

E51.D7S Series Piezo Controller

User Manual

Version: V1.0



This document describes the following products:

- E51.D7S Servo controller SGS sensor 7 channels

DECLARATION

Declaration!

This user manual is a integrated user manual of the E51.D7S series piezoelectric controller. Please read this user manual carefully before using this controller. Follow the instructions in the manual during use. If there is any problem, please contact us for technical support. If you do not follow this manual or disassemble and modify the product yourself, the company will not be liable for any consequences arising therefrom.

Please read the following to avoid personal injury and to prevent damage to this product or any other product connected to it. In order to avoid possible hazards, this product can only be used within the specified range.

Notice!

Do not touch any exposed ends of the product and its accessories.

There is high voltage inside. Do not open the case without permission.

Do not connect or disconnect input, output, or sensor cables with power on.

Please keep surface of E51.D7S clean and dry, don't operate in humid or static environment.

After use, output voltage should be cleared to zero before turning off the controller switch, such as switching the servo state to the open-loop state.

Danger!

The piezoelectric power amplifier described in this manual is a high-voltage device capable of outputting high currents, which can cause serious or even fatal damage if not used properly.

It is strongly recommended that you do not touch any parts that connect to the high voltage output.

Special Note: If you connect it with other products in addition to our company, please follow the general accident prevention procedures.

Operating the high-voltage amplification requires training professional operators.

Warning!

If the voltage exceeds the PZT's tolerable range, it will cause permanent damage to the PZT. Before adding voltage to the PZT poles, it must be ensured that the positive and negative poles of the PZT are connected correctly and the operating voltage is within the allowable range of this PZT.

Cautious!

E51.D7S housing should be installed on a horizontal surface in an area with a 3CM air flow area to prevent internal convection in the vertical direction.

Insufficient airflow can cause equipment to overheat or premature instrument damage.

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1.Security

1.1 Introduction

- ▶ Please keep surface of E51.D7S clean and dry.
- ▶ Do not operate in the humid or static environment.
- ▶ E51.D7S is used to drive capacitive loads (such as piezo actuators).
- ▶ E51.D7S should not be used in user manuals of other products of the same name.
- ▶ Pay special attention that E51.D7S cannot be used to drive resistive or inductive loads.
- ▶ E51.D7S could be used for static and dynamic operating applications.

1.2 Safety Instructions

E51.D7S is based on the national safety standard. Improper use may cause personal injury or damage to the piezo controller. The operator is responsible for the correct installation and operation of the piezo controller.

- ▶ Please read the user manual in detail.
- ▶ Please eliminate any faults and potential safety hazards caused by the faults.

If the protective ground wire is not connected or connected incorrectly, there will be a possibility of leakage. If you touch the E51.D7S piezo controller, it may cause serious or even fatal injuries.

If the piezo controller housing is opened without permission, touching the live parts may cause electric shock, resulting in serious or even fatal injury or damage to the piezo controller.

▶ Only authorized professional technicians with corresponding qualifications could open the piezo controller.

- ▶ When opening E51.D7S series controller, please disconnect the power plug.
- ▶ Please do not touch any internal parts when operating under bare conditions.

1.3 Notes

▶ The contents in the user manual are all standard descriptions, and the customized parameters are not explained in detail in this manual.

▶ The latest user manual is available for download on CoreMorrow website.

▶ When operating the E51.D7S, the user manual should be placed near the system for easy reference in time. If the user manual is missing or damaged, please contact CoreMorrow customer service department.

- ▶ Please timely add all the information given in the manufacturer's user manual, such as

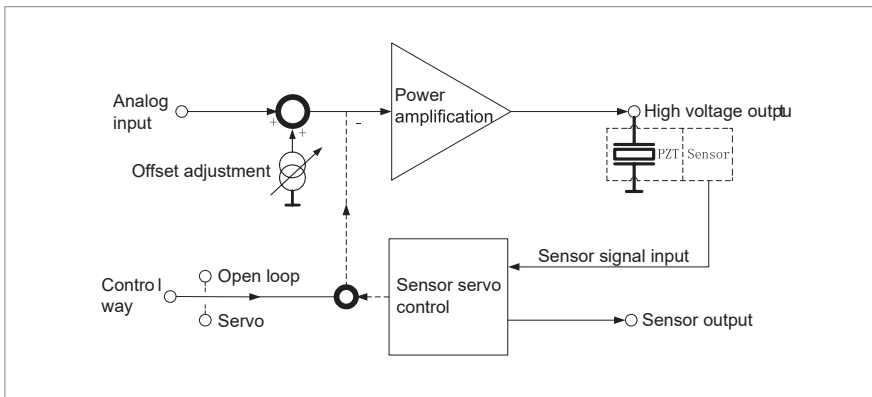
supplements or technical descriptions.

