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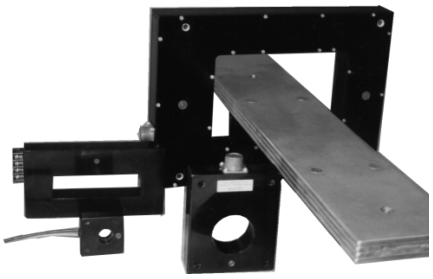
HALL EFFECT CURRENT SENSORS *MODEL* CTL

Ohio Semitronics has been a leader in the field of Hall effect current measurement for more than 35 years. Since Ohio Semitronics pioneered the development of materials required for precise measurements, we have developed devices used for commercial, industrial, military and space applications.



Hall-effect current measurement is a non-contact technique that measures the magnetizing effects of current flowing in a conductor. This measurement type offers a number of benefits not afforded by conventional direct or contact (in-line) measurement. Some of these benefits are high electrical isolation between conductor and sensor output, high overload capability, fast response to input changes and no power consumption on measured circuit.

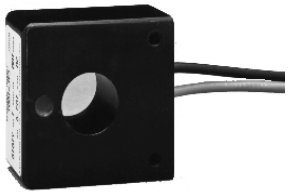
The most popular Hall-effect current sensor products are the CTL/CTA product families. The CTL is a current sensor and the CTA is a signal conditioner which provides the nominal output. These two units are factory calibrated together for maximum accuracy and linearity. This combination of units gives the greatest flexibility in terms of inputs and outputs.

CURRENT

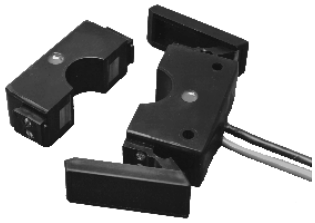
CTL HALL EFFECT CURRENT SENSORS

FEATURES AND APPLICATIONS:

- 5000 Volt line-to-output isolation.
- dc - 5KHz response, dc - 1KHz operating frequency.
- Bi-directional operation.
- Available in split-core configurations.
- Response time less than 50 microseconds.
- Output is proportional in **direction and magnitude** to the current flow through the window.
- Overload capability to **50** times rating (at 60 Hz).
- Stability maintained during severe vibration.
- Models available to 40KA.
- Replaces shunts. No insertion loss.
- For use with model CTA signal conditioners.
- Ideal for use on ac systems with dc components and/or chopped waveforms.

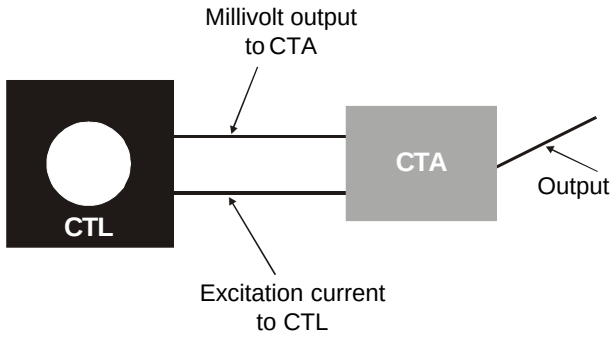


Solid-core models



Split-core models

CTL/CTA Hall-effect Current Measurement System



AC

DC

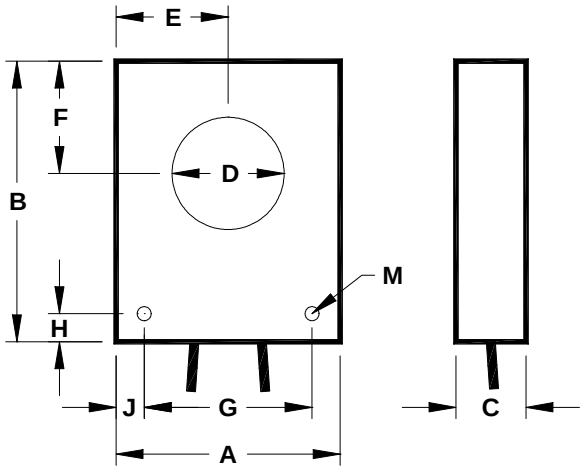
HALL EFFECT CURRENT SENSORS

CIRCULAR WINDOW MODELS:

Current Range	Model Number	Typical Output	Sensor Size
0 - 35A	CTL-51/35	35mV	A
0 - 50A	CTL-51/50	50mV	A
	CTL-101/50	50mV	C
0 - 75A	CTL-101/75	75mV	C
0 - 100A	CTL-101/100	100mV	C
0 - 150A	CTL-201/150	75mV	D
0 - 200A	CTL-201/200	100mV	D
0 - 300A	CTL-401/300	75mV	D
0 - 400A	CTL-401/400	100mV	D
0 - 500A	CTL-601/500	40mV	E
0 - 600A	CTL-601/600	50mV	E
0 - 800A	CTL-202/800	40mV	E
0 - 1000A	CTL-202/1000	50mV	E
	CTL-202EES/1000*	100mV	EE*
0 - 1500A	CTL-202/1500	75mV	E
	CTL-202EES/1500	150mV	EE*
0 - 2000A	CTL-202/2000	100mV	E
	CTL-202EES/2000*	200mV	EE*
0 - 2500A	CTL-302EES/2500*	150mV	EE*
0 - 3000A	CTL-302EES/3000*	200mV	EE*

Current range is dc or RMS ac. Output is ±30%

** EES models are available as standard in split-core case only.*



SENS SIZE	SENSOR DIMENSIONS										WT. LBS.
	a	b	c	d	e	f	g	h	j	m	
A	1 1/8	1 1/2	1/2	3/8	9/16	9/16	9/16	3/16	9/32	1/8	0.12
C	2	2	3/4	3/4	1	7/8	1 1/2	1/4	1/4	5/32	0.28
D	3 1/8	4	3/4	1 1/8	1 9/16	1 1/2	2 1/8	1/2	1/2	11/64	0.75
E	4 1/8	5	1 1/4	2	2 1/16	2	3 1/4	7/16	7/16	17/64	2.80
EE	6 1/2	7 1/4	1 5/8	4 1/4	3 1/4	3 5/8	5 1/2	1/2	1/2	5/16	2.80

All dimensions in inches.

Specifications:

Accuracy and Linearity: ±0.5% F.S.
(when calibrated with CTA)
Excitation Current: 200mA
Temperature Range:
Standard: -10ºC to 40ºC
Extended: -40ºC to 65ºC
Add suffix **"T"** to part number.
Temperature Effects: ±1% F.S.
Input Resistance (ohms):
0 - 400A models: 6 ohms ±3
600A + models: 23 ohms ±5
Output Resistance (ohms): 25 ohms ±15
Initial Offset: less than ±2mV

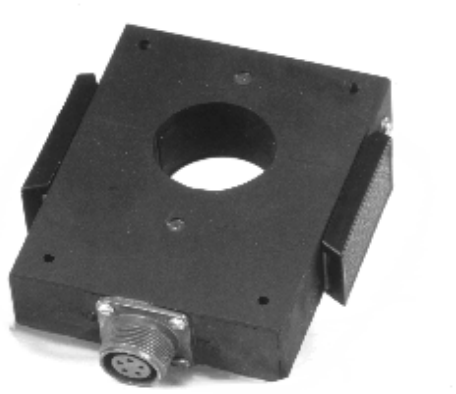
Options:

Split-core models (above 50A):
Add suffix "**S**" to model number.
Extended temperature range (-40ºC to +65ºC):
Add suffix "**T**" to model number.

ORDERING INFORMATION

EXAMPLE: 300 Amp split-core current sensor with extended temperature range.

CTL - 401TS/300
Order in combination with appropriate CTA Signal Conditioner found on page 75.



