AD-4421

Weighing Indicator

Simplified Instruction Manual

A&D Company, Ltd.

1WMPD4005321

Detailed Instruction Manual

This manual provides simplified precautions and operating instructions for AD-4421. For further information about the AD-4421, please refer to the separate detailed instruction manual which are available for download from the A&D website (https://www.aandd.jp).

Introduction

The AD-4421 is a weighing indicator that can convert signals from strain gauge load cells to weighing values and outputs them.

- Segment LCD display with character height of 14.5mm and display resolution of ±999999.
- High speed AD conversion of 1200 times/second and digital filter enable high speed and accuracy weighing.
- Cutout 138x68 mm panel mount type with IP65 protection on the front panel.
- Equipped with a code memory function that stores 100 types of setpoint values and accumulation results.
- PC can update the settings via USB port.

Safety Precaution

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

For safe and correct usage, read the following precautions carefully before using the indicator.

⚠ WARNING

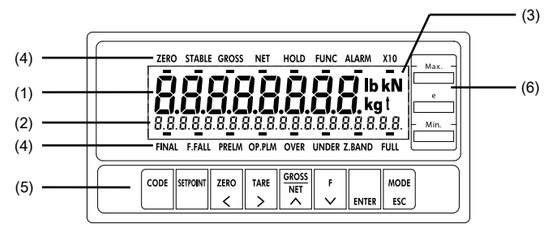
- Provide an external safety circuit to the indicator so that the safety of the whole system can be secured even if errors occur in the external power supply or in the indicator.
- This indicator must be used indoors. Do not use the indicator in the following environment:
  -where the temperature and the humidity exceed the specifications
  -where corrosive gases or flammable gases exist
  -where the indicator gets wet with oil, chemicals or water
- Please note that securing the indicator to the control panel will provide the indicator outside of the control panel the IP65 protection.
- When installing or removing the indicator, be sure to turn off all the external power supplies used beforehand.
- When wiring the indicator, be sure to turn off all the external power supplies used beforehand.
- Be sure to earth ground the indicator.

⚠ CAUTION

- Do not clamp control wires or communication cables with power lines, or do not place them close to power lines.
- Place the load cell cable sufficiently away from high frequency circuits such as high voltage power lines and inverter load circuit.
- When the front cover have dirt, wipe them with wet soft cloth. Do not use organic solvent such like benzine, thinner and alcohol. Doing so may result in deformation or discoloration of the unit.
- Suitable for use at pollution degree of 2 or less.
- Use within an altitude of 0 to 2000m
- To an external connection port other than AC power supply terminal and AC input/output terminal, connect the circuit separated from a dangerous voltage by a double/reinforced insulation.
- This product's Overvoltage Category is Category II.

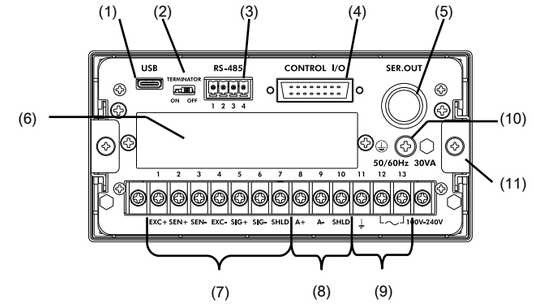
Part Names

Front panel



No.	Name	
(1)	Main display	
(2)	Sub display	
(3)	Unit display	
(4)	Status Display	Upper ZERO, STABLE, GROSS, NET, HOLD, FUNC(FncF-05), ALARM, X10
		Lower FINAL, F.FALL, PRELM, OP.PLM, OVER, UNDER, N.BAND, FULL
(5)	Key Switches	[CODE], [SETPOINT], [ZERO / ←], [TARE / →], [GROSS|NET / ↑], [F / ↓], [ENTER], [MODE / ESC]
(6)	Rating label (Accessory)	

Rear panel



No.	Name
(1)	USB Type-C connector
(2)	Switch for termination resistor of RS-485
(3)	RS-485 connector
(4)	Control I/O connector
(5)	SER.OUT (Standard serial output) connector
(6)	Option slot
(7)	Load cell input terminal block
(8)	Optional analog output terminal block
(9)	AC power input terminal block
(10)	Protective conductor terminal
(11)	Slide rail

