 VAC +10%, -15% (50/60 Hz)
 Power requirement: Approx. 10 VA
 Sensors: 5 volt, 120 Ω, one sensor maximum
 5 volt, 350 Ω, three sensors maximum
 Operating temperature: -10 °C to +40 °C
 Operating humidity: Max. 85% RH (no condensation)
 External dimensions: 96 x 48 x 127.5 mm (W x H x D)
 Panel cutout: 92 x 45 mm
 Separation: Width: 120 mm or more
 Length: 70 mm or more
 Mass: Approx. 290 g

4. OPTIONS

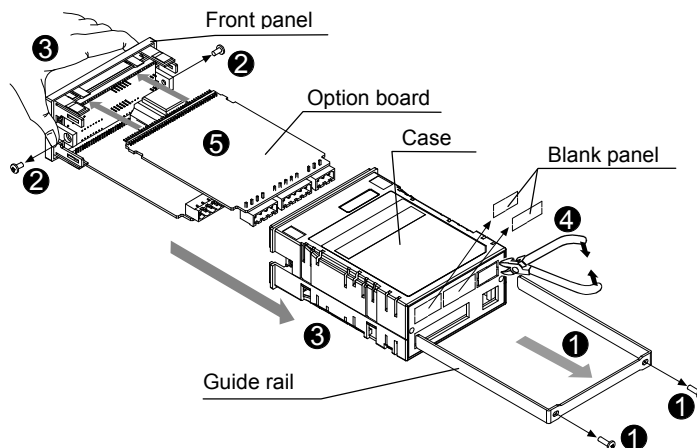
4.1. Options

- AD-4530-200: Relay output
- AD-4530-030: RS-485
- AD-4530-040: RS-232C
- AD-4530-007: Analog output
- AD-4530-237: Relay output, RS-485, analog output
- AD-4530-247: Relay output, RS-232C, analog output

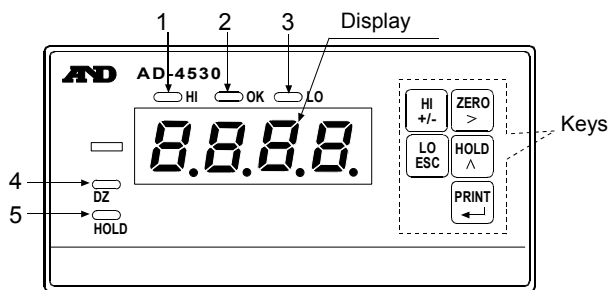
Note: Only one option can be installed in the AD-4530 at a time.

4.2. Installing an option

1. Remove the two screws that secure the guide rail, and then remove the guide rail.
2. Remove the two screws that secure the case.
3. Pull the case out from the front panel (holding it as shown).
4. Remove unnecessary blank panels with nippers, etc.
5. Insert the option board at the position specified on the rear of the front panel.
6. Reattach the case and guide rail by reversing the steps above.



5. FRONT PANEL



5.1. Display

Displays a measured or set value. To set the decimal point position, use function mode **CFDI**. The display is composed of four seven-segment indicators plus a minus sign.

5.2. Status indicators

Name	Description
1 HI	Turns on when the measured value is greater than the upper limit (HI).
2 OK	Turns on when the measured value is equal to or greater than the lower limit and equal to or less than the upper limit.
3 LO	Turns on when the measured value is less than the lower limit (LO).
4 DZ	Turns on when adjusting the digital zero.
5 HOLD	Turns on when a value is being held.