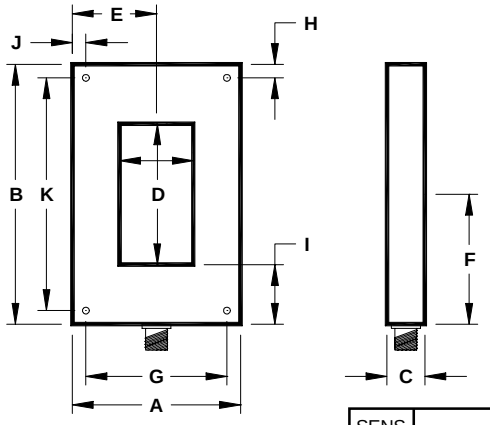
Solid-core models are supplied with 18 inch cables on sensor sizes A, C & D. All other solid-core models supplied wth detachable 8 foot cable. Sensor size C split-core models are supplied with 8 foot attached cable. All other split-core models are supplied with detachable 8 foot cable. Longer cables are available.

HALL EFFECT CURRENT SENSORS

RECTANGULAR WINDOW (BUS BAR) MODELS:

Current Range	Model Number	Typical Output	Sensor Size
0 - 500A	CTL-202H/500	50mV	Z
0 - 1000A	CTL-202H/1000	100mV	Z
	CTL-202ZZS/1000*	100mV	ZZ*
0 - 1500A	CTL-202H/1500	150mV	Z
	CTL-202ZZS/1500*	150mV	ZZ*
0 - 2000A	CTL-202H/2000	200mV	Z
	CTL-202ZZS/2000*	200mV	ZZ*
	CTL-502H/2000	60mV	Z
0 - 2500A	CTL-302ZZS/2500*	125mV	ZZ*
	CTL-502/2500	75mV	G
	CTL-502H/2500	75mV	Z
0 - 3000A	CTL-302ZZS/3000*	150mV	ZZ*
	CTL-502/3000	90mV	G
	CTL-502H/3000	90mV	Z
0 - 4000A	CTL-502/4000	120mV	G
	CTL-502H/4000	120mV	Z
0 - 5000A	CTL-502/5000	150mV	G
	CTL-502H/5000	150mV	Z
	CTL-103/5000	50mV	H
0 - 6000A	CTL-103/6000	60mV	H
0 - 7000A	CTL-103/7000	75mV	H
0 - 8000A	CTL-103/8000	75mV	H
0 - 9000A	CTL-103/9000	100mV	H
0 - 10000A	CTL-103/10000	100mV	H
0 - 12000A	CTL-203/12000	60mV	H
0 - 15000A	CTL-203/15000	75mV	H
0 - 18000A	CTL-203/18000	100mV	H
0 - 20000A	CTL-203/20000	100mV	H
0 - 25000A	CTL-303/25000	75mV	HH
0 - 30000A	CTL-303/30000	100mV	HH
0 - 35000A	CTL-403/35000	75mV	HH
0 - 40000A	CTL-403/40000	100mV	HH

Current range is dc or peak ac. Output is ±30%



All models supplied with detachable 8 ft. cable. Longer cables are available.

All dimensions in inches.

Specifications:

Accuracy and Linearity:
202H and 502H: ±1% F.S.
502 and 103: ±1% F.S.
203, 303 and 403: ±2% F.S.
Excitation Current: 200mA
Temperature Range:
Standard: -10ºC to +40ºC
Extended: -40ºC to +65ºC
Add suffix **"T"** to part number.
Temperature Effects: ±1% F.S.
20,000A & up Extended Range: ±2% F.S.
Input Resistance (ohms):
500 - 5,000A models: 23 ohms ±5
6,000A + models: 12 ohms ±5
Output Resistance (ohms):
500 - 5,000A models: 25 ohms ±15
6,000A + models: 32 ohms ±10

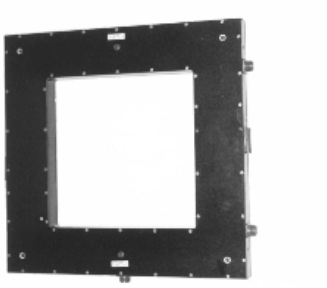
Options:
Split-core models:
Add suffix "**S**" to model number.
Extended temperature range (-40ºC to +65ºC):
Add suffix "**T**" to model number.

