Analog Loop Powered Isolation Amplifier IC

2-wire Passive Loop Powered Analog Signal Isolation Transmitter
ISO U/A/R-O Series

Features

●Unique high efficient loop powered technique, external power supply is not required.
● Designed for various types of analog signal input, loop powered output.
●2-wire, 3-wire, 4-wire sensor active signal amplification and isolated transmission.
● Input terminal accept meters and sensor single or bidirectional voltage or current signal:
0-75mV/0-5V/0-10V/0-±10mV/0-±5V/0-±10V,ect
0-1mA/0-10mA/0-±1mA/0-±20mA/4-20mA, etc.
●Input resistance or potentiometer signal: 0-2KΩ, 0-10KΩ, etc.
● 3kv isolation voltage between analog input loop and current loop output.
●High accuracy and linearity in full measuring range, non-linearity < 0.1%
●Low cost small size SIP 12Pin, standard PCB-mounted.
●Industrial temperature range: -40 ~ +85 ℃, in compliance with UL94V-0 flame-retardant standards.

Applications

●DC current or voltage signal isolation, amplification and conversion.
●Displacement, weight bridge, potentiometer signal acquisition, isolation and control.
●mV small signal to standard 4-20mA analog signal conversion.
● PLC/DCS and meters, sensor signal receiving and transmission.
● System ground wire current loop interference isolation and inhabitation.
●Industrial site analog signal long distance transmission and interference isolation.
● Analog signal transmission between sensor and meters.
● Industrial system analog signal isolation and conditioning. One input two outputs, one input three outputs, one input four outputs, two input two outputs, and three inputs three outputs transmission.

Introduction

ISO U-O（voltage signal）, ISO A-O(current signal), ISO R-O(resistance signal) series are the smallest size low cost passive loop powered analog signal isolation amplifier IC modules. Unique high efficiency loop powered technology has been applied in design the module which enable it works without external power supply. It is powered by the back loop powered output. The IC module can be applied in various types of analog signal input: 2-wire, 3-wire, 4-wire sensor active signals to 4~20mA, 2-10mA, 4-12mA. 4-8mA, 12-20mA,etc 2-wire analog current signals amplification and isolation.

The design of product follows the low cost, small size standards, and adopts SIP12PIN flame-retardant IC package. Inside the product, there are current signal modulation circuit, magneto-electric isolation transform circuit and signal reduction demodulation circuit. Low input equivalent resistance, high linearity. The power modules are convenient to use, which achieve isolated distribution from meters, sensor, transmitter, resistance potentiometers signal to standard 2-wire 4-20ma current loop signal only by adding some peripheral components. Zero and gain can be adjusted by adding external potentiometers. Its isolation withstand voltage between signal input and output is up to 3000VDC and can meet the requirements that operating in industrial field wide temperature, humidity, vibration, etc adverse operation conditions. Loop powered voltage is 15-30V dc voltage, the recommended voltage range is ±10% of the rated voltage value.

Unique magneto-electric isolation mode and high efficient loop powered technology are used to make the modules convert dc voltage, current, potentiometer, resistance signal into standard 2-wire 4-20mA loop powered current signal. The signal transmitter is compatible with the standard analog input terminals, like PLC, DCS, and Digital display meter. It can be used in normal in abominable industrial conditions like wide temperature, humidity and vibration. The signal transmitter has two types of package, small size PCB-mounted package and 35mm DIN rail-mounted package. The 35mm DIN rail-mounted products support 1-input 1-output,

1-input 2-outputs, 1-input 3-output, 2-input 2-output, 3-input 3-output and 8-channel,16-channel V/I isolated conversion functions.

Max. Rate value (Using it at max. rate value affects life time of products, exceeding the max. value may cause permanent damage.)

Continuous Isolation Voltage	3000Vrms
Vin	30VDC
Junction Temperature	- 40 ~ +85 ℃
Storage Temperature	+150℃
Lead Temperature	+300℃
Output Short to Common	Continuous

Note: 1. The module operates in loop powered mode, reference power output current is limited, if input is potentiometer signal, the resistance must ≥2KΩ.

2. The module's operating voltage is 15-30V loop voltage, it's output accuracy may affect by voltage change and load range. To ensure high measuring accuracy, the recommended power supply range is ±10%, load range ±50Ω. When voltage and load value has been changed, user can calibrate accuracy through zero and span potentiometers.

