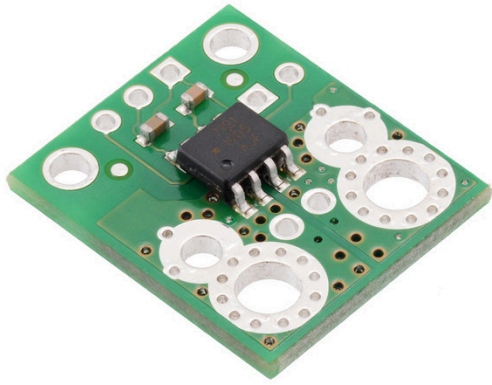


ACHS-7121 Current Sensor Carrier -10A to +10A



Pololu item #: 4030

Brand: [Pololu](#)

[supply outlook](#)

Status: Clearance [?](#)

✓ RoHS3

Price break Unit price (US\$)

1 **3.95** 6.95

Quantity:

Add to cart

[backorders](#) allowed

[Add to list](#)

Clearance notice: These older current sensors are on clearance at a discounted price and will be discontinued once remaining component stock is depleted.

This board is a simple carrier of Broadcom's **bidirectional $\pm 10\text{A}$** ACHS-7121 Hall effect-based, electrically isolated current sensor, which offers a low-resistance ($\sim 0.7\text{ m}\Omega$) current path and electrical isolation. This version accepts a bidirectional current input with a magnitude up to 10 A and outputs a proportional analog voltage (185 mV/A) centered at 2.5 V with a typical error of $\pm 1.5\%$. It operates from 4.5 V to 5.5 V and is intended for use in 5 V systems.

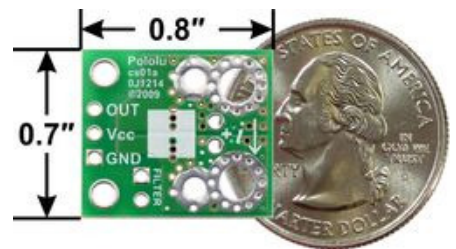
Alternatives available with variations in these parameter(s): version [Select variant...](#)

or .

[Description](#) [Specs \(10\)](#) [Pictures \(8\)](#) [Resources \(5\)](#) [FAQs \(0\)](#) [On the blog \(2\)](#) [Distributors \(50\)](#)

Overview

This current sensor is a carrier board or breakout board for Broadcom's ACHS-7121/7122/7123/7124/7125 Hall effect-based, electrically isolated current sensors; we therefore recommend careful reading of the [ACHS-7121/7122/7123 datasheet](#) (1MB pdf) or [ACHS-7124/7125 datasheet](#) (1MB pdf) before using this product. The following list details some of the sensor's key features:



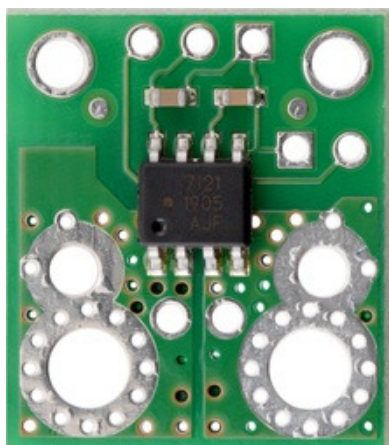
- Hall effect-based sensor with electrically isolated current path allows the sensor to be inserted anywhere along the current path and to be used in applications that require electrical isolation.
- The conductive path internal resistance is typically $0.7\text{ m}\Omega$, and the PCB is made with 2-oz copper, so very little power is lost in the board.
- 80 kHz bandwidth that can optionally be decreased by adding a capacitor across the board pins marked "filter".
- High accuracy and reliability: typical total output error of $\pm 1.5\%$ at room temperature with factory calibration, an extremely stable output offset voltage, and almost zero magnetic hysteresis.

- Robust sensor IC can tolerate 100 ms transient current spikes up to 100 A.
- Wide operating temperature range of -40°C to 110°C.