Accessories (AD-4421)

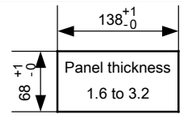
Name		A&D Part Number	Qty
Terminal block cover		1074005384-4	1
Terminal block cover securing screw		11702FN-S3X6	2
Connector for the control I/O	Connector	1JI361J016-AG	1
	Connector cover	1JI360C016-B	1
Connector for the serial out		1JATCP0576	1
Connector for the RS-485		1JIMC1.5/4-ST	1
Panel mount packing		1063038193B	1
Rating label		1084063608	1

Accessories (AD4421-01)

Name		A&D Part Number	Qty
Connector for the BCD output	Connector	1JI361J040-AG	1
	Connector cover	1JI360C040-B	1

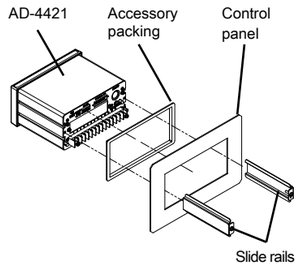
Mounting to Control Panel

Make a hole in a control panel as shown below.



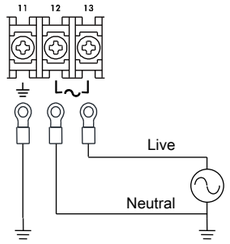
Unit: mm

Remove the slide rails on both sides and insert the AD-4421 with the accessory packing through the hole into the panel.



Insert the slide rails from behind.
(Recommended torque:0.4 Nm)

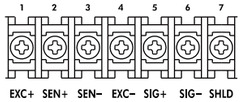
Connection to Power Supply



No.	Symbol	Description
11	⏚	Ground terminal
12	~	AC power input (Neutral) Earthed conductive part
13		AC power input (Live) Unearthed conductive part

Use a solderless terminal with a width of 6.2 mm or less.

Connection to Loadcell

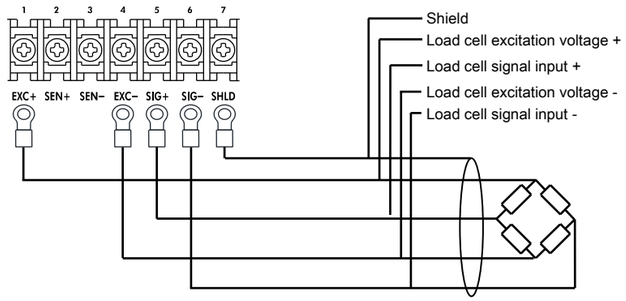


No.	Symbol	Description
1	EXC+	Load cell excitation voltage +
2	SEN+	Sensing input +
3	SEN-	Sensing input -
4	EXC-	Load cell excitation voltage -
5	SIG+	Load cell signal input +
6	SIG-	Load cell signal input -
7	SHLD	Frame ground

Use a solderless terminal with a width of 6.2 mm or less.

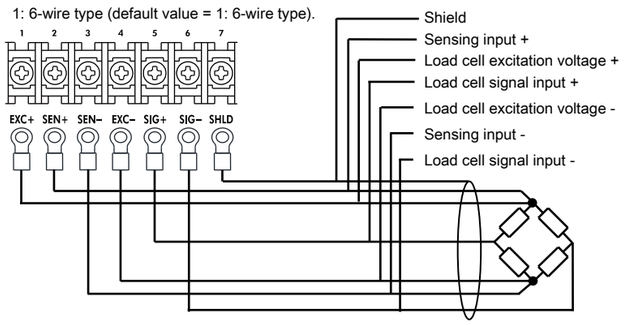
- In case of 4-wire connection type

Change the load cell connection type (CALF-25) in the calibration function to 0: 4-wire type (default value = 1: 6-wire type).

