C-sdAMP

Compact Sensor Digital Amplifier

User's Manual

Sensor is source of technology

Easy Measure Co., Ltd.

For Your Safety

In order to use correctly and safely, please be sure to observe the following.

■The meaning of the symbols used in this document are as follows.

⚠ **Warning**	Follow the description, or it may cause injury.

⚠ **Causion**	Follow the description, or it may cause damage.

■Warning Notes

⚠ **Warning**

● Use in a gas

Do not operate or keep the product in flammable or explosive gas or vapor.

● AC Adaptor

To prevent electric shock or fire, use the AC Adaptor that comes with the product.

● Power

Check the power voltage before connecting the power to the product.

● Power Code

Do not put heavy objects on the power code and keep it away from heat sources. Damaged code may cause electric shock or fire.

●Connection

To present electric shock or product failure, turn the power off before connecting to the measuring object or to the external equipment.

● Short-curcuit

Ground and common of some signals and connectors can be internally connected. When multiple signal sources or equipment are used, please pay attention to short-circuit via the connection.

● Excessive Input

Do not apply excessive voltage or current to the input terminals.

It may cause damage, fire, or electric shock.

● Disassembly/Modification

Do not disassemble or modify the product. It may cause electric shock, fire, or damage.

⚠ **Warning**

● In case of emergency

In the following cases, stop using, and turn the power off. Then, contact us, our sales office, or our sales agent:

- Water or other foreign matter gets inside the product.
- Flame, smoke, or strange smell comes out of the product.
- Product housing or other parts are damaged.

⚠ **Caution**

● Operation/Storage Environment

In order to use the product safely and correctly, do not use the product in the following places exposed to:

- ・Humidity
- ・Dust
- ・Direct Sunlight
- ・High Temperature
- ・Vibration and Shock
- ・Water, Oil, and Chemicals.
- ・Corrosive, Flammable, Explosive Gasses
- ・Strong Electric Noise

Please choose a location close to the room temperature and where temperature change is small to opeate or store the product.

● Connection

To prevent malfunction or reduce measurement errors by noise, keep the product and its connecting cables away from noise sources such as high-volatage or power cables.

Introduction

Thank you for purchasing ***C-sdAMP***.

This docment explains functions, operations, handling precautions of ***C-sdAMP*** and its "Setting Application." To utilize the functions of this product fully, please read carefully before use, and keep this document in a safe place so that you will find it whenever you need.

■General Precautions

- When carrying the product, make sure to disconnect the cables.
- In transportation or operation, do not give a shock to the product. It may cause failure.
- Check if the functions and performances are normal, before putting the product in operation.
- If the product is used out of the standard written in the specifications, or if the product is modified, we cannot guarantee the functions/performances.
- Please consider that the product may no satisfy its functions/performances, depending on the conditions of use or environment.
- Please use various measures to prevent damages considering cases if the product fails.

■Warranty

The product has been manufactured under strict quality control and shipped after proper inspection. In case of failure or malfunction, however, please contact our sales agent or our sales office.

The warranty period is 12 months. For the failure or malfunction during the time, and if the cause is found as our responsibility, we will repair it free of charge.

■Notes

- We shall not be responsible for any failure or malfunction cause by misuse of the customer or a third party, or for the damages caused by the use of the product (business loss, business interruption, change or loss of the stored content, or others).
- The specifications, design, and price described in this document, may be changed without notice for improvement.
- Company names, product names noted herein may be trademarks or registered trademarks of respective companies.
- The whole or any part of the document shall not be copies or reproduced without permission.

Please check the package contents.

Please check the product and accessories before use. If any mistake, insufficiency, or abnormality is found, please contact the agent or the sales office where the product is purchased.

