Powertek

- ✓ Power Instrumentation, LCR analysis
- ✓ Gain Phase Analysis, PAV
- ✓ Current sensors and probes
- ✓ Transducers

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Instructions and installation for the CTH dc current transducers Ver 1.3 Mar 13, 2023

<<< Important! Serial number of sensor head and signal conditioner should match >>>

Introduction

The CTH dc current transducers will produce a linear voltage or current output proportional to the input current. Depending on the CTH model, the actual input current and proportional output are indicated on the transducer label. For example, using a CTH/50A/10V/SC/24Vdc with 1 primary turn, a 0-10Vdc output will be produced for a 0-50Adc input. With ac current signals, the CTH transducers can be used to provide an instantaneous output signal that can be viewed using an oscilloscope.

Installation and safety

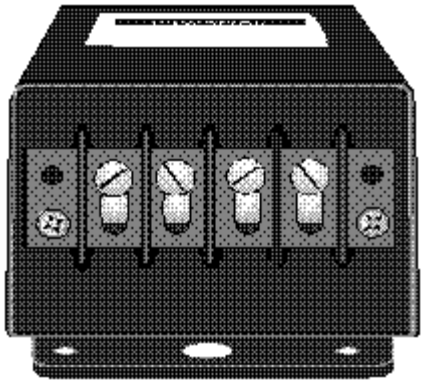
<<<< WARNING! >>>>

ALL CTH CURRENT SENSOR HEADS MUST BE PAIRED WITH THEIR CORRESPONDING SIGNAL CONDITIONERS (TERMINATION BOX)

The CTH transducer should only be used in dry indoor environments. If the current sensor is detachable, ensure that the sensor and signal conditioner are matched - refer to serial numbers. When using CTH split core models (part numbers containing 'SC' i.e. CTH/50/10/SC/24Vdc), ensure the CTH split core is closed correctly before use and that the conductor is positioned centrally, in the middle 30% of the hole. To prevent damage, check for correct connection of the power input and measurement output. Installation should be carried out by authorized personnel, familiar with the risks and dangers of electrical systems. Allow a minimum warm up period of 15 minutes (required when measuring small current signals) for best accuracy. If an external dc offset control is fitted, ensure that the CTH output = 0V or 4mA when zero primary current is flowing. For best performance, high sensitivity models CTH Type 1 and CTH Type 3, with a full scale range less than 5A, may require dc offset adjustment in situ, during commissioning

CTH User manual contents

Connections and installation for Types 1, 2, 3, 4, 4 mini, 5, 6, 7, 8, 8 mini, 8EE, 8F and 9z connections 2000-2022



Screw terminals are provided for the power input and output connections. The terminal block connections are labeled. Ensure that the primary current direction is correct, refer to direction arrow above transducer aperture. A hole is provided to securely mount the transducer.

Note the 125Vdc input on the 125Vdc-24Vdc or 125Vdc-12Vdc power converters is not polarity sensitive

CTH Types: 1, 2, 3, 4, 4 mini, 5, 6, 7, 8, 8 mini, 8EE, 8F and 9z connections

Early CTH type 4 & CTH type 8 have lug/fork connections (up to ~2008) or if specified . In this case the cable connection end is labelled. Later CTH type 4/8 units are fitted with a flanged connection box similar to the standard CTH signal conditioner. CTH type 4, CTH type 4 mini, CTH type 8 and CTH type 8 mini

Power + (Red)	Power – (Black)	Input – (White)	Input + (Green)

The input current, output type and required power will be indicated on the rating label.
In general the cable shield will be terminated on the signal ground [white].

<< From 2022 onward refer to Page 7 – the signal conditioner label indicates connections >>

Protection

A bi-polar dc current can be applied to the CTH voltage output version, but not with 4-20mA versions.
Accidental connection of output terminals to either a dc or ac voltage source, >15V, may result in damage.
Internal fast acting fuses protect the auxiliary power supply input and measurement output
Maximum isolation between power input terminals and output terminal is 500Vdc.
Maximum isolation between the current transducer aperture to power input terminals or output terminal is 2000V.

Gain and Offset adjust and calibration

The CTH are supplied calibrated. Internal adjustment of dc offset drift and gain is possible, this should be made using the correct calibration procedure. Although yearly calibration adjustment is not required, it is recommended that periodical comparisons are made to known calibration standards.