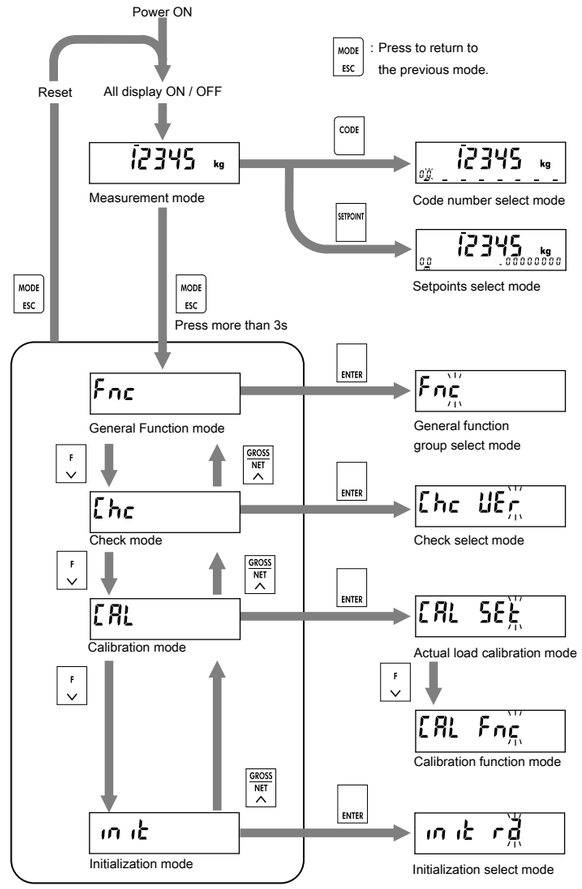


- In case of 6-wire connection type

Change the load cell connection type (CALF-25) in the calibration function to 1: 6-wire type (default value = 1: 6-wire type).



Operation mode



Calibration

Calibration the AD-4421 so that it can properly convert the signal from the load cell to a load value. Please prepare a calibration weight.

Shifts to actual load calibration mode according to the operating mode.

Press [ENTER] key to execute Zero calibration.

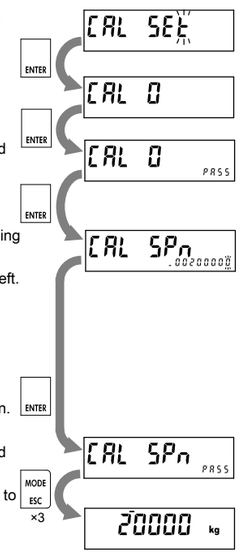
If the calibration is successful, "PASS" is displayed on the sub display, Zero calibration is complete.
Press [ENTER] key.

Set the weight value by operating the keys according to the following.

- [ZERO / ←] key: Moves the blinking digit to the left.
- [TARE / →] key: Moves the blinking digit to the right.
- [GROSS|NET / ↑] key: Adds a blinking digit.
- [F / ↓] key: Subtracts a blinking digit.

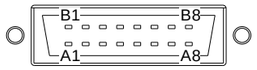
After setting, place the weight on the load cell.
Press the [ENTER] key to execute span calibration.

If the calibration is successful, "PASS" is displayed on the sub-display, Span calibration is completed.
Press the [MODE / ESC] key three times to return to the measurement mode.



CONTROL I/O

CONTROL I/O

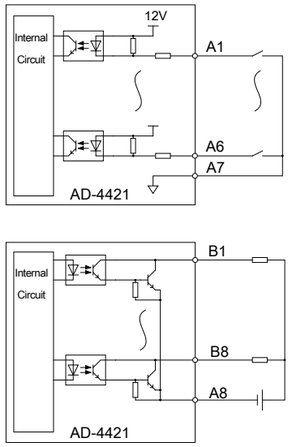


Connector for the control I/O is provided with AD-4421.

Pin Assignment

Pin No.	Description	Description	Pin No.
A1	Control input	Control output	B1
A2	Control input	Control output	B2
A3	Control input	Control output	B3
A4	Control input	Control output	B4
A5	Control input	Control output	B5
A6	Control input	Control output	B6
A7	Input common	Control output	B7
A8	Output common	Control output	B8

Connection Diagram



Control input
- ON voltage: 1 V or less
- ON current: 3 mA or more
- OFF current: 1 mA or less

Control output
- Maximum load voltage: 30 VDC
- Maximum load current:
  50 mA/point
- Voltage drop at ON: 1 V or less
- Leakage current at OFF:
  0.1 mA or less

Standard Serial (Current Loop) Output

SER.OUT

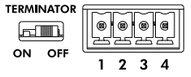
Pin Assignment

Pin No.	Description
1	NC
2	Frame ground
3	Current loop output No polarity
4	NC
5	Current loop output No polarity
6	NC
7	NC
Shell	Frame ground

Connector for the serial out is provided with AD-4421.