- ▶ If your user manual is incomplete, it will miss a lot of important information, cause serious or fatal injuries, and cause property damage. Please read and understand the content in the user manual before installing and operating the E51.D7S.
- ▶ Only professionals who are authorized to meet the technical requirements could install, operate, maintain and clean the E51.D7S.

2. Introduction

- ▶ 7 channels controlled
- ▶ DC 24V power supply
- ▶ Peak current 180mA
- ▶ Ave current 25mA
- ▶ Unload bandwidth 1KHz
- ▶ Rs-422 communication control

3. Driving Principle





4.Open-Box Inspection

The E51.D7S controller has been checked for electrical and mechanical aspects prior to shipment. When you receive the device, unpack the package and check whether the surface of the device is damaged.If there is damage which may have occurred during shipment, please contact Coremorrow in time.Check whether all accessories are complete according to the packing list. Please take good care of the original packaging for subsequent maintenance.



5.Installation

5.1 Installation Notes

Attention! Improper installation of the E51.D7S can result in personal injury or damage to the E51.D7s!

- ▶ The E51.D7S shall be installed close to the power supply, so that the power plug can be quickly disconnected from the main power supply.
- ▶ Connect the E51.D7S with the supplied power line.
- ▶ If the original power line must be replaced,please use a power line of sufficient size and be effectively grounded.

5.2 Ensure Ventilation

Attention! Ensure ventilation. Overheating of equipment due to high temperatures may damage the equipment.

- ▶ Ensure that the heat dissipation area is adequately cooled.
- ▶ Make sure there are adequate ventilation areas.
- ▶ Maintain ambient temperature to non-critical level (<50°C).
- ▶ If the temperature is more than 50°C, . It is recommended to take external heat dissipation measures to improve the stability of the controller.

5.3 Power Supply

Use the power adapter to connect to the E51.D7S power supply.

5.4 Cable Connection

- ▶ When the power supply is disconnected, the swing mirror cable is connected to the E51. D7S controller interface. Note that the number of the piezoelectric actuator corresponds to the number of the controller.
- ▶ Connect the RS-422 interface via cable to a computer or other device with RS-422 interface.

6. Appearance

6.1 Front Panel



Symbol	Function	Description
POWER	Latching switch	Power switch. Press power to turn on the green light. Power off, lights off.
CH1 H2	DB15-HD	6 DEGREES of freedom subtable connector.

6.2 Rear Panel

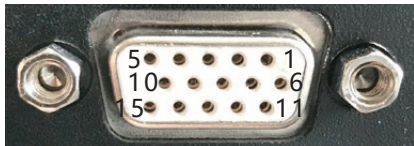


Symbol	Function	Description
24V DC	DC-044B-J(2.5)	Power connector socket.Connect through a power adapter or a DC power supply.
RS-422	D-SUB 9 hole socket	The computer is connected with the controller interface module through RS-422 port access terminal to realize computer control.

6.3 Interface

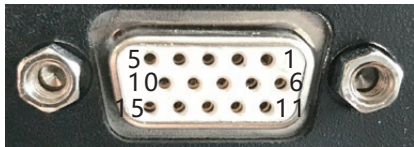
DB15-HD interface

CH1 driving output and sensor connector



No.	Pin definition	No.	Pin definition
1	CH2 drive output	9	CH2 CH3 sensing power supply ground
2	CH3 drive output	10	CH1 sensing power supply ground
3	CH3 sensor input signal -	11	CH1 constant voltage drive output
4	CH3 sensor input signal +	12	CH2 sensor input signal -
5	Sensor power supply: DC 10V	13	CH2 sensor input signal +
6	CH1 drive output	14	CH1 sensor input signal +
7	CH2 CH3 drive output ground	15	CH1 sensor input signal -
8	Constant voltage drive output		

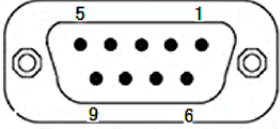
CH2 driving output and sensor connector



No.	Pin definition	No.	Pin definition
1	CH5 drive output	9	CH5 CH6 sensing power supply ground