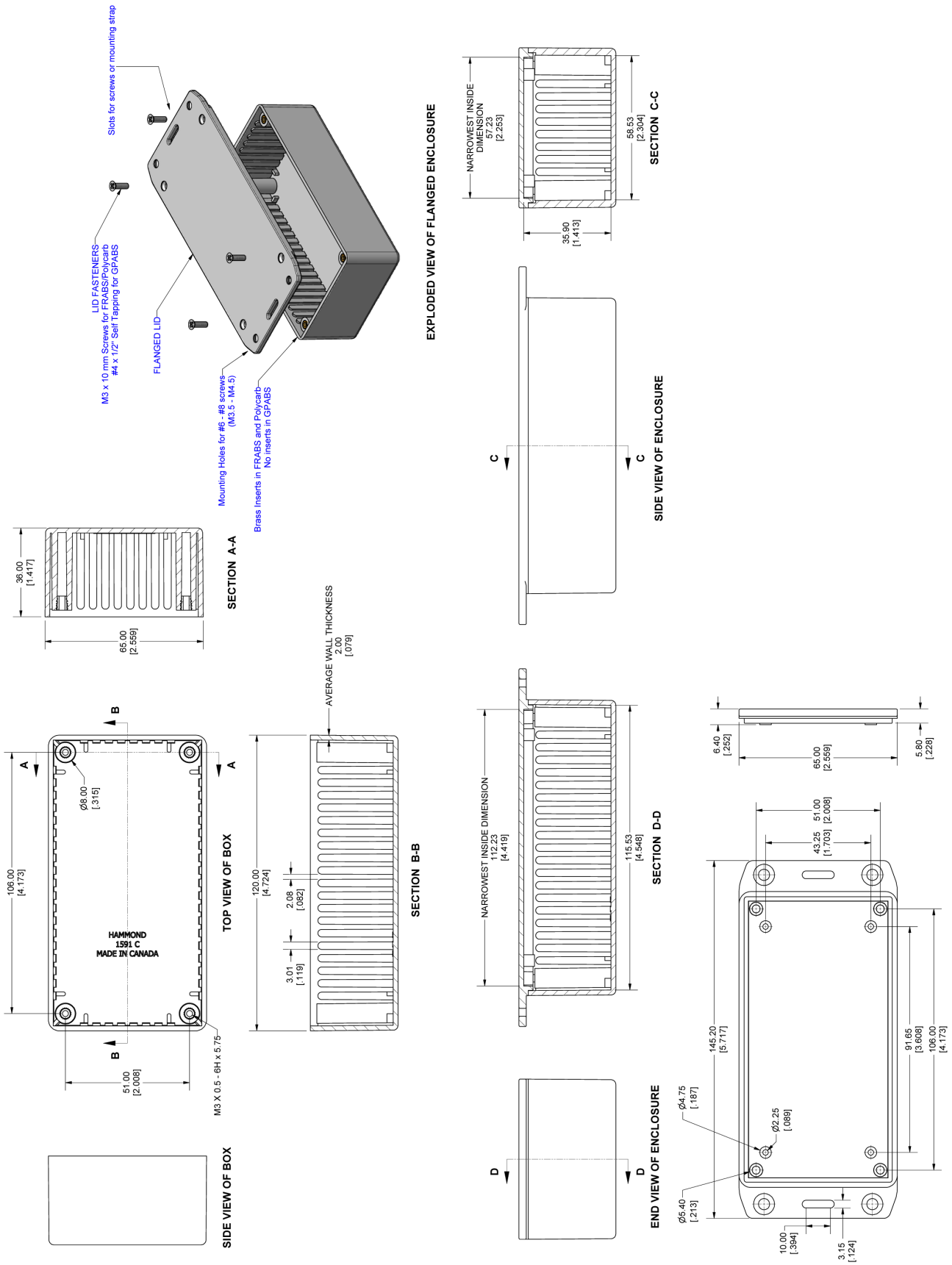
CTH DC current transducer general specifications	
Ranges	Depending on core type: 1A / 2A / 5A / 10A / 20A / 30A / 40A / 50A / 100A / 200A / 500A / 1000A / 2000A / 3000A / 4000A / 5000A / 6000A / 10000A / 20000A / 25000A / 30000A / 35000A / 40000A Amps peak
Outputs	0-100mV, 0-1V, 0-2V, 0-5V, 0-10V or 0-20mA, 4-20mA or 5-25mA outputs. All CTH outputs can be bipolar / instantaneous. Non-standard outputs are available.
Core type	Through hole or split core clamp type, based on dc Hall Effect sensing
Insulation voltage rating	Type 1, 2 & 5 rated insulation (Galvanic) 2.5kVpk 1 min 50/60Hz. Type 6 & 7 3kVpk 1 min 50/60Hz. Type 4 & 8 5kVpk 1 min 50/60Hz
Power input	5V / 12Vdc / 24Vdc / wide range 9-36Vdc / 48Vdc / 72Vdc / 110Vdc / 125Vdc / 250Vdc / 115Vac / 230Vac - all fuse, polarity and surge protected 125Vdc power input, voltage range is 100Vdc to 150Vdc, max current draw 25mA 48Vdc power input, voltage range is 36Vdc to 72Vdc, max current draw 80mA 24Vdc power input, voltage range is 18Vdc to 36Vdc, max current draw 140mA 12Vdc power input, voltage range is 9Vdc to 18Vdc, max current draw 200mA 5Vdc power input, voltage range is 4.5Vdc to 6Vdc, max current draw 300mA
Accuracy	±0.5% for a non split core, ±1.0% for a split core. Conditions +23°C ±5°C, traceable to UKAS NPL/NIST USA
Working temperature range	Typically -20°C - 65°C (can be extended, check for exact model). Functional temperature range –20°C - 70°C (check for each model). CTH types 1 & 2 are –40°C - 85°C (sensor head only)
Protection	Input fuse, output fuse, power input polarity diode, spike suppression
Frequency response	Depending on sensor type/model. Type 1 & 2 DC- 150kHz max. Type 5, 6, 7, 8 & 9 split cores are DC-10kHz max. Standard HF cut-off filter is 1.5kHz (other values available)
Adjustment	Internal dc offset and gain controls
Mounting	All signal conditioners and sensors have fixing points. Current sensors up to 400A can be mounted on the signal conditioner case or via a cable.
Approvals	CE Marked, IEC1010 cat II & IEC348, UL/CSA rated materials. Self extinguishing materials to UL94V0
Warranty	2 year warranty