S-dAMP(Strain Gause) - Package Items

	Items	PCS
1	***S-dAMP***(Strain Gause Input)	1
2	User's Manual (This document)	1
3	Warranty Certificate	1

T-dAMP (Thermocouple) - Package Items

	Items	PCS
1	***T-dAMP***(Thermocouple Input)	1
2	User's Manual (This document)	1
3	Warranty Certificate	1

PC Connection Kit - Package Items

	Items	PCS
1	Serial/USB Conversion Connector	1
2	USB Cable	1
3	Setting Software (CD)	1
4	User's Manual (This document)	1
5	Warranty Certificate	1

- Content -

General

C-sdAMP converts strain gauge/transducer or thermocouple signal into a voltage signal (±5V).

1. Function Overview and Features

C-sdAMP is a very small (25mm square) digital amplifier for instrumentation. There are two types: ***S-dAMP*** (Strain Gauge) and ***T-dAMP*** (Thermocouple). The product converts the input signal, and can be connected to PC to change its input range or CAL output value by "Setting Application" included in the PC Connection Kit. This chapter explains the functions of the product as well as the functions of "Setting Application."

Input Types and Ranges

Input range can be selected by "Setting Application."

As to ***S-dAMP***, the range can be selected from ±1000με, ±2000με, ±5000με, and ±10000με. The product can also be connected to 120Ω input resistance or 120Ω--1kΩ strain gauge transducer.

As to ***T-dAMP***, the type of thermocouple can be selected from B/E/J/K/N/R/S/T.

The inputs that correspond to the maximum output voltage and the minimum output voltage can be set arbitrarily.

Bridge Function (***S-dAMP*** only)

S-dAMP has a build-in bridge circuit, and can select from single gauge, single gauge/3-wire, two gauge, two gauge/opposite, and four gauge by wiring and jumper pin settings.

Zero Adjustment Function (***S-dAMP*** only)

The zero point can be registered by the switch on the product or by Setting Application.

Calibration Function

The CAL value registered by Setting Application can be outputted.

2. System Block Diagram

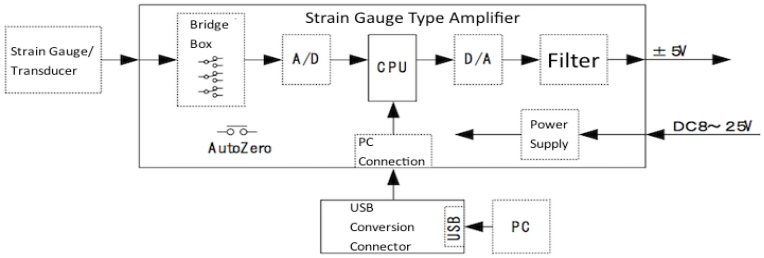


Fig. 1 ***S-dAMP*** (Strain Gauge) Block Diagram

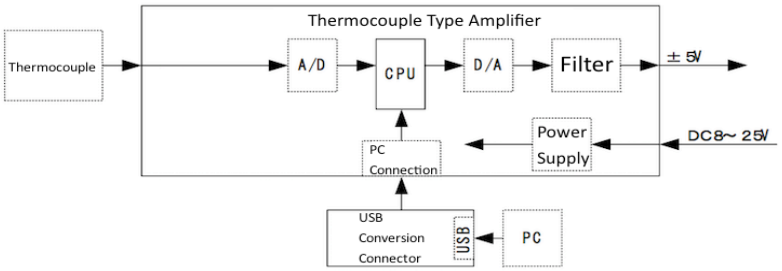


Fig. 2 ***T-dAMP*** (Thermocouple) Block Diagram

3. Connections and Settings

This chapter explains connections and settings of the product. Fig. 3 and 4 are the dimensions of ***S-dAMP*** and ***T-dAMP***.