ORDERING INFORMATION

EXAMPLE: 7000Amp rectangular split-core current sensor with extended temperature range.

CTL - 103TS/7000
Order in combination with appropriate CTA Signal Conditioner found on page 75.

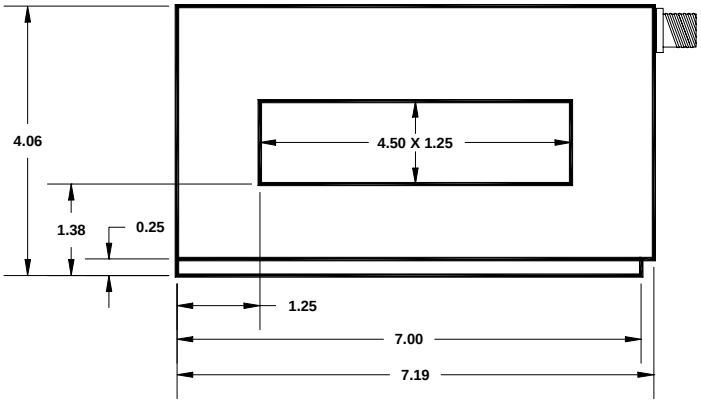
** ZZS models are available as standard in split-core case only.*



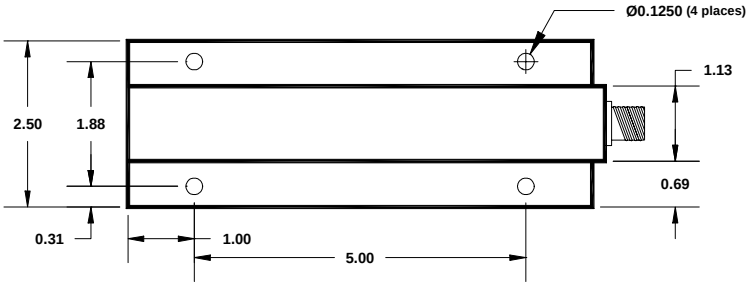
SENS SIZE	SENSOR DIMENSIONS												WT. LBS.
	a	b	c	d	e	f	g	h	j	k	l	m	
Z Z	5 1/16	7 11/16	1 3/16	2 7/16 x 4 1/4	2 17/36	3 19/32	n/a	n/a	n/a	n/a	1 7/16	n/a	3.00
G	7 3/4	12	1 3/4	3 x 6 1/2	3 7/8	6	6 1/2	5/8	5/8	10 3/4	2 3/4	5/16	12.25
H	10	13 3/4	1 3/4	5 1/2 x 8	5	6 1/2	8 3/4	1 1/2	5/8	11 1/2	3 1/4	5/16	13.00
HH	21	21	2	13 x 13	10 1/2	10 1/2	18	1 1/2	1 1/2	18	3 1/2	3/8	22

CTL CASE DIMENSIONS

Z-CASE CTL DIMENSIONS



All standard models supplied with mating connector and 8 ft. cable. Longer cables are available, consult factory.



All dimensions in inches.

CTA SIGNAL CONDITIONERS

The CTA Signal Conditioner provides the excitation current (instrument power) that the CTL Hall effect sensor requires as well as amplifying the low level (mV) signal into a more typical signal. The CTA is calibrated to the output of the specific CTL selected for the application. Each CTA model has a specific input range (mV) which corresponds to the output of the CTL.