Specification notes

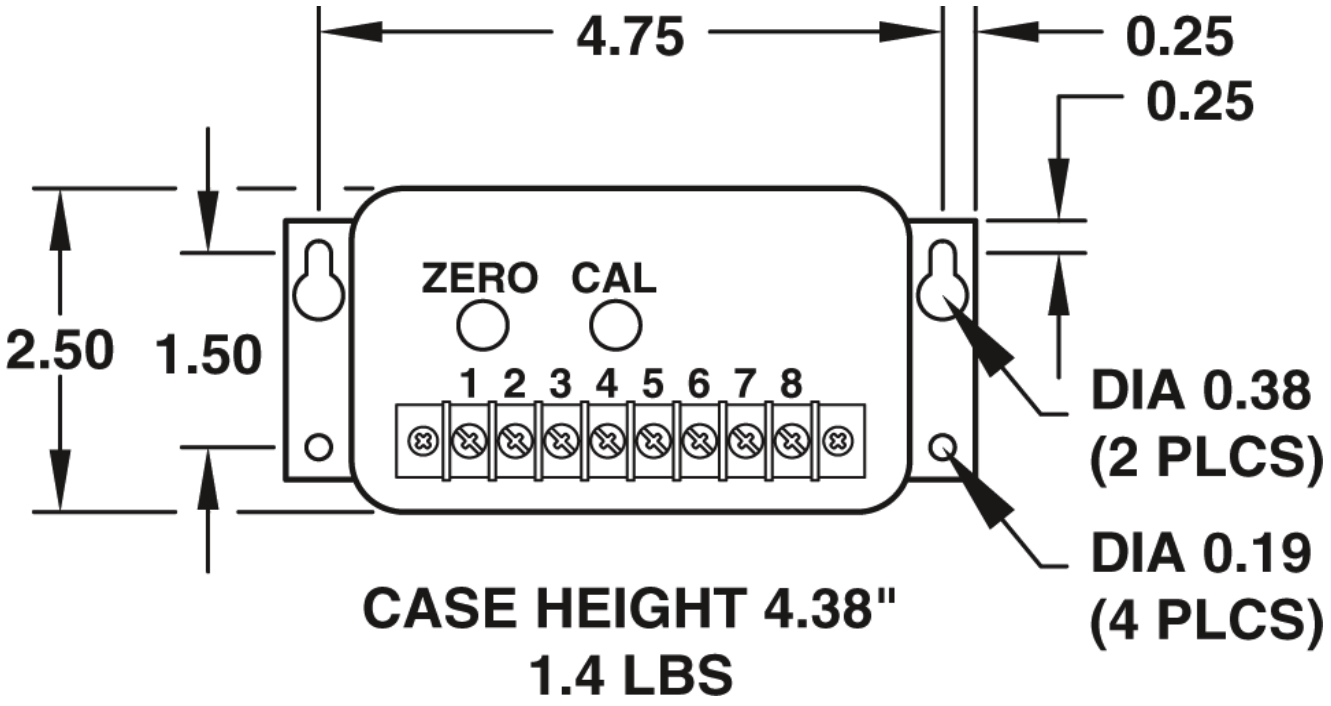
Recommended Measurement range is 5% to 100% range
The output load impedance for a 10Vdc output should be >5kohms
The output load impedance for a 4-20mA output should be <500ohms

