# Weighing Indicator

# Simplified Instruction Manual

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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.

## 

- 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.

# 

- 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.





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 / $\leftarrow$ ], [TARE / $\rightarrow$ ], [GROSS NET / $\uparrow$ ], [F / $\downarrow$ ], [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-1121)				

Name	A&D Part Number	Qty	
Terminal block cover	1074005384-4	1	
Terminal block cover securing screw	11702FN-S3X6	2	
Consector for the constant VO	Connector	1JI361J016-AG	1
Connector for the control I/O	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	
Comparison for the DOD surfacet	Connector	1JI361J040-AG	1
Connector for the BCD output	Connector cover	1JI360C040-B	1

# 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 Loadcell

Mounting to Control Panel

below

Make a hole in a control panel as shown

1	2	3	4	5	6	7
EXC+	SEN+	SEN-	EXC-	SIG+	SIG-	SHLD
Use	a sol	derle	ss te	rmina	al with	na

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

 $138^{+1}_{-0}$ 

Unit: mm

Control

panel

Slide rails

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





## 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 he operating mode.		[ 81	SE <u></u> Ľ	
Press [ENTER] key to execute Zero calibration.	ENTER	[ 81	0	
f the calibration is successful, "PASS" is displayed on the sub display, Zero calibration is complete. Press [ENTER] key.	ENTER	[ RL	0	P 8 5 5
Set the weight value by operating the keys according o the following.	g	[ RL	5 <b>P</b> <u>n</u>	០០០ឆ្គ័
<ul> <li>[TARE / →] key: Moves the blinking digit to the right.</li> <li>[GROSS NET / ↑] key: Adds a blinking digit.</li> <li>[F / ↓] key: Subtracts a blinking digit.</li> </ul>				
After setting, place the weight on the load cell. Press the [ENTER] key to execute span calibration.	ENTER			
f 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	MODE	[81	5Pn	P 8 5 5
he measurement mode.	×3	20	000	kg

## CONTROL I/O

## CONTROL I/O

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

Control input

- ON voltage: 1 V or less

- ON current: 3 mA or more

- OFF current: 1 mA or less

#### 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





#### Standard Serial (Current Loop) Output

SER.OUT



Pi	in 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
TERMINATOR	
ON OFF	1 2 3 4

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

Applicable wire

-				
Item		Specifications		
	Wire size	0.14 to 1.5 mm <sup>2</sup> (AWG 26 to 16)		
	Wire strip length	7 mm		
	Tightening torque	0.22 to 0.25 Nm		

#### Pin Assignment

<u> </u>		
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 (100 $\Omega$ ).

#### Connection Diagram



## 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	Туре-С	
	Communication	USB 2.0 (Full-speed) virtual COM port	
	Power	5V 3.0A at using bus power	
Communication protoc	col	Modbus RTU	
Slave address Baud rate Data length / Parity / Stop bit		1	
		115200bps	
		8bits / None / 1bit	

#### Option BCD output AD4421-01

OP-0	01		BCD.O	UT	
	Г	B1 B20	. Т		Connector for the BCD output is
	0		0	ℍ	provided with AD4421-01.
		A1 A20	_		

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= A15=OFF, B15=ON, A16 A15=ON, B15=OFF, A16 A15=ON, B15=OFF, A16 A15=ON, B15=ON, A16= A15=ON, B15=ON, A16=	B16	
	A17	Unit A17=OFF, B17=OFF: No A17=OFF, B17=ON : t A17=ON B17=OFF : lb o A17=ON, B17=ON : g o	ne or kg r kN r 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 -		Send data +	
		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 Description Pin No. FG 1 2 RXD TXD 3 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

8	9	10	
ЪД	рд	рд	
M	M	$\overline{\sim}$	
억	벋		
J	Ь-Ц	Ь-Ц	
A+	A-	SHLD	

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  $\Omega$  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

S

pecification				
Dimension	144 (W) x 72 (H) x 134.7 (D) mm			
Operating temperature and	-10 to 40°C			
humidity range	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%			
Power supply voltage	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				
	DC5V ±5% 120 mA			
Excitation voltage	Up to eight 350 $\Omega$ 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	$0.15 \mu\text{V/d}$ 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				
	Non-voltage contact input: 6 points			
Control I/O	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			
RS-422/485	mA / 0-10V output.			
RS-232C	Among other option boards, only one can be			
Modbus-TCP	installed.			
Analog 4-20 mA / 0-10V	1			
output				

External dimension



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.