The CTA family has two different types, Direct and RMS. Direct models provide an isolated output that is directly proportional to the amplitude and frequency of the input signal. If the input signal is ac then the output signal is ac. If the input signal is dc, then the output signal is dc. The RMS output models provide an output which is directly proportional to the RMS of the input signal. The output is dc regardless of whether the input is ac or dc.

Each type has four output options 1mA, 4-20mA, 10V or 5V. To select the proper CTA model find the CTL model (selected previously) in the following chart, move to the right selecting either Direct or RMS and the appropriate output signal.

CTA SIGNAL CONDITIONERS

MODEL CTA

	Direct models - Output proportional to ac or dc input. Standard ac or dc outputs.				**RMS models** - Output proportional to RMS ac or dc input. Standard dc outputs.			
CTL Model	**±5V**	**±10V**	**4-20mA***	**±1ma**	**0 - 5V**	**0 - 10V**	**4-20mA**	**0 - 1mA**
CTL-51/35	201RX5	201R	212R	201RA	213RX5	213R	215R	214R
CTL-51/50	201X5	201	212	201A	213X5	213	215	214
CTL-101/50	201X5	201	212	201A	213X5	213	215	214
CTL-101/75	201HX5	201H	212H	201HA	213HX5	213H	215H	214H
CTL-101/100	201PX5	201P	212P	201PA	213PX5	213P	215P	214P
CTL-201/150	201HX5	201H	212H	201HA	213HX5	213H	215H	214H
CTL-201/200	201PX5	201P	212P	201PA	213PX5	213P	215P	214P
CTL-401/300	201HX5	201H	212H	201HA	213HX5	213H	215H	214H
CTL-401/400	201PX5	201P	212P	201PA	213PX5	213P	215P	214P
CTL-601/500	201X5	201	212	201A	213X5	213	215	214
CTL-601/600	201X5	201	212	201A	213X5	213	215	214
CTL-202/800	201X5	201	212	201A	213X5	213	215	214
CTL-202/1000	201X5	201	212	201A	213X5	213	215	214
CTL-202EES/1000	201PX5	201P	212P	201PA	213PX5	213P	215P	214P
CTL-202ZZS/1000	201PX5	201P	212P	201PA	213PX5	213P	215P	214P
CTL-202/1500	201HX5	201H	212H	201HA	213HX5	213H	215H	214H
CTL-202EES/1500	201KX5	201K	212K	201KA	213KX5	213K	215K	214K
CTL-202ZZS/1500	201KX5	201K	212K	201KA	213KX5	213K	215K	214K
CTL-202/2000	201PX5	201P	212P	201PA	213PX5	213P	215P	214P
CTL-202EES/2000	201LX5	201L	212L	201LA	213LX5	213L	215L	214L
CTL-202ZZS/2000	201LX5	201L	212L	201LA	213LX5	213L	215L	214L
CTL-202H/500	201X5	201	212	201A	213X5	213	215	214
CTL-202H/1000	201PX5	201P	212P	201PA	213PX5	213P	215P	214P
CTL-202H/1500	201KX5	201K	212K	201KA	213KX5	213K	215K	214K
CTL-202H/2000	201LX5	201L	212L	201LA	**** Use CTL-502H/2500 for 2500A ac models*			
CTL-302EES/2500	201NX5	201N	212N	201NA	**** Not available in ac models.*			
CTL-302ZZS/2500	201NX5	201N	212N	201NA	**** Use CTL-502H/3000 for 3000A ac models*			
CTL-302EES/3000	201KX5	201K	212K	201KA	**** Not available in ac models.*			
CTL-302ZZS/3000	201KX5	201K	212K	201KA	**** Use CTL-502H/2000 for 2000A ac models*			
CTL-502/2500	201HX5	201H	212H	201HA	213HX5	213H	215H	214H
CTL-502/3000	201PX5	201P	212P	201PA	213PX5	213P	215P	214P
CTL-502/4000	201NX5	201N	212N	201NA	**** Use CTL-103/4000 for 4000A ac models*			
CTL-502/5000	201KX5	201K	212K	201KA	**** Use CTL-103/5000 for 5000A ac models*			
CTL-502H/2000	**** Use CTL-202H for 2000A ac/dc models.*				213X5	213	215	214
CTL-502H/2500	201HX5	201H	212H	201HA	213HX5	213H	215H	214H
CTL-502H/3000	201PX5	201P	212P	201PA	213PX5	213P	215P	214P
CTL-502H/4000	201NX5	201N	212N	201NA	**** Use CTL-103/4000 for 4000A ac models*			
CTL-502H/5000	201KX5	201K	212K	201KA	**** Use CTL-103/5000 for 5000A ac models*			
CTL-103/4000	**** Use CTL-502H\502 for 4000A ac/dc models.*				213X5	213	215	214
CTL-103/5000	201X5	201	212	201A	213X5	213	215	214
CTL-103/6000	201X5	201	212	201A	213X5	213	215	214
CTL-103/7000	201HX5	201H	212H	201HA	213HX5	213H	215H	214H
CTL-103/8000	201HX5	201H	212H	201HA	**** Not available in ac models.*			
CTL-103/9000	201PX5	201P	212P	201PA	**** Not available in ac models.*			
CTL-103/10000	201PX5	201P	212P	201PA	**** Not available in ac models.*			
CTL-203/12000	201X5	201	212	201A	213X5	213	215	214
CTL-203/15000	201HX5	201H	212H	201HA	213HX5	213H	215H	214H
CTL-203/18000	201PX5	201P	212P	201PA	**** Not available in ac models.*			
CTL-203/20000	201PX5	201P	212P	201PA	**** Not available in ac models.*			
CTL-303/25000	201X5	201	212	201A	**** Not available in ac models.*			
CTL-303/30000	201PX5	201P	212P	201PA	**** Not available in ac models.*			
CTL-403/35000	201HX5	201H	212H	201HA	**** Not available in ac models.*			
CTL-403/40000	201PX5	201P	212P	201PA	**** Not available in ac models.*			