5.3. Keys

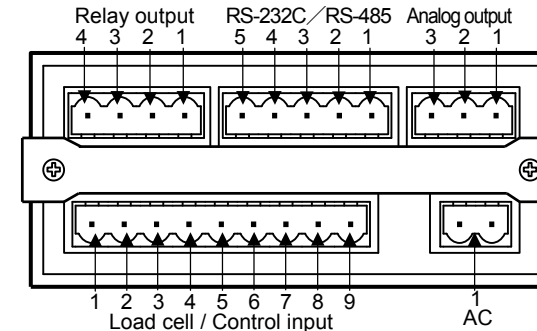
Operation	Function
HI +/-	Press to proceed to upper limit value setting mode. When inputting a numerical value, press to change the polarity.
LO ESC	Press to proceed to lower limit value setting mode. When inputting a numerical value, press to cancel the setting.
ZERO >	Press to turn the digital zero on. When inputting a numerical value, press to shift the position of the blinking digit to the right or change the function group.
HI +/- + ZERO >	Press to turn the digital zero off.
HOLD ^	Press to turn holding on or off. When inputting a numerical value, press to change the blinking digit or change the function parameter.
PRINT ←	Press to output the serial data (print). When inputting a numerical value, press to enter the setting.
HI +/- + PRINT ←	Press to proceed to calibration mode.
LO ESC + PRINT ←	Press to proceed to function selection mode.
HI +/- + LO ESC + PRINT ←	Press to proceed to selection mode in check mode.

* To change the digital zero operation, use the function **CFDI**.
 To protect against accidental operation, press **HI +/-** + **ZERO >** or press and hold **ZERO >** for more than 1 second to turn the digital zero on.

5.4. Operation mode

- Upper / lower limit setting mode
Use this mode to set the upper and lower limit of the comparator.
- Calibration mode
Use this mode to perform zero and span calibration with an actual load.
- Function setting mode
Use this mode for setting functions.
- Check mode
Use this mode to confirm input and output operation.

6. REAR PANEL



CAUTION

Confirm the terminal numbers when making connections.
 ■ When making connections, confirm the terminal numbers printed on the side of the terminal block and on the top of the indicator casing.

6.1. Connector function

6.1.1 AC input connector

- (1) AC Connect the AC power cord.
The power requirement is 100 VAC to 240 VAC, 50/60 Hz.

CAUTION

When making connections,
 ■ Switch off the power of all the instruments used
 ■ Keep cables away from power cables and other sources of electrical noise

6.1.2 Load cell / Control input connector

- Load cell
- (1) SHLD Connect the shielded cable of the sensor cable.
 - (2) SIG- Negative signal input terminal for the sensors.
 - (3) SIG+ Positive signal input terminal for the sensors.
 - (4) EXC- Negative excitation terminal for the sensors.
 - (5) EXC+ Positive excitation terminal for the sensors.
- Control input
- (6) COM Input common terminal.
 - (7) LATCH Inputs the latching signal for the function settings and outputs.
 - (8) HOLD Inputs the hold signal.
 - (9) ZERO Inputs the zero correction signal.

6.1.3 Relay output connector (Option)

- (1) COM Relay output common terminal
- (2) LO Relay LO output terminal
Outputs LO when the measured value is less than the lower limit.
- (3) OK Relay OK output terminal
Outputs OK when the measured value is equal to or greater than the lower limit and equal to or less than the upper limit.
- (4) HI Relay HI output terminal
Outputs HI when the measured value is greater than the upper limit.

CAUTION

Comparator output
 ■ To prevent damage, do not exceed the rated capacities of the output relays.
 To protect the output relays, use a varistor, CR circuits or diodes.

6.1.4 Serial communication connector (Option)

- In the case of RS-232C
- (1) IC Connected internally (Do not use)
 - (2) IC Connected internally (Do not use)
 - (3) SG Signal ground terminal
 - (4) TxD Sending terminal
 - (5) RxD Receiving terminal
- In the case of RS-485 (Two-wire connection)
- (1) B B terminal
 - (2) A A terminal
 - (3) SG Signal ground terminal
 - (4) B B terminal
 - (5) A A terminal

* Each of the A and B connections has two terminals. These terminals are connected internally and can be used for a terminating resistor or multi-drop connection.

6.1.5 Analog output connector (Option)

- (1) COM Common terminal of the analog output
- (2) IOUT Analog current output terminal
- (3) VOUT Analog voltage output terminal

7. CALIBRATION

The AD-4530 measures voltage signals from sensors and displays the values. Calibration is performed so that it performs correctly.