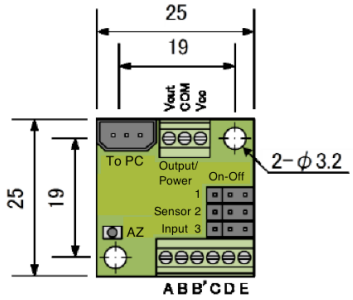


Fig. 3 ***S-dAMP*** Dimensions [mm]

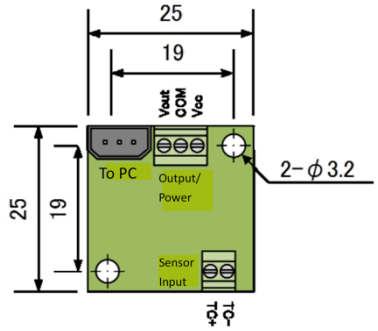


Fig. 4 ***T-dAMP*** Dimensions [mm]

1) Output/ Power

Table 1. Analog Input/Output Connection

Vcc	Power Input (+): DC8--25V
COM	Common Terminal: Power Input (-) and Signal Output (-)
Vout	Signal Output (+): ±5V

2) Sensor

・***S-dAMP***

Table 2. Analog Input/Output Connection

A	Bridge Voltage Output (+)
B	Signal Input (-)
B'	Open
C	Bridge Voltage Output (-)
D	Signal Input (+)
E	Shield

*This connection is for four gauge bridge.

For other connections, refer to "4. Connection for Bridge Box Function."

・***T-dAMP***

Table 3. Analog Input Connection

TC+	Thermocouple Input (+)
TC-	Thermocouple Input (-)

3) Serial/USB Conversion Terminal (To PC)

Via Serial/USB Conversion Terminal (sold separately) the product can be connected to PC to make range setting by Setting Application.

4) AZ Switch (***S-dAMP*** Only)

Read the current input value as Zero Point.

4) Bridge Selection Jumper (***S-dAMP*** Only)

Bridge box function is used by changing jumpers.

Please refer to "4. Connection for Bridge Box Function."

4. Connection for Bridge Box Function

Fig.5-9 shows the connections and jumper settings when the bridge box function is used. Refer to Fig. 3 for the jumbler numbers.

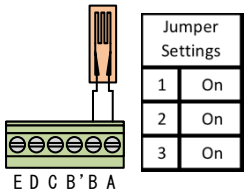


Fig. 5 Single Gauge Bridge

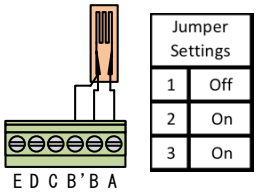


Fig.6 Two Gauge/3-Wire Bridge

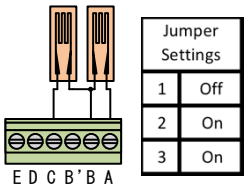


Fig. 7 Two Gauge Bridge

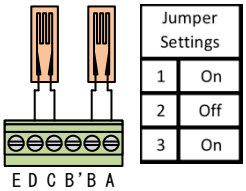


Fig. 8 Two Gauge Opposite

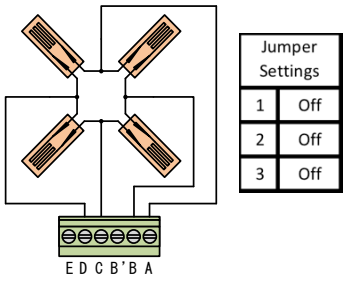


Fig. 9 Four Gauge Bridge

Software Installation

1. Installation of Application Software

Copy “csdamp_app.exe” from the Setting Software CD.

2. Installation of USB Driver

USB Drive must be installed in PC to use “Setting Application,” as shown in the following procedures.

1) Execute “CP210x_VCP_Win2K_XP_S2K3.exe” in Setting Software CD. Then, the screen as shown in Fig. 10 will appear.

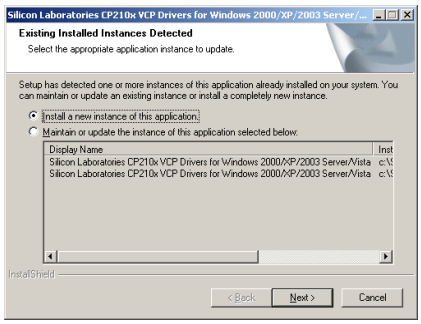


Fig. 10 USB Driver Installation Screen 1

2) Press “Next” in Fig.10 to proceed to the next screen.

