

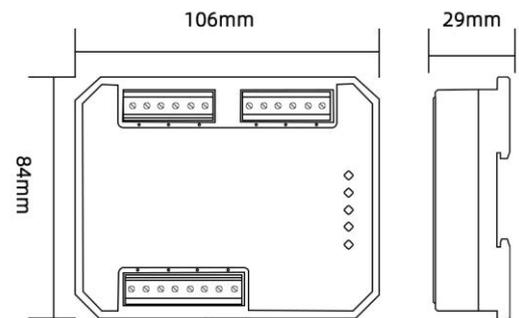
SPS9-TTL Series Differential to Single Ended Module

User Manual



I. Precautions

- Do not operate this product beyond its design limits under any circumstances.
- The power supply for this product is 24V DC. Strictly prohibit the use of 220V AC power.
- This product should be installed in a safe location. The shell's maximum withstand temperature is +85°C.
- When used in environments with strong magnetic interference, Shielded cable is recommended for signal lines.
- Strictly prohibit unauthorized disassembly, modification, or repair of this product.
- Pay attention to the wiring method of this product to ensure correct Wiring and avoid damaging the product.
- Read this manual carefully before installation and use. If you have Any questions, please contact our technical support personnel or refer to relevant technical guidance videos.
- Our company is not responsible for damage to components other than this product during use.
- Please download the latest electronic version of the documentation. The content of this manual is for reference only. We continuously improve the user experience, and technical parameters are subject to change without notice.



II. Product Dimensions

- Product dimensions: **106mm (L) X 84mm (W) X 29mm (H)**
- Industrial-grade flame-retardant plastic shell, standard DIN35 rail mounting.

III. Operating Environment

- Do not expose this product to excessively high or low temperatures.
- The surrounding environment must be free from strong vibration, impact, and electromagnetic interference such as large currents and sparks.
- The operating environment must not contain harmful substances that cause severe corrosion to metal or plastic components. Do not use or store the product in harsh environments, otherwise it will affect the electrical performance of the product.
- Operating Temperature: -40°C ~ +80°C Relative Humidity: 10% ~ 90%RH (non-condensing)

IV. After-Sales Service

We are committed to providing you with comprehensive after-sales service and warranty policy. The product warranty period is three years. During the warranty period, if the product fails due to non-human factors, we will provide free repair or replacement service. Damage caused by violation of operating regulations and requirements will require payment of parts cost and repair fee. After the warranty period expires, we continue to provide technical support and assistance. During this period, replacement parts are provided at cost price.

V. Application Fields



Automation Equipment



Medical Electronics



Remote Monitoring



Process Control

• Product Introduction

SPS9 Series Differential Signal Converter converts differential signals (A+/A-, B+/B-, C+/C-, D+/D-) from devices like servo encoders and optical grating rulers into standard PLC high-speed counting signals (phases A, B, C, D). It is widely used in power, railway, telecommunications, PLC measurement and control systems, and various automated control systems.

SPS9-TTL Series Differential-to-Single-Ended Module is meticulously designed with internal optical coupler isolation between its front and rear stages. Using this signal for closed-loop control significantly enhances signal accuracy. This product is characterized by high precision, high isolation, high speed, and low drift. It is suitable for resolving interface conversion between the differential-mode outputs of rotary encoders/optical grating rulers and microcontrollers/PLC controllers. It can also be applied as a conversion interface for high-speed counter modules and pulse input terminals of various PLCs (including Siemens, ABB, Omron, Mitsubishi, Panasonic, Delta), as well as for signal transmission between motor encoders, optical grating rulers, inverters, and PLC controllers. It is particularly well-suited for motor automatic control applications and related fields.

This product requires independent power supply and adopts DIN 35mm standard rail mounting, enabling simple field installation and flexible deployment for various application environments.

• Technical Parameters

Basic Parameters	
Power Supply	DC12~28V(DC24V recommended)
Power Consumption	< 1.5W
Isolation Voltage	3000VDC
Power Protection	Reverse connection voltage< -40V
Dielectric Strength	1500 VAC / 1 minute (Power, Input, Output)
Insulation Resistance	≥100MΩ (Power, Input, Output)
EMC Compatibility	Complies with GB/T18268.1 (IEC61326-1)
Input Terminal	
Input Signal	2/3/4-Channel Differential Signals
Input Signal Frequency	0~500KHz
Signal Voltage	DC3.5-5V
Output Terminal	
Output Signal	5V Open Collector Single-Ended Signal
Signal Current	≤20mA
Wiring Method	PNP/NPN Wiring
Voltage Drop Requirement	The voltage difference between the positive and negative phases of the same differential pair at the input must be maintained between 3.5V and 5V.
Environmental Conditions	
Operating Temperature	-40°C~+80°C
Storage Temperature	-40°C~+85°C
Relative Humidity	10%~90%RH (non-condensing)
Atmospheric Pressure	80kPa~106kPa

• Product Model Description

Model	Number of Channels
SPS9020TTL	2-Channel Differential to Single-Ended
SPS9030TTL	3-Channel Differential to Single-Ended
SPS9040TTL	4-Channel Differential to Single-Ended