The decimal point (*CFD1*), minimum scale value (*CFD2*) and rated capacity (*CFD3*) are set using function mode. The zero point input voltage (*CFD4*), the span input voltage (*CFD5*) and the display value for the span input voltage (*CFD6*) are set using calibration mode. Calibration setting by function mode is also available. (Digital calibration)

- * During calibration, maintain a stable environment or a calibration error may occur.
- * You can confirm stabilization by confirming that the **HOLD** LED is on.
- * The decimal point blinks to indicate that a number is being displayed, not a measured value.

7.1. Calibration Modes

In measurement mode, press **HI +/-** + **PRINT** to enter calibration mode.

PRINT Enter zero point calibration mode.

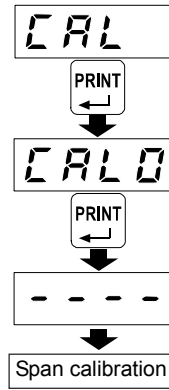
LO ESC Return to measurement mode.

7.1.1. Zero point calibration mode
With nothing on the load cell, wait for it to stabilize, and then press **PRINT**.

PRINT Perform zero point calibration, and proceed to span calibration mode.

LO ESC Cancel zero point calibration, and proceed to span calibration mode.

HI +/- Hold to display the mV/V of the zero point.



7.1.2. Span calibration mode
Add the actual load for span calibration to the load cell, and then input the value to be displayed when the load is loaded.

After stabilization, press **PRINT**.

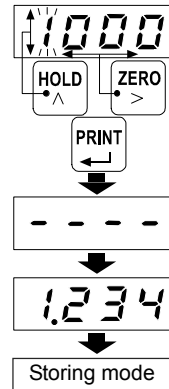
ZERO > Select the digit to be changed.

HOLD ^ Increase the value of the digit to be changed.

HI +/- Change the polarity.

PRINT Perform span calibration, and proceed to storing mode.

LO ESC Cancel span calibration, and proceed to storing mode.

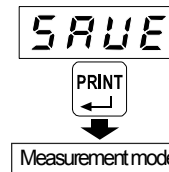


* After the span calibration, the AD-4530 displays the mV/V value of the span calibration for 3 seconds, and then proceeds to storing mode.

7.1.3. Storing calibration mode
Store the calibration zero, span and displayed value acquired. When calibration was not performed, data is not stored.

PRINT Store the data acquired, and return to measurement mode.

LO ESC Do not store the data acquired, and return to measurement mode.



7.2. Calibration Error

Display	Cause	Remedy
C E2	Voltage at zero point calibration was too far in the positive direction.	Confirm the rating and connection of the load cell.
C E3	Voltage at zero point calibration was too far in the negative direction.	

Display	Cause	Remedy
C E4	The value of the calibration weight exceeds the rated capacity.	Use a proper calibration weight.
C E5	The value of the calibration weight is less than the minimum scale value.	Use a proper calibration weight.
C E6	The load cell sensitivity is insufficient.	Confirm the load cell connection. Use a proper calibration weight.
C E7	Voltage at span calibration is less than the zero point.	Confirm the load cell connection.
C E8	When adding a load of the rated capacity, the load cell output voltage is too high.	Use a load cell with a greater rated capacity or set a smaller rated capacity value.

8. FUNCTION MODE

Use function mode to set various functions and data. The set values are saved in non-volatile memory and are maintained even if the power is switched off.

8.1. Structure of Functions

The first 2 digits of the Function No. are the function group. The last 2 digits of the Function No. are the function item.

- CF** Calibration function
- FO** Basic function
- F1** Comparator function
- F2** Analog output function
- F3,F4** Serial communication function

- * Set the zero point input voltage (*CFD4*), the span input voltage (*CFD5*) and the display value for the span input voltage (*CFD6*) in calibration mode.
- * Set the upper limit value (*F101*) and lower limit value (*F102*) in comparator mode.
- * When setting a function, the decimal point blinks to indicate that a number is being displayed, not a measured value.

8.2. Key operation

In measurement mode, press **LO ESC** + **PRINT** to enter function selection mode.