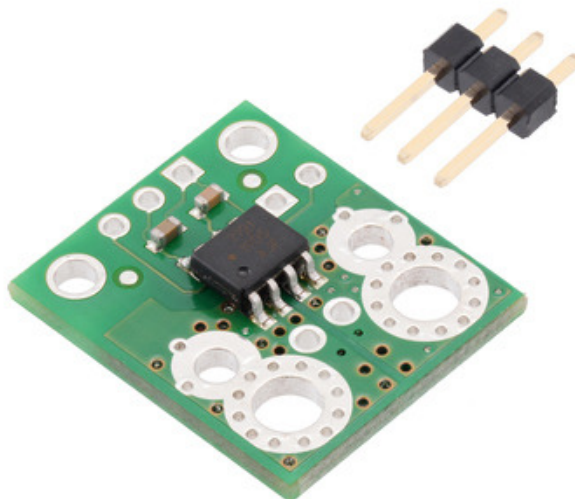
The pads are labeled on the bottom silkscreen, as shown in the picture to the right. The silkscreen also shows the direction that is interpreted as positive current flow via the **+i** arrow.

We sell five different versions of this board ([±10A](#), [±20A](#), [±30A](#), [±40A](#), and [±50A](#)) so you should consider adding your own distinguishing marks or labels if you will be working simultaneously with multiple versions. A white box is provided on the bottom silkscreen of the board to make labeling easier. You can also distinguish the versions by reading the text on the IC.

Details for item #4030



ACHS-7121 Current Sensor Carrier -10A to +10A, top view.

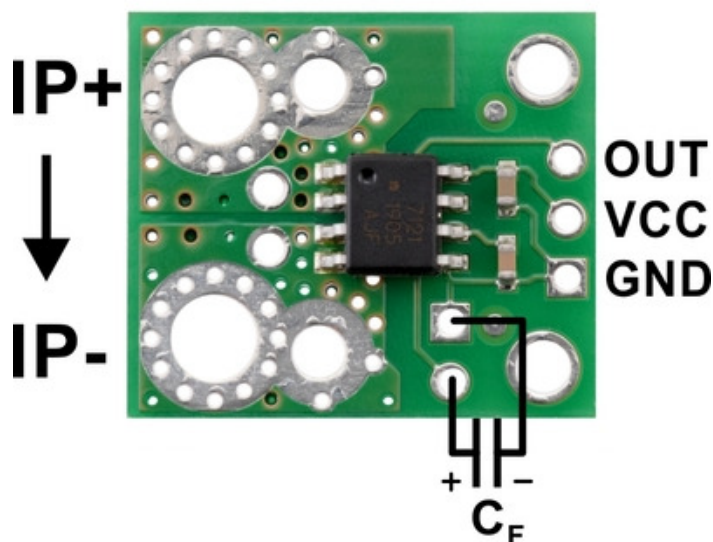


ACHS-7121 Current Sensor Carrier -10A to +10A with included 0.1" header pins.

The ACHS-7121 sensor operates at 5 V and is designed for bidirectional input current from -10 A to 10 A. When V_{CC} is 5 V, the output voltage is centered at 2.5 V and changes by 185 mV per amp of input current, with positive current increasing the output voltage and negative current decreasing the output voltage.

This board ships assembled with all surface mount components, and a 3×1 strip of [0.1" header pins](#) is included but not soldered in.

Using the sensor

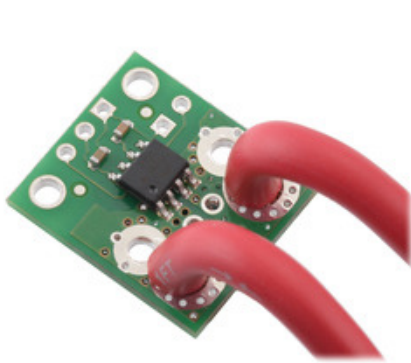


This sensor has five required connections: the input current (IP+ and IP-), logic power (VCC and GND), and the sensor output (OUT).

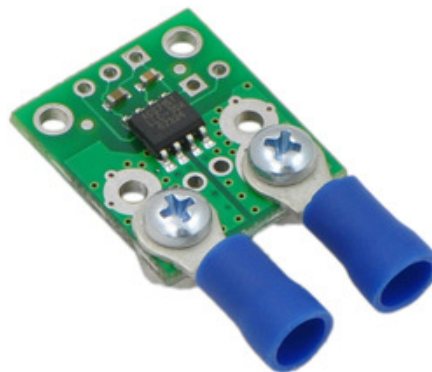
The sensor requires a supply voltage of 4.5 V to 5.5 V to be connected across the VCC and GND pads, which are labeled on the bottom silkscreen, and the sensor outputs an analog voltage that is linearly proportional to the input current.