Model Selection & Definition

DIN □X□ ISO U (A/R)□ -O□

35mm DIN Rail-mounted	Input Current/Voltage/Resistance Value				Output
Omitted code: SIP IC	U1:0-5V	U9:0-±10mV	A1:0-1mA	R6:0-2K Ω	O1:4-20mA
DIN1X1: 1-IN 1-OUT	U2:0-10V	U10:0-10mV	A2:0-10mA	R7:0-5K Ω	O2:2-10mA
DIN2X2: 2-IN 2-OUT	U3:0-75mV	U11:0-±20mV	A3:0-20mA	R8: Customized	O3:4-12mA
DIN3X3: 3-IN 3-OUT	U4:0-2.5V	U12:0-±30mV	A4:4-20mA	R9:0-10K Ω	O4:4-8mA
DIN1X2: 1-IN 2-OUT	U5:0-±5V	U20:0-20mV	A5:0-±1mA		O5:12-20mA
DIN1X3: 1-IN 3-OUT	U6:0-±10V	U30:0-30mV	A6:0-±10mA		O8: Customized
. . . . .	U7:0-±100mV	U50:0-50mV	A7:0-±20mA		
DIN3: Small DIN Rail	U8:Customized	U60:0-60mV	A8: Customized		

Model selection examples

E.g.1: Signal input: 0-10mA; signal output: 4-20mA; PCB-mounted.
Model No.: **ISO A2-O1**

E.g. 2: Signal input: 0-5KΩ; signal output: 4-12mA; PCB-mounted.
Model No.: **ISO R7-O3**

E.g.3: Signal input: 0-±5V; signal output: 12-20mA; PCB-mounted.
Model No.: **ISO U5-O5**

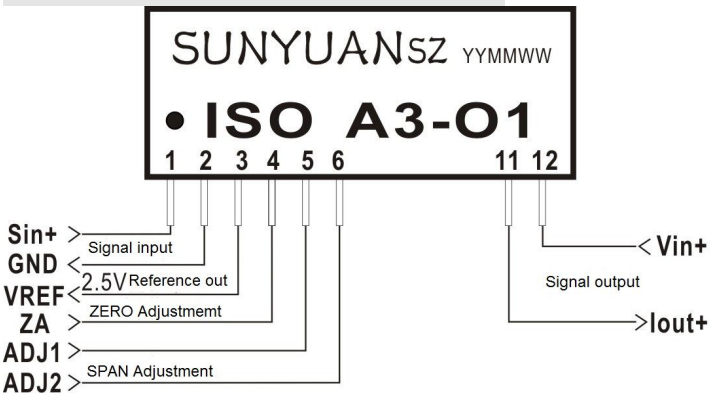
E.g. 4: Signal input: 0-±10V; signal output: 4-20mA; two-input two-output.
Type I standard 35mm DIN Rail-mounted.
Model No.: **DIN 2 X 2 ISO U6-O1**

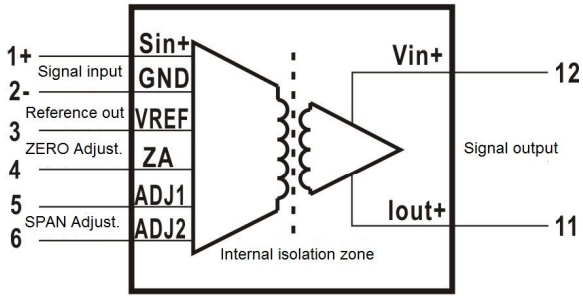
E.g. 5: Signal input: 0-10V; signal output: 4-8mA; one-input one-output.
Small size 35mm DIN Rail-mounted.
Model No.: **DIN 3 ISO U2-O4**

Technical Parameters

Parameters	Test Conditions	ISO U-O / ISO A-O / ISO R-O			Unit
		MIN	TYP	MAX	
Isolation voltage AC, 50Hz	10S		3000		VDC
Insulation resistance	500VDC		100		MΩ
Voltage input impedance	0-5V	100	400		KΩ
Current input impedance	0-20mA	50	125		Ω
Output current linearity		2		24	mA
Gain	IN：0-5V		0.3125		V/mA
Temperature drift	- 40- + 85℃		±100		PPM/℃
Non-linearity		±0.1	±0.2	±0.5	%FSR
Input offset voltage			±2	±5	mV
Input voltage signal		±0.01		±50	V
Input current signal		±1		±50	mA
Input resistance signal		2		50	KΩ
Frequency features	-3dB		100		Hz
Reference voltage	Ireg=2mA	2.475	2.5	2.525	V
Loop powered voltage range		15	24	30	V
Loop powered voltage fluctuate range	Rated volt. power supply		±5	±10	%
Load capacity	24V		250	600	Ω
Response time			20	100	mS