8.2.1. Function selection mode

- ZERO >** Select the function group. (First 2 digits)
- HOLD ^** Select the function item. (Last 2 digits)
- PRINT** Enter setting changing mode.
- LO ESC** Save the setting in non-volatile memory, and then return to measurement mode.

8.2.2. Setting changing mode (Two methods)

- P** Parameter selection method (All digits blinking)
 - HOLD ^** Change the parameter.
 - PRINT** Enter the setting and return to function selection mode.
 - LO ESC** Cancel the setting and return to function selection mode.
- D** Digital input method (Change the blinking digit only)
 - ZERO >** Move the digit to be changed to the right.
 - HOLD ^** Change the value of the blinking digit.
 - HI +/-** Change the polarity.
 - PRINT** Enter the setting and return to function selection mode.
 - LO ESC** Cancel the setting and return to function selection mode.

8.3. Function Items

8.3.1. Calibration (C function)

Function No. Setting range	Function	Description	Default value Setting type
<i>CFD1</i> 0 to 3	Decimal point position	Decimal point position of the measured value 0: 0.0000 2: 0.000 1: 0.000 3: 0.000	0 P
<i>CFD2</i> 1 to 50	Minimum scale value	Minimum division (d) of the measured value 1: 1 10: 10 2: 2 20: 20 5: 5 50: 50	1 P
<i>CFD3</i> 1 to 9999	Rated capacity	Measurement is possible up to the value of this setting plus 8 d (8 minimum divisions) Decimal point position depends on <i>CFD1</i> .	7000 D
<i>CFD4</i> -7.000 to 7.000	Input voltage of zero point	Input voltage from the load cell at zero point (Unit: mV/V)	0000 D
<i>CFD5</i> 0.001 to 9.999	Input voltage of span	Input voltage from the load cell at span (measurement point - zero point) (Unit: mV/V)	7000 D
<i>CFD6</i> -9999 to 9999	Display value for input voltage of span	Display value for span (measurement point - zero point) Decimal point position depends on <i>CFD1</i> .	7000 D
<i>CFD7</i> 0 to 100	Zero adjustment range	Range to enable zero adjustment by the ZERO key Expressed in percent of the rated capacity with the calibration zero point as the center	100 D
<i>CFD8</i> 0.0 to 5.0	Zero tracking time	Performed in combination with zero tracking width. (Unit: second) When 00, zero tracking is not performed.	00 D
<i>CFD9</i> 0.0 to 9.9	Zero tracking width	Performed in combination with zero tracking time. (Unit: 0.1 d) When 00, zero tracking is not performed.	00 D
<i>CF10</i> 0 to 2	Power on zero	Digital zero when turning power on 0: Digital zero off 1: Perform digital zero again 2: Use state when the power was turned off	0 P
<i>CF11</i> 1 to 3	Zero operation	1: On with ZERO > 2: On with HI +/- + ZERO > 3: On by pressing and holding ZERO > for more than 1 second * In all settings: When it is on, Off with HI +/- + ZERO >	1 P
<i>CF12</i> 1 to 2	Zero of the I/O input	1: On / Off depends on the I/O input 2: Only digital zero on (no off)	1 P

8.3.2. Basic Functions

Function No. Setting range	Function	Description	Default value Setting type
<i>FO01</i> 0000 to 1111	Disable key	Each digit of the setting corresponds to a key switch. Only available in measurement mode. Key assignment 0: Enabled 1: Disabled 0 0 0 0 PRINT HOLD ^ ZERO > HI +/- + LO ESC	0000 (Binary) D
<i>FO02</i> 0 to 11	Digital filter	Cutoff frequency 0: Off 1: 2.5 Hz 2: 2.0 Hz 3: 1.5 Hz 4: 1.0 Hz 5: 0.7 Hz 6: 0.5 Hz 7: 0.35 Hz 8: 0.25 Hz 9: 0.20 Hz 10: 0.15 Hz 11: 0.10 Hz	4 P
<i>FO03</i> 0 to 4	Hold mode	0: Off 1: Sample hold 2: Peak hold 3: Bottom hold 4: Bipolar peak hold	1 P
<i>FO04</i> 0000 to 1111	Latch function	Function corresponds to an external input latch. Setting and latch assignment 0: Off 1: On 0 0 0 0 Display value latch Comparator latch Analog output latch Serial output latch	0000 (Binary) D

* If you want to confirm the measured value when setting the digital filter (*FO02*), press **HI +/-**.