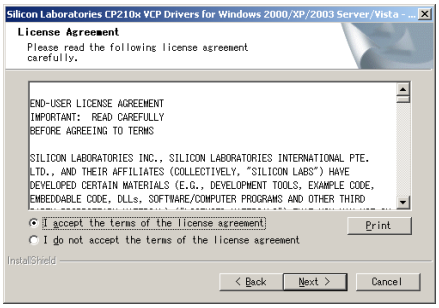


Fig. 11 USB Driver Installation Screen 2

3) Select “I accept ----“ in Fig. 11.

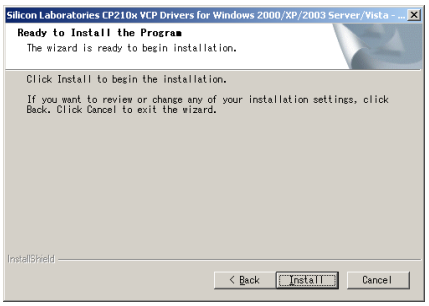


Fig. 12 USB Driver Installation Screen 3

4) Press “Install” in Fig. 12.

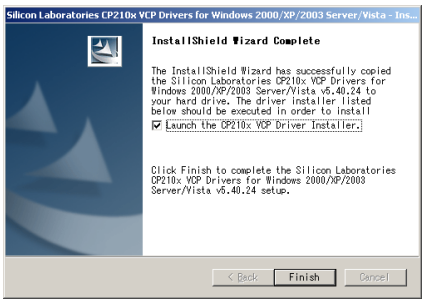


Fig. 13 USB Driver Installation Screen 4

5) Press “Finish” in Fig. 13.

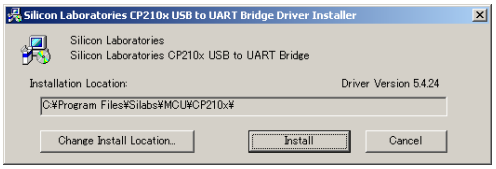


Fig. 14 USB Driver Installation Screen 5

6) Press “Install” in Fig. 14, and then concludes this operation.

Terminal Block Connections

Terminal Block Connections

This chapter explains about output/power, and sensor input connections to the product.

As shown in Fig. 15, insert the wire to the connector, and fasten the screw with a driver from above to fix the wire. If a stranded wire is used, make sure to twist it before inserting.

The applicable wire is 0.14mm^2--0.5mm^2 and the strip length is 4.5mm.

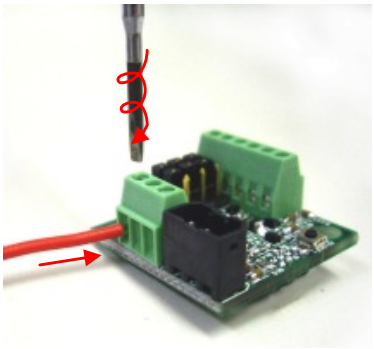


Fig. 15 Terminal Block Connections

Operation of Setting Application

Operation of Setting Application

Connect ***C-sdAMP*** and PC that has installed "Setting Application" with Serial/USB Conversion Connector, and start "csdamp_app.exe" with the power supplied to the product (See Fig. 16 and Fig. 17). First, open USB (Virtual) COM Port to communicate with the product.

Setting Application will recognize the type of sensor when COM Port is opened.

1) Open/Close COM Port

Select COM Port where *C-sdAMP* is connected, and "Open" button opens the port. The opened port can be closed by "Close" button.

2) Type of Sensor Input

Type of sensor connected to ***C-sdAMP*** is displayed: Strain or TC.

3) Update Rate

The output update rate can be selected.

S-sdAMP: 2,000SPS/500SPS/100SPS

T-sdAMP: 50SPS/20SPS

Press "Read" button to read the current settings, and "Write" button to write the settings to the product.