Functional block & Pin Definition

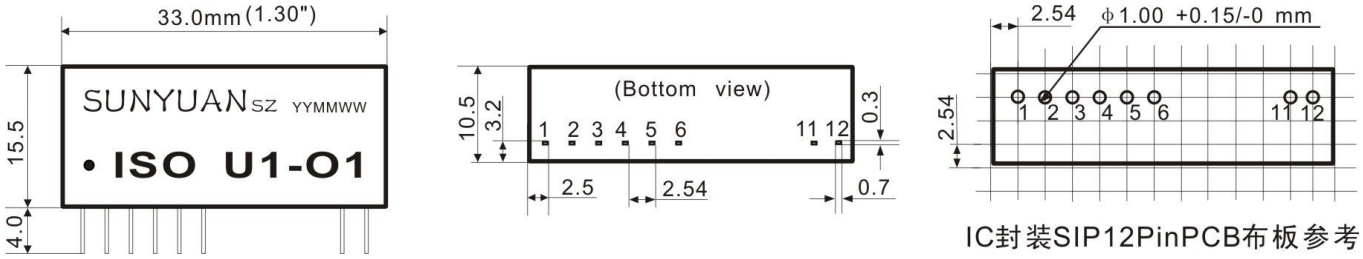




Pin function description (SIP 12Pin)

Signal input +	Signal input-	2.5V Volt. Reference output	ZERO ADJ.	SPAN ADJ. 1	SPAN ADJ. 2	No Connection	Current output+	Voltage input+
SIN+	GND	VREF	ZA	ADJ1	ADJ2	NC	Iout+	Vin+
1	**2**	**3**	**4**	**5**	**6**	**7~10**	**11**	**12**