The FILTER pin lets you adjust the board's bandwidth by adding a capacitor, C_F , to ground (a ground pad has been added next to the FILTER pin for convenience) in parallel with the 1 nF capacitor that is already on the board. Without any external filter capacitor, the bandwidth is 80 kHz. The datasheet provides more information on how the external filter capacitor affects bandwidth.

You can insert the board into your current path in a variety of ways. For low-current applications, you can solder **0.1" male header pins** to the board via the smallest pair of through-holes on the input-current side of the board. For higher-current applications, you can solder wires directly to the through-holes that best match your wires, or you can use solderless ring terminal connectors. The largest pair of through-holes are big enough for #6 screws.



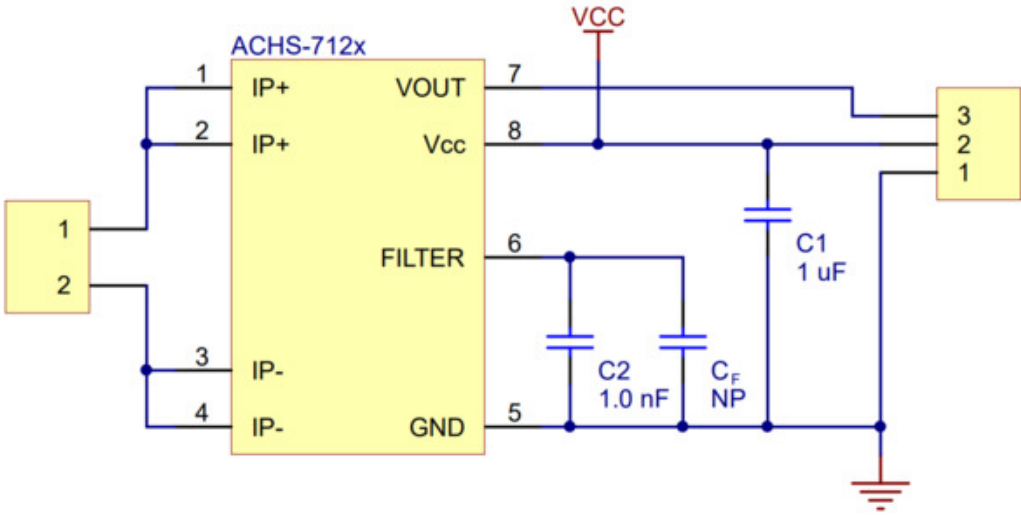
Current sensor carrier soldered with high-current wires.



Current sensor carrier with solderless ring terminal connectors (not included).

Warning: This product is intended for use below 30 V. Working with higher voltages can be extremely dangerous and should only be attempted by qualified individuals with appropriate equipment and protective gear.

Schematic and dimension diagrams

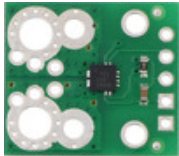
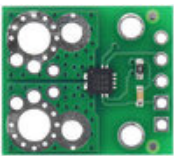
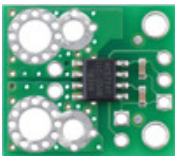
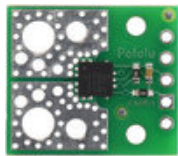
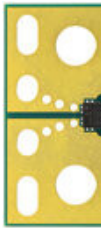


Schematic diagram of the ACHS-712x Current Sensor Carrier.

The dimension diagram is available as a [downloadable PDF](#) (318k pdf).

Comparison of the Pololu current sensor carriers

We have a variety of current sensors available with different ranges, sensitivities, and features. The table below summarizes our selection of active and preferred options:

	 ACS711 Current Sensor Carriers	 ACS71240 Current Sensor Carriers	 ACS724 Current Sensor Carriers	 ACS37220 Current Sensor Compact Carriers	 ACS3 Current Large C
Allegro Sensor	ACS711KEXT	ACS71240	ACS724LLCTR	ACS37220	
Sensing technology	Hall effect	Hall effect	Hall effect	Hall effect	
Logic voltage range	3.0–5.5 V	3.3V ver: 3.0–3.6 V 5V ver: 4.5–5.5 V	4.5–5.5 V	3.3V versions: 3.15–3.45 5V versions: 4.5–5.5 V	
Family current range	15.5–31 A	10–50 A	2.5–50 A	100–200 A	