4) AutoZero (***S-dAMP*** Only)

Read the current input value as Zero Point.

5) CAL On

The voltage corresponding the CAL value is outputted from the analog output. Press "CAL On" button again to stop the voltage output.

6) Input Range

The input range can be set. Press "Read" button to read the current settings, and "Write" button to write the settings to the product.

7) DA MAX Value

The input value corresponding to the maximum output (+5V) can be set. Press "Read" button to read the current settings, and "Write" button to write the settings to the product.

8) DA MIN Value

The input value corresponding to the minimum output (-5V) can be set. Press "Read" button to read the current settings, and "Write" button to write the setting to the product.

9) CAL Out Value

The CAL value can be set. If "CAL On" button is pressed, the voltage corresponding this setting is outputted from the analog output. Press "Read" button to read the current settings, and "Write" button to write the settings to the produce.

10) Read Button

Read out the current settings of the product to PC.

11) Write Button

Write the PC settings to the product.

12) Monitoring ON

"Monitoring ON" button will start the monitoring function; the input, the output, and the waveform are displayed. To stop the monitoring function, press "Monitoring ON" again.

"Start Logging" button will open the save dialog box, and the monitored data can be stored in CSV file. This data logging function can be used only when the monitoring function is on.

The data monitoring and logging rate is fixed to 10SPS regardless of the update rate setting.

13) Waveform Monitoring

The input waveform is displayed when the monitoring function is on. If the AutoScale box is checked, the waveform scale is automatically set.

If not checked, the waveform is displayed using the specified max and min values. The upper box is for the maximum scale value, and the lower box is for the minimum scale value.

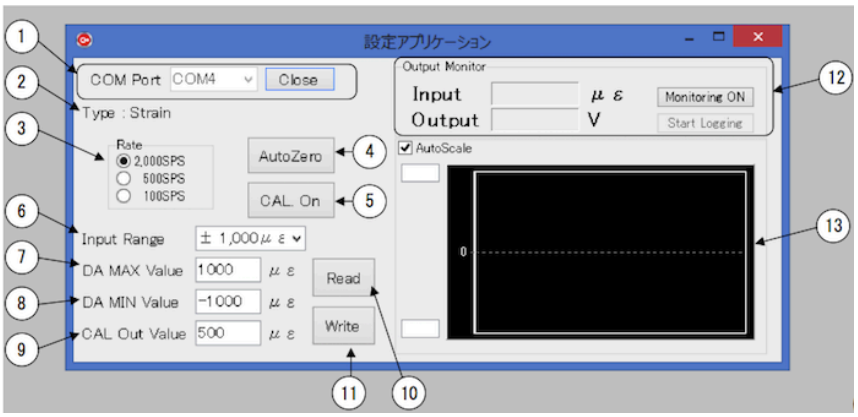


Fig. 16 Application Screen (***S-dAMP***)

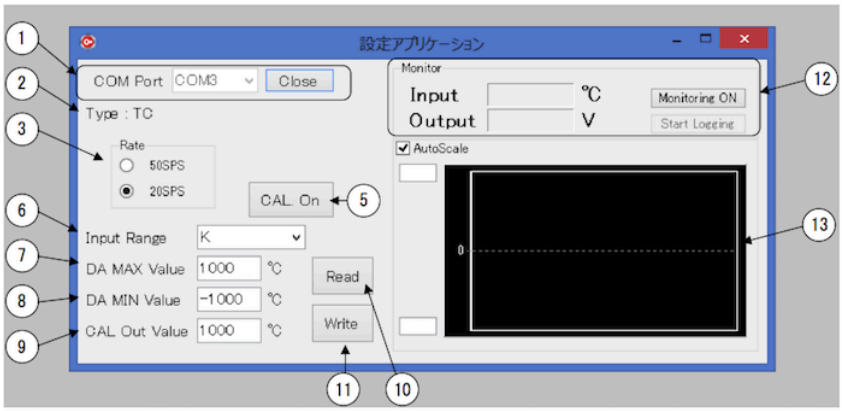


Fig. 17 Application Screen (***T-dAMP***)