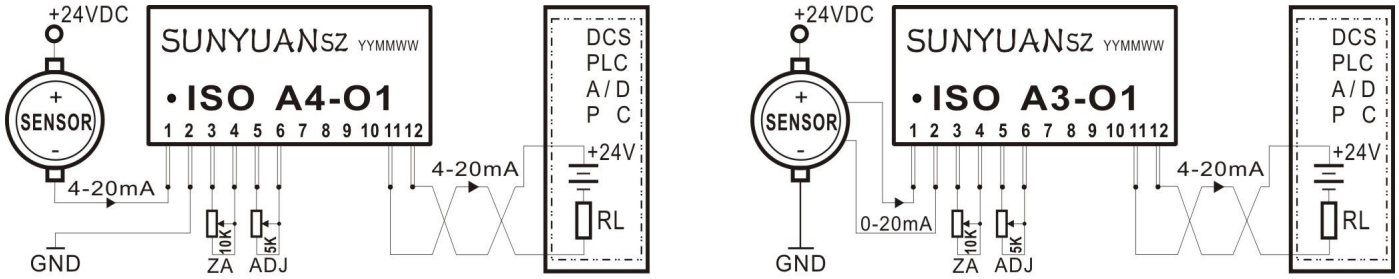
Dimension & PCB Layout



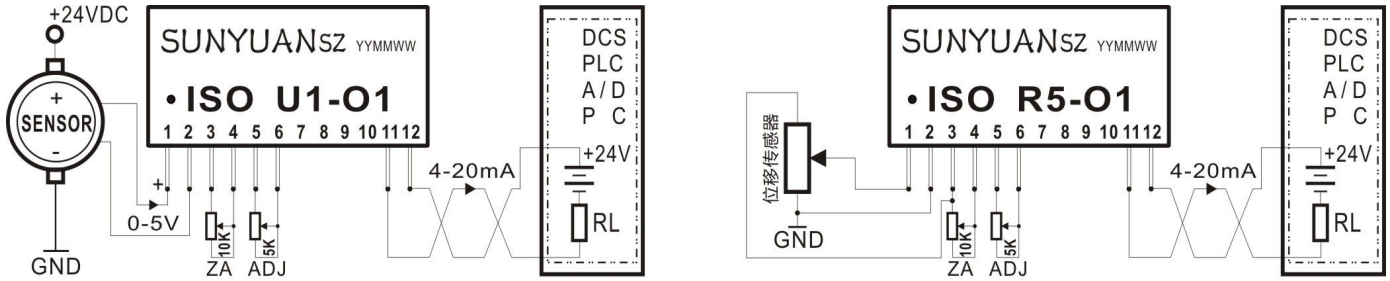
IC封装SIP12PinPCB布板参考

Typical application cases

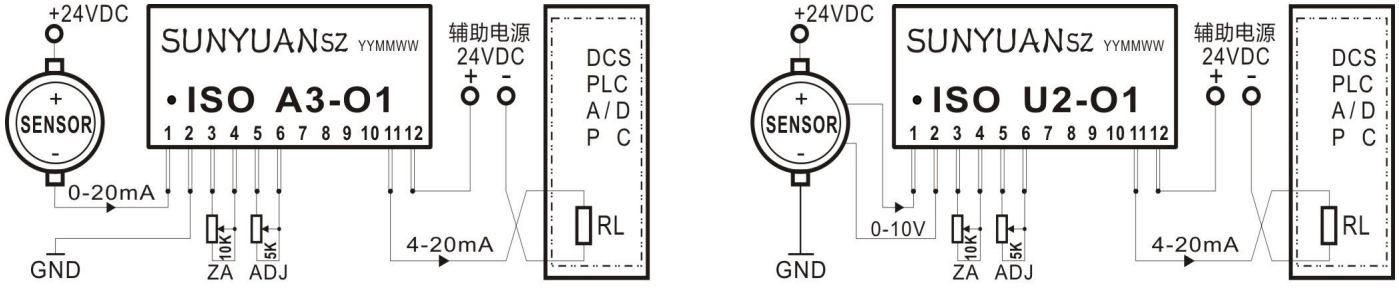
I. 2-wire and 4-wire sensor active current signal input amplification and conversion (2-wire loop powered output).



II. Voltage, displacement, potentiometer and resistance signal isolated transmission (2-wire loop powered output).

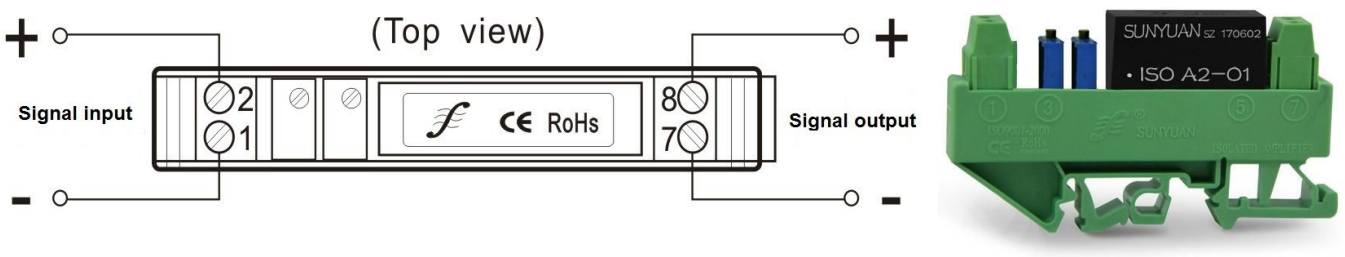


III. PLC, DCS, etc analog signal terminal non-active terminal data acquisition (separate external auxiliary power supply current loop output mode)



DIN3 ISO U-O / DIN3 ISO A-O Series single channel low cost small size standard DIN35 rail mounted type

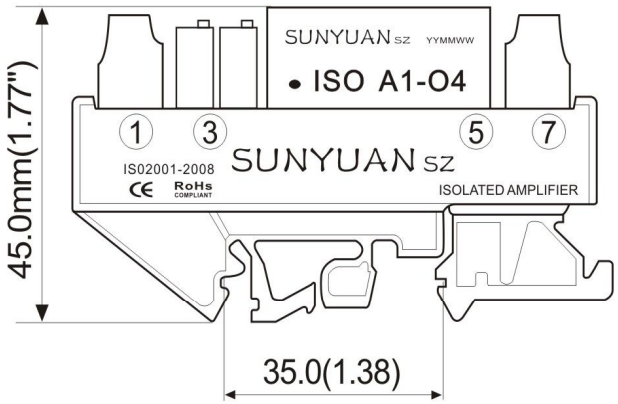
SunYuan DIN3 ISO U/A-O series module has slim (12.5mm thickness) DIN rail-mounted external chassis and wiring terminal blocks for input and output wiring. It is embedded with ISO U/A-O module, zero and span potentiometers to enable user to calibrate. DIN3 ISO U/A-O module only support 1-channel input and output because of space limitation.