RS-485

RS-485



Connector for the RS-485 is provided with AD-4421.

Applicable wire

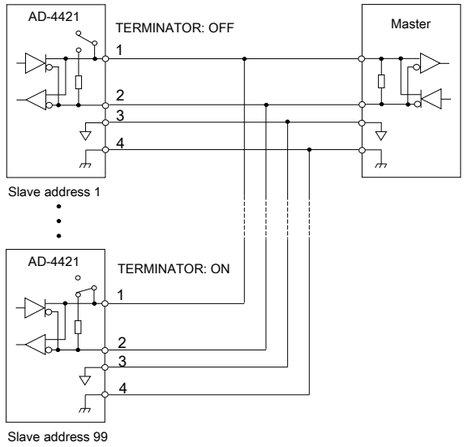
Item	Specifications
Wire size	0.14 to 1.5 mm² (AWG 26 to 16)
Wire strip length	7 mm
Tightening torque	0.22 to 0.25 Nm

Pin Assignment

Pin No.	Description
1	DATA+
2	DATA-
3	SG
4	FG

Switch for termination resistor of RS-485
If TERMINATOR set ON, then enables the terminating resistor (100Ω).

Connection Diagram



USB

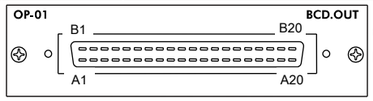
USB

USB allows backup of settings and logging of measured values on a PC with a dedicated Windows application.
Please download the dedicated Windows application from the A&D website (https://www.aandd.jp).

Communication specification

USB Specification	Connector	Type-C
	Communication	USB 2.0 (Full-speed) virtual COM port
	Power	5V 3.0A at using bus power
Communication protocol		Modbus RTU
Slave address		1
Baud rate		115200bps
Data length / Parity / Stop bit		8bits / None / 1bit

Option BCD output AD4421-01

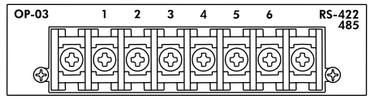


Connector for the BCD output is provided with AD4421-01.

Pin Assignment

Pin No.	Description	Description	Pin No.
A1	1	2	B1
A2	4	8	B2
A3	10	20	B3
A4	40	80	B4
A5	100	200	B5
A6	400	800	B6
A7	1000	2000	B7
A8	4000	8000	B8
A9	10000	20000	B9
A10	40000	80000	B10
A11	100000	200000	B11
A12	400000	800000	B12
A13	OFF: Overload	ON: Positive OFF: Negative	B13
A14	ON: Stable	ON: Net value OFF: Gross or Tare value	B14
A15	Decimal point position		B15
A16	A15=ON, B15=ON, A16=ON, B16=ON: None A15=OFF, B15=ON, A16=ON, B16=ON: 0.0 A15=ON, B15=OFF, A16=ON, B16=ON: 0.00 A15=ON, B15=ON, A16=OFF, B16=ON: 0.000 A15=ON, B15=ON, A16=ON, B16=OFF:0.0000		B16
A17	Unit A17=OFF, B17=OFF: None or kg A17=OFF, B17=ON : t A17=ON B17=OFF : lb or kN A17=ON, B17=ON : g or N		B17
A18	Strobe output	Hold input	B18
A19	Common	Common	B19
A20	Frame ground	Frame ground	B20

Option RS-422/485 AD4421-03

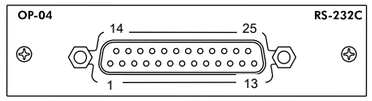


Use a solderless terminal with a width of 6.2 mm or less.

Pin Assignment

No.	Description
1	Send data +
2	Send data -
3	Receive data +
4	Receive data -
5	Open-circuit: Disable the terminal resistor Short-circuited to No. 4: Enable the terminal resistor
6	Signal ground

Option RS-232C AD4421-04

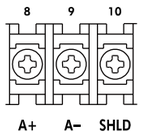


The applicable connector is a D-sub 25-pin male connector. The locking screw is M2.6. The connector is not provided and must be prepared by the user.