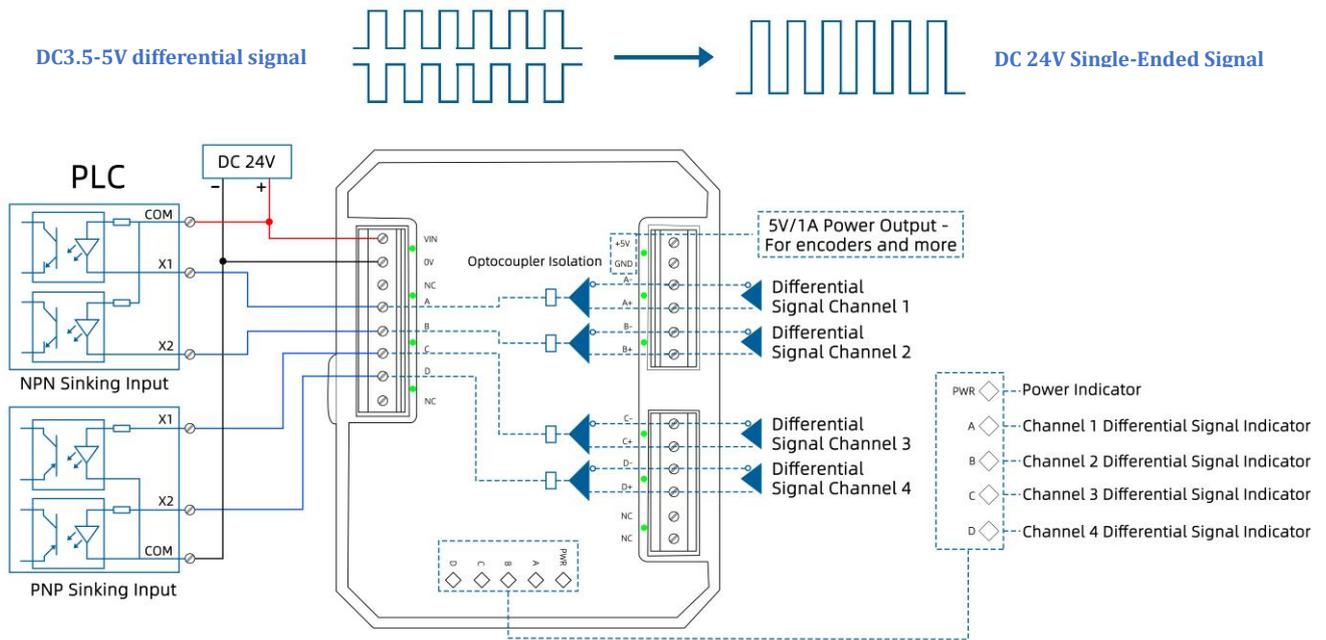
• Terminal Description

Terminal Mark	Function Description
VIN	Power supply positive terminal, DC12-28V input
OV	Power supply negative terminal
NC	No Connection (Empty pin)
A	Channel 1 Push-Pull Signal Output
B	Channel 2 Push-Pull Signal Output
C	Channel 3 Push-Pull Signal Output
D	Channel 4 Push-Pull Signal Output
NC	No Connection (Empty pin)
NC	No Connection (Empty pin)
NC	No Connection (Empty pin)
D+	Channel 4 Signal Input Positive
D-	Channel 4 Signal Input Negative
C+	Channel 3 Signal Input Positive
C-	Channel 3 Signal Input Negative
B+	Channel 2 Signal Input Positive
B-	Channel 2 Signal Input Negative
A+	Channel 1 Signal Input Positive
A-	Channel 1 Signal Input Negative
GND	Power Output Negative
+5V	+5V Power Output Terminal

• Terminal Description

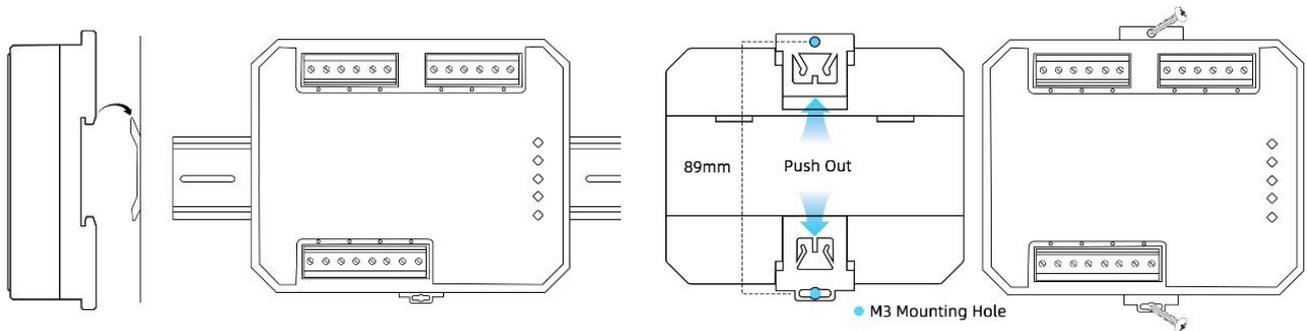
Indicator Mark	Function Description
PWR	Power indicator
A	The LED indicator lights up when Channel 1 push-pull signal is active.
B	The LED indicator lights up when Channel 2 push-pull signal is active.
C	The LED indicator lights up when Channel 3 push-pull signal is active.
D	The LED indicator lights up when Channel 4 push-pull signal is active.

Wiring and Indication



Installation Instructions

This module uses the DIN35mm rail mounting method. The rail should comply with the installation dimension specifications for the TH35-7.5 type rail according to the national standard GB/T19334-2003. Users can easily install or remove the module on the rail. Installation must be stable and secure. This module also supports screw mounting without a rail.



- Installation method of guide rail -

- Screw installation method -