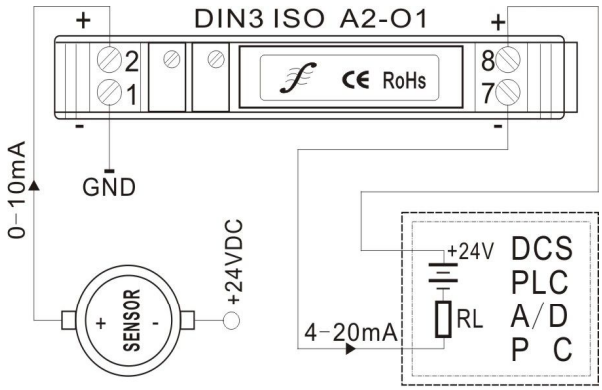


DIN3 ISO U/A-O Series DIN Rail-mounted Isolation Transmitter Pin Description:

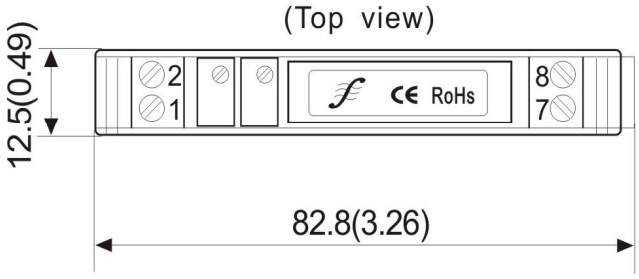
Signal input	Signal input	No Pin	No Pin	No Pin	No Pin	Current output	Voltage input
Sin-	**Sin+**	**NC**	**NC**	**NC**	**NC**	**Iout+**	**Vin+**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**

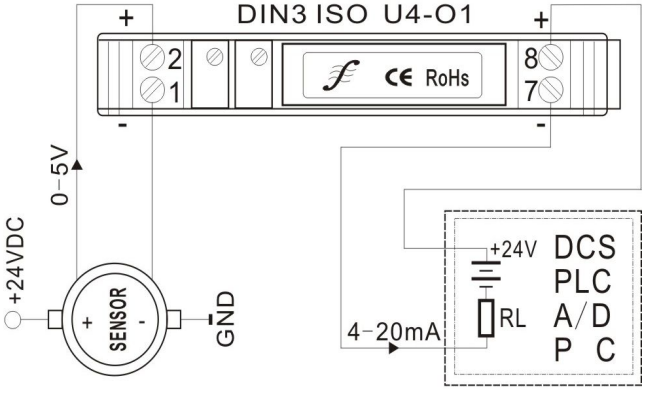
DIN3 ISO U/A-O Series DIN Rail-mounted Isolation Transmitter Dimension& Typical Wiring