Current range/ sensitivity of individual versions	Bidirectional: ⁽¹⁾ <u>$\pm 15.5 \text{ A} / 90 \text{ mV/A}$</u> <u>$\pm 31 \text{ A} / 45 \text{ mV/A}$</u>	3.3V Bidirectional: <u>$\pm 10 \text{ A} / 132 \text{ mV/A}$</u> <u>$\pm 30 \text{ A} / 44 \text{ mV/A}$</u> <u>$\pm 50 \text{ A} / 26.4 \text{ mV/A}$</u> 5V Bidirectional: <u>$\pm 10 \text{ A} / 200 \text{ mV/A}$</u> <u>$\pm 30 \text{ A} / 66 \text{ mV/A}$</u> <u>$\pm 50 \text{ A} / 40 \text{ mV/A}$</u> 5V Unidirectional: <u>$0-50 \text{ A} / 80 \text{ mV/A}$</u>	5V Bidirectional: ⁽²⁾ <u>$\pm 2.5 \text{ A} / 800 \text{ mV/A}$</u> <u>$\pm 5 \text{ A} / 400 \text{ mV/A}$</u> <u>$\pm 10 \text{ A} / 200 \text{ mV/A}$</u> <u>$\pm 20 \text{ A} / 100 \text{ mV/A}$</u> <u>$\pm 30 \text{ A} / 66 \text{ mV/A}$</u> <u>$\pm 50 \text{ A} / 40 \text{ mV/A}$</u> 5V Unidirectional: ⁽²⁾ <u>$0-5 \text{ A} / 800 \text{ mV/A}$</u> <u>$0-10 \text{ A} / 400 \text{ mV/A}$</u> <u>$0-20 \text{ A} / 200 \text{ mV/A}$</u> <u>$0-30 \text{ A} / 133 \text{ mV/A}$</u>	3.3V Bidirectional: <u>$\pm 100 \text{ A} / 13.2 \text{ mV/A}$</u> <u>$\pm 150 \text{ A} / 8.8 \text{ mV/A}$</u> 5V Bidirectional: <u>$\pm 100 \text{ A} / 20 \text{ mV/A}$</u> <u>$\pm 150 \text{ A} / 13.3 \text{ mV/A}$</u> <u>$\pm 200 \text{ A} / 10 \text{ mV/A}$</u>	3.3V Bidir <u>$\pm 100 \text{ A} / 13.2 \text{ mV/A}$</u> <u>$\pm 150 \text{ A} / 8.8 \text{ mV/A}$</u> 5V Bidire <u>$\pm 100 \text{ A} / 20 \text{ mV/A}$</u> <u>$\pm 150 \text{ A} / 13.3 \text{ mV/A}$</u> <u>$\pm 200 \text{ A} / 10 \text{ mV/A}$</u>
IC current path resistance	0.6 mΩ	0.6 mΩ	0.6 mΩ	0.1 mΩ	
PCB	2 layers, 2-oz copper	2 layers, 2-oz copper	2 layers, 2- or 4-oz copper ⁽⁴⁾	2 layers, 2-oz copper	6 lay 2-oz c
Max bandwidth	100 kHz	120 kHz	120 kHz ⁽³⁾	150 kHz	
Size	0.7" × 0.8"	0.7" × 0.8"	0.7" × 0.8"	0.7" × 0.8"	1.4" ×
Overcurrent fault output	✓	✓		✓ User-configurable thresh	
Common-mode field rejection		✓	✓		✓
Nonratiometric output		✓			✓
1-piece price	\$3.49	\$3.95	\$6.95 – \$7.49	\$4.95	\$7.

⁽¹⁾ Sensitivity when $V_{CC} = 3.3 \text{ V}$; actual sensitivity is ratiometric (i.e. it is proportional to V_{CC}).

⁽²⁾ Sensitivity when $V_{CC} = 5 \text{ V}$; actual sensitivity is ratiometric (i.e. it is proportional to V_{CC}).

⁽³⁾ Bandwidth can be reduced by adding a filter capacitor.

⁽⁴⁾ 50A version uses 4-oz copper PCB; all other versions use 2-oz copper.

⁽⁵⁾ 50A and higher versions use a 4-layer PCB; all other versions use a 2-layer PCB.

You can also use the following selection box to see all these options sorted by current range:

Alternatives available with variations in these parameter(s): current range [Select variant...](#)

People often buy this product together with:



[Pololu 400-Point
Breadboard with
Mounting Holes](#)



[ACHS-7122 Current
Sensor Carrier
-20A to +20A](#)



[ACHS-7123 Current
Sensor Carrier
-30A to +30A](#)