No.	Pin definition	No.	Pin definition
2	CH6 drive output	10	CH4 sensing power supply ground
3	CH6 sensor input signal -	11	CH4 constant voltage drive output
4	CH6 sensor input signal +	12	CH5 sensor input signal -
5	Sensor power supply: DC 10V	13	CH5 sensor input signal +
6	CH4 drive output	14	CH4 sensor input signal +
7	CH5 CH6 drive output ground	15	CH4 sensor input signal -
8	Do not connect any cable		

RS-422 interface

No.	Pin definition	
1		
2		
3		
4		
5	GND	
6	RS-422 RxD+	
7	RS-422 RxD-	
8	RS-422 TxD-	
9	RS-422 TxD+	

7. Operating Calculation

- Average output (Sine wave operation mode)

$$Pa \approx U_{pp} \cdot U_s \cdot f \cdot C_{piezo}$$

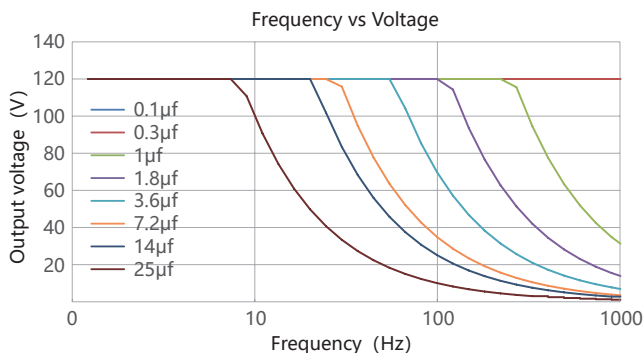
Pa =Average output[W]

C_{piezo} =Piezo actuator capacitance[F]

U_{pp} =Peak and peak drive voltage [V]

f =Operating frequency of the sine wave[Hz]

U_s =Drive voltage[V] ($(V_{s+}) - (V_{s-})$)



8. Maintenance, Storage, Transportation

8.1 Cleaning measures

Note! The PCB board of the function module in the E51.D7S system is an ESD (electrostatic discharge) sensitive device. Take precautions against any static build-up of these devices before use to avoid contact with circuit component leads and PCB wiring. Before touching any electronic components, the body first touches the grounding conductor to discharge static electricity, ensuring that any type of conductive particles (metal, dust or debris, pencil lead, screws) enter the device. Be careful not to drop the equipment when cleaning, to avoid any form of mechanical shock!

- ▶ Disconnect the power plug of the E51.D7S system before cleaning.

▶ Prevent cleaning fluid and any liquid from entering the system module to avoid short circuits.

▶ The surface of the system chassis and the front panel of the module, please do not use an organic solvent for surface wiping.

8.2 Transportation and Storage

▶ This product is packed in carton. Transportation must be carried out under product packaging conditions, and direct rain and snow, direct contact with corrosive gases and strong vibrations should be avoided during transportation.

▶ The instrument can be transported under various conditions of normal transportation, and should avoid damp, load, collision, extrusion, irregular placement and other adverse conditions during transportation.

▶ If the instrument is not used for a long time, the instrument should be packaged and stored.

▶ The instrument should be stored in a non-corrosive atmosphere and in a well ventilated, clean room.

▶ In the process of transportation, storage and use, attention should be paid to fire prevention, shockproof, waterproof and moisture proof.

9. Service and Maintenance

9.1 Disposal

▶ When disposing of old equipment, please abide by the national regulations and local regulations. Please dispose of the old equipment properly. Please contact CoreMorrow for the upgrade and replacement of old equipment in order to meet the customer's handling of system products.

▶ If you have an old device or an unusable device that cannot be handled, you can ship it to the following address: However, the shipping costs will be borne by the sender. We do not accept freight collect shipments.

▶ Address: 1F, Building I2, No.191 Xuefu Road, Nangang District, Harbin, Heilongjiang

9.2 After-sales Service

- ▶ E51.D7S does not contain user repairable components.
- ▶ E51.D7S must be returned to factory for any service and repair.
- ▶ Any part of E51.D7S is dismantled, there will be no warranty service.
- ▶ E51.D7S is a precision instrument which should be handled with care.
- ▶ In case of any problem, please record the problem and contact CoreMorrow to be repaired

by professional technicians.



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