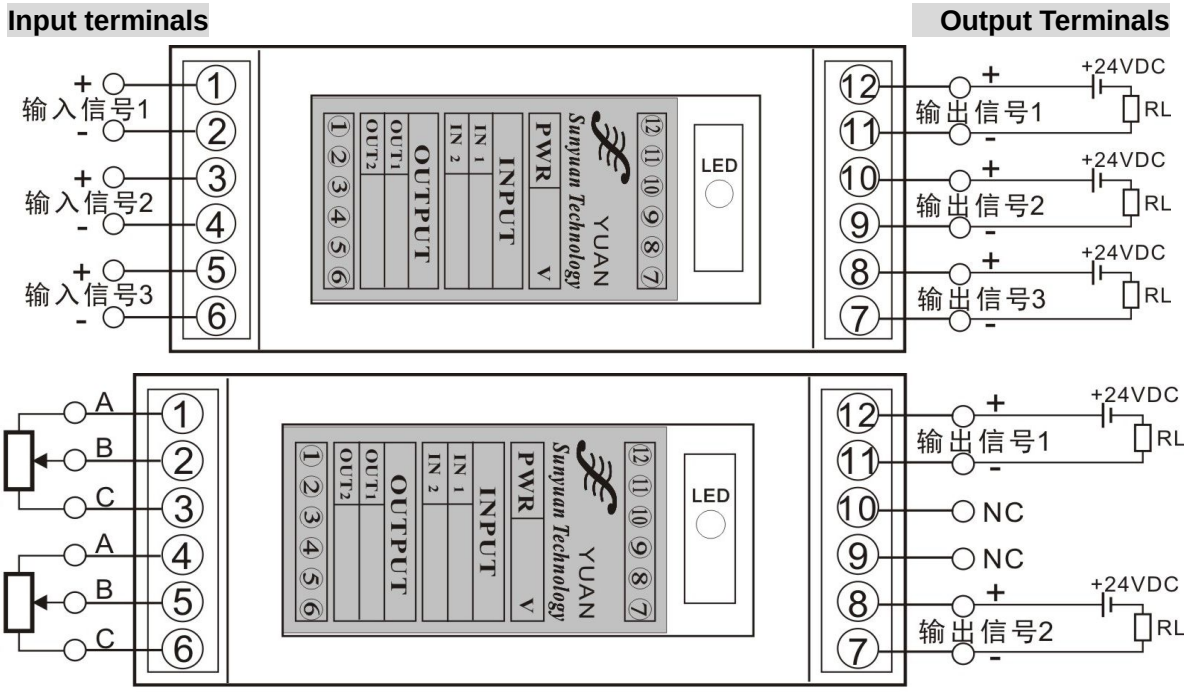
II隔离放大变送典型应用接线图1





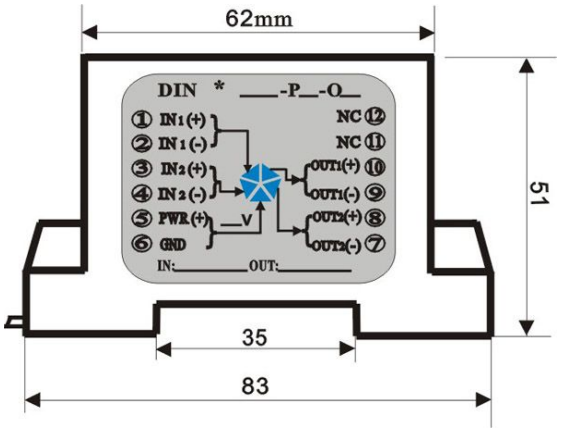
DIN 1X1/2X2/3X3/1X2/1X3 Type **I** Multi-channel DIN Rail-mounted type

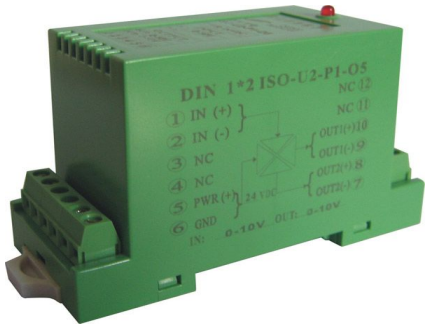
SunYuan DIN ISO U/(A/R)-O Series type I standard DIN35 DIN Rail-mounted 2-wire output loop powered dc current voltage isolation transmitter is embedded with several units of ISO U/(A/R)-O SIP IC module, external power supply is not required. That type supports 1-in 1-out (DIN1X1), 2-in 2-out (DIN2X2), 3-in 3-out (DIN3X3), 1-in 2-out (DIN1X2), 1-in 3-out (DIN1X3) isolated conversion. The isolation transmitter can withstand 3kv isolation among each channel, and has ZERO and SPAN adjusting potentiometer, anti-surge protection circuits. It is easy and reliable to use.



DIN 1X1 / DIN 2X2 / DIN 3X3 / DIN 1X2 / DIN 1X3 Series Dimension & Pin Description

Pin	Pin Function	
1	Signal in1 +	Signal input 1+
2	Signal in1 -	Signal input1-
3	Signal in2 +	Signal input2+
4	Signal in2 -	Signal input2-
5	Signal in3 +	Signal input3+
6	Signal in3 -	Signal input3-
7	Iout3 +	Signal output3+
8	Vin3+	Voltage input3+
9	Iout2 +	Signal output2+
10	Vin2+	Voltage input2+
11	Iout1 +	Signal output1+
12	Vin1+	Voltage input1+





*The data sheet is subject to change without notice.