Current draw
125Vdc power input, voltage range is 100Vdc to 150Vdc, max current draw 25mA
48Vdc power input, voltage range is 36Vdc to 72Vdc, max current draw 80mA
24Vdc power input, voltage range is 18Vdc to 36Vdc, max current draw 140mA
12Vdc power input, voltage range is 9Vdc to 18Vdc, max current draw 200mA
5Vdc power input, voltage range is 4.5Vdc to 6Vdc, max current draw 300mA

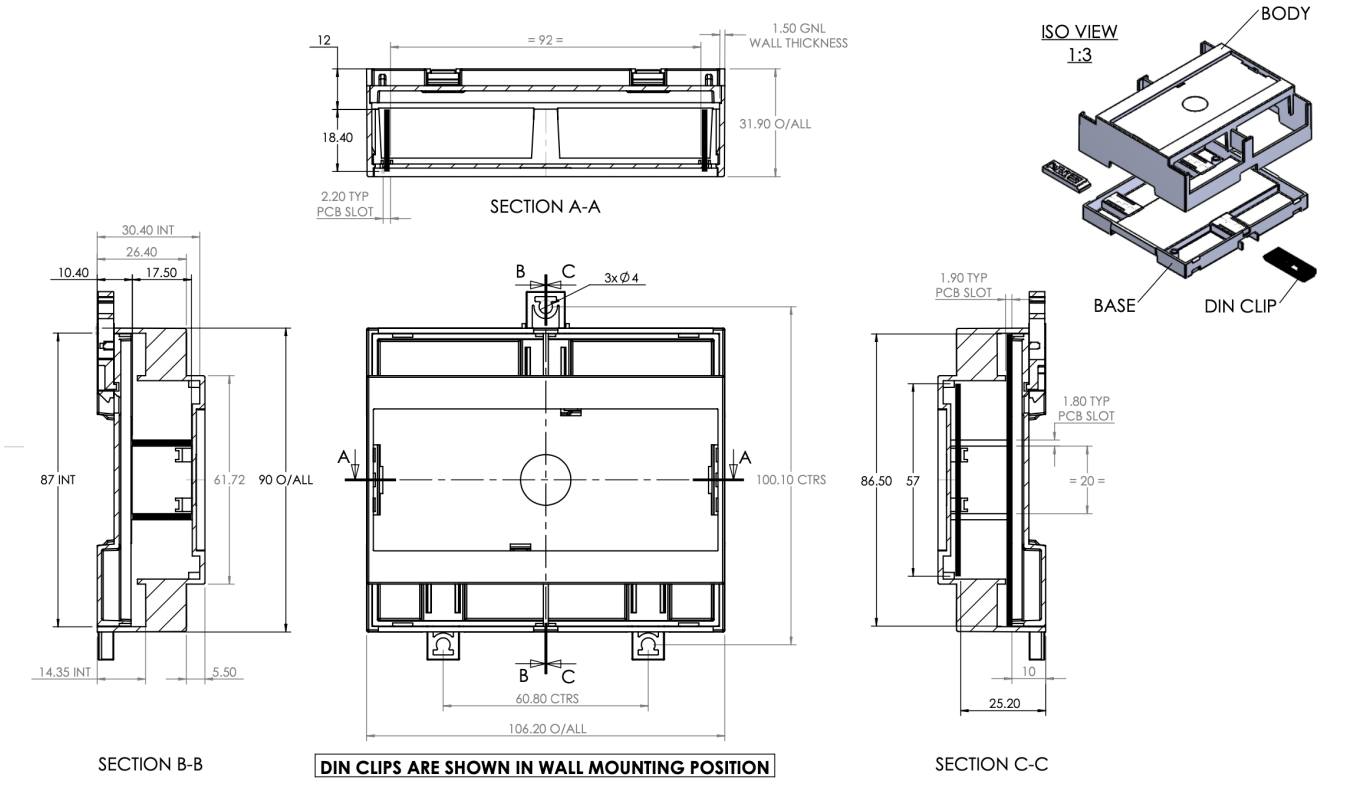
CTH Sensor and conditioner outline drawings – as used 2001 to mid 2022