Pin Assignment

Pin No.	Description
1	FG
2	RXD
3	TXD
4	CTS
5	RTS
6	DTR
7	GND
8	DCD
9 to 19	NC
20	DSR
21 to 25	NC

Option Analog 4-20 mA / 0-10V output AD4421-07

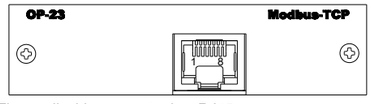


Applicable solderless terminal: R1.25-3
Applicable wire size:
0.3 to 0.75 mm2. Use a 2-wire shielded twisted pair cable.
External load resistance:
600 Ω or less (for current output),
1kΩ or more (for voltage output)

Pin Assignment

No.	Symbol	Description
1	A+	Analog output +
2	A-	Analog output -
3	SHLD	Frame ground

Option Modbus-TCP AD4421-23



The applicable connector is a RJ45.
The connector is not provided and must be prepared by the user.

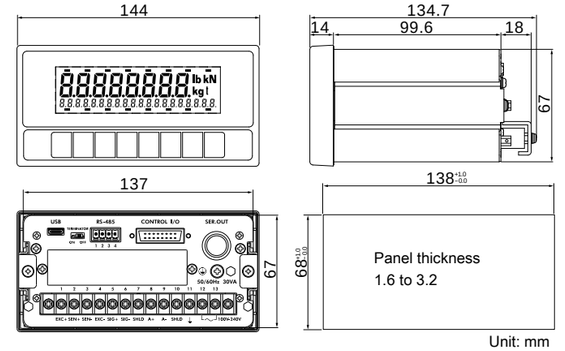
Pin Assignment

Pin No.	Description (Fixed to MDI)
1	Send data +
2	Send data -
3	Receive data +
4	NC
5	NC
6	Receive data -
7	NC
8	NC

Specification

Dimension		144 (W) x 72 (H) x 134.7 (D) mm
Operating temperature and humidity range		-10 to 40°C Less than 85%RH, non-condensing
IP rating		When the indicator is secured to the control panel: Outside of the control panel: IP65 Inside of the control panel: IP2X
Power supply		
	Power supply voltage	AC 100 to 240 V +10% -15% 50/60 Hz ±5%
	Maximum apparent power	30 VA
	Rush current	AC 115 V: 25 A or less, AC 230 V:45 A or less
	Fuse	Internal (Not user replaceable)
Load cell input		
	Excitation voltage	DC5V ±5% 120 mA Up to eight 350 Ω load cells can be connected in parallel. 6-wire type with remote sensing
	Signal input range	-7.0 to 7.0 mV/V
	minimum input sensitivity	0.15 μV/d or more (d = minimum division)
	Nonlinearity	0.005% of F.S. Max.
	Temperature coefficient	Zero drift: ±0.02 μV/°C Typ. ±0.1 μV/°C Max. Span drift: ±3 ppm/°C Typ. ±15 ppm/°C Max.
	Sampling rate	1200 times/s
Display		
	Main display	Segment LCD, character height 14.5 mm, 8 digits
	Sub display	Segment LCD, character height 5 mm, 20 digits
	Unit	g, kg, t, lb, N, kN or none (selectable)
	Status display	16
Key switches		8
Standard interface		
	Control I/O	Non-voltage contact input: 6 points NPN open collector output: 8 points
	Standard serial output	Current loop output
	RS-485	2-wire RS-485
	USB	USB 2.0 (Full-speed), Virtual COM Port
Option interface		
	BCD output	A dedicated slot is available only for analog 4-20 mA / 0-10V output. Among other option boards, only one can be installed.
	RS-422/485	
	RS-232C	
	Modbus-TCP	
	Analog 4-20 mA / 0-10V output	

External dimension



Unit: mm

FCC - Supplier's Declaration of Conformity
47 CFR § 2.1077 Compliance Information
Model: AD-4421
Responsible Party: A&D ENGINEERING, INC.
Address: 4622 Runway Boulevard Ann Arbor, MI 48108, U.S.A.
Tel: [1] (888) 726-5931
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.