When the measured value is displayed, the **OK** LED blinks and the display can be set to zero by pressing **ZERO >**.

Press **HI +/-** to return the setting display.

8.3.3. Comparator

Function No. Setting range	Function	Description	Default value Setting type
<i>F101</i> -9999 to 9999	Upper limit value	Upper limit value of comparator. Decimal point position depends on <i>CFD1</i> .	0000 D
<i>F102</i> -9999 to 9999	Lower limit value	Lower limit value of comparator. Decimal point position depends on <i>CFD1</i> .	0000 D
<i>F103</i> 0 to 2	Comparator mode	0: Off 1: On when the measured value is not near zero 2: Always on	2 P
<i>F104</i> -9999 to 9999	Near zero	Set the near zero range for comparator mode.	0000 D
<i>F105</i> 1 to 3	Hysteresis mode	Hysteresis direction 1: Upward 2-level judgment 2: Upper / lower limit judgment 3: Downward 2-level judgment	2 P
<i>F106</i> 0.0 to 5.0	Hysteresis time	Set the hysteresis time by units of 0.1 seconds. When 00, the hysteresis is not used.	00 D
<i>F107</i> 00 to 99	Hysteresis width	Set the hysteresis width to a two-digit value. When 00, the hysteresis is not used.	99 D

8.3.4. Analog

Function No. Setting range	Function	Description	Default value Setting type
<i>F201</i> -9999 to 9999	0 V output	Measured value at DAV 0V output. Decimal point position depends on <i>CFD1</i> .	0000 D
<i>F202</i> -9999 to 9999	10 V output	Measured value at DAV 10V output. Decimal point position depends on <i>CFD1</i> .	1000 D
<i>F203</i> -9999 to 9999	4 mA output	Measured value at DAI 4 mA output. Decimal point position depends on <i>CFD1</i> .	0000 D
<i>F204</i> -9999 to 9999	20 mA output	Measured value at DAI 20 mA output. Decimal point position depends on <i>CFD1</i> .	1000 D

8.3.5. Serial Communication

Function No. Setting range	Function	Description	Default value Setting type
<i>F301</i> 2.4 to 38.4	Baud rate	24: 2400 bps 48: 4800 bps 96: 9600 bps 192: 19200 bps 384: 38400 bps	24 P

<i>F302</i> 7 to 8	Data bit length	7: 7 bits 8: 8 bits	7 P
<i>F303</i> 0 to 2	Parity	0: None 1: Odd 2: Even	2 P
<i>F304</i> 1 to 2	Stop bit	1: 1 bit 2: 2 bits	1 P
<i>F305</i> 1 to 2	Terminator	1: CRLF 2: CR	1 P
<i>F306</i> 1 to 2	Communication mode	1: Stream 2: Manual print	2 P
<i>F307</i> 00 to 99	Model No.	ID that is added to the serial output When setting to 00, the ID is not added.	00 D
<i>F401</i> <i>F402</i> <i>F403</i> <i>F404</i> <i>F405</i> 00 to 7F	Unit character1 Unit character2 Unit character3 Unit character4 Unit character5	Unit character added to serial output. Set with the hexadecimal ASCII code. All characters after 00 are ignored.	00 00 00 00 00 (Hexadecimal) D

8.3.6. Error

Display	Cause	Remedy
Ad E	The data cannot be acquired from A/D converter.	Repair is required.
EEPE	Correct data cannot be read from EEPROM.	Perform initialization. If the initialization does not clear the error, repair is required.
CALE	Calibration data error.	Perform calibration.
dt E	A setting value is out of range.	Check setting values and correct if necessary.

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