Available dc - Consult factory. For 220Vac instrument power - Add option "-22".
*** For use with dc current only.**

MODEL CTA SPECIFICATIONS

INPUT:
Voltage: See tables
Frequency Range: dc - 5000 Hz.
Instrument Power: 115Vac, 50 - 400Hz., 2VA

OUTPUT:
Linearity: ±0.1% F.S.
Output Ripple: Less than 0.25% F.S.
Field Adjustable Gain: 25%
Output Loading (ohms):
1mA: 0 - 10K
10V, 5V: 2K min.
4 - 20mA: 0 - 500
Response time (to 90%):
Direct models: 40 microseconds
RMS Models: 200 milliseconds
Temperature Effect (0°C to +70°C): ±0.005%/°C

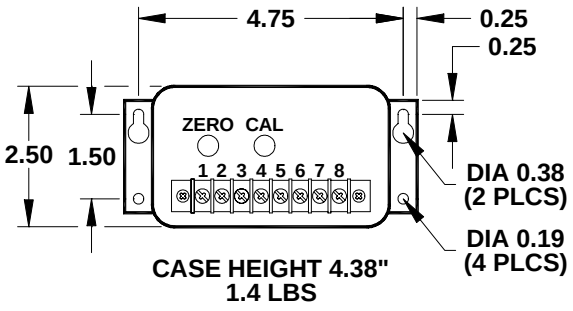
ORDERING INFORMATION

Locate model CTL part number in first column. Determine type of output required, (Direct or RMS). Locate model CTA signal conditioner part number in corresponding output column. **Order as separate items**.

EXAMPLE: CTL - 401TS/300 current sensor. RMS output from signal conditioner of 0 - 10Vdc.

ITEM 1: CTL-401TS/300 ITEM 2: CTA213P

MODEL CTA CASE DIMENSIONS



All dimensions in inches.