Specifications

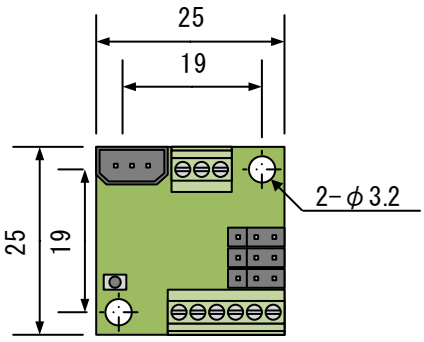
1. Product Specifications

Model		*S-dAMP*	***T-dAMP***
Input	Number of Channels	Single Channel	
	Connecting Sensor	Strain Gauge and transducer	Thermocouple
	Input Sensor Type	Single Gauge/ 2 or 3 Wire (120Ω) Two Gauge (120Ω) Four Gauge (120Ω -- 1kΩ)	B/E/J/K/N/R/S/T
	Measurement Range	±1,000με -- ±10,000με	Whole Temp. Range (JIS)
	Bridge Voltage	DC2V	-
	Input Connection	Screw Terminal	Screw Terminal
	Response Speed	2,000 Times/ S 500 Times/ S 100 Times/ S	50 Times/ S 20 Times/ S
Output	Number of Channels	Single Channel	
	Output Voltage	±5V	
	Output Connection	Screw Terminal	
	Low-pass Filter	Cutoff Characteristics : -18dB/OCT	Cutoff Characteristics : -18dB/OCT
		Cutoff Frequency: 1kHz	Cutoff Frequency: 10Hz
Non-linearity		0.1%FS	
Time Delay		< 1.3msec (2,000 Times/ S) < 3.5msec (500 Times/ S) < 15msec (100 Times/ S)	< 50msec (50 Times/ S) < 90msec (20 Times/ S)
Zero Adjustment	Adjustment Method	On-board SW or PC	-
	Adjustment Range	< 1/2 x Range	-
Calibration Function	Calibration Method	PC	
	Calibration Value	Registered by Setting Software	
PC Interface	Connection	Serial/USB Conversion Connector	
	Functions	Input range setting, CAL value setting, AutoZero Operation, CAL Operation.	Input range setting, CAL value setting, CAL Operation.
Power	Supply Voltage	DC 8 – 25V	
	Consumption Current	30mA typ.	
Dimensions / Weight		W25 x D25 x H14 mm/ about 8g	
Operating Environment		Temp.: 0 –60 ℃ Humidity: 5 –85% RH (No condensation)	

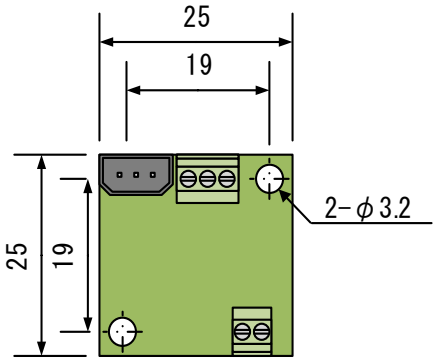
2. Setting Application Specifications

Supported PC	DOS/V Compatible
	CPU: Pentium4 1GHz or higher
	RAM: 1GB or more
Supported OS	Windows XP/Vista/7/8
Main Functions	Update Rage, Input Range, Full Scale Values, CAL Value.
	Zero Value Register, CAL Voltage Output.
	Data Monitoring, Data Logging (Save)

3. Dimensions



S-dAMP Dimensions [mm]



T-dAMP Dimensions [mm]

--------Warning ----------

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Please contact us if you have found any unclear points, errors, and insufficiency.

C-sdAMP User's Manual

April 21, 2015 3rd Edition

Sensor is source of technology

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