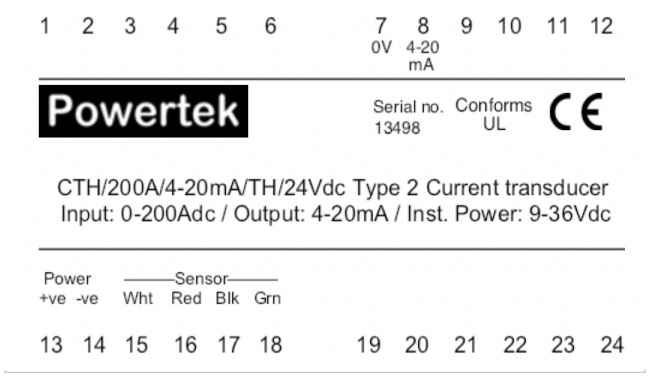
Signal Conditioner Box CTH Types G, 10, 11

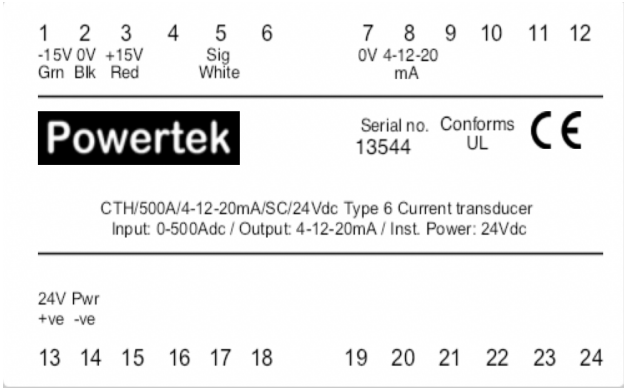


CTH Din-rail conditioner outline drawings – as used 2022 onward

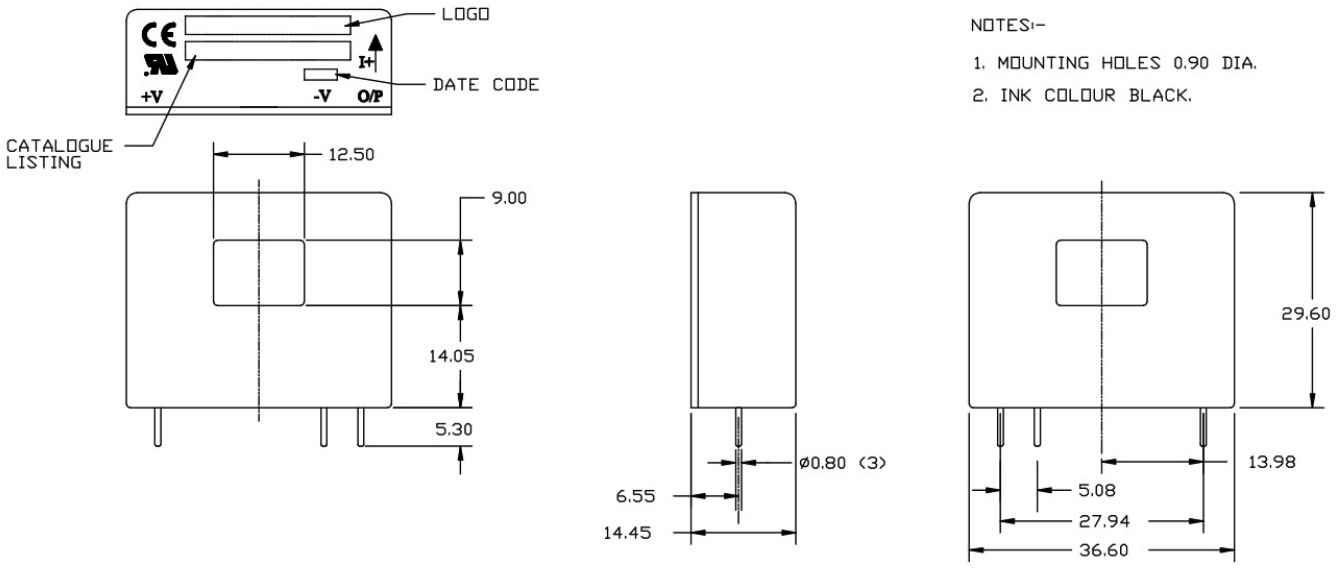


CTH Terminal layout – subject to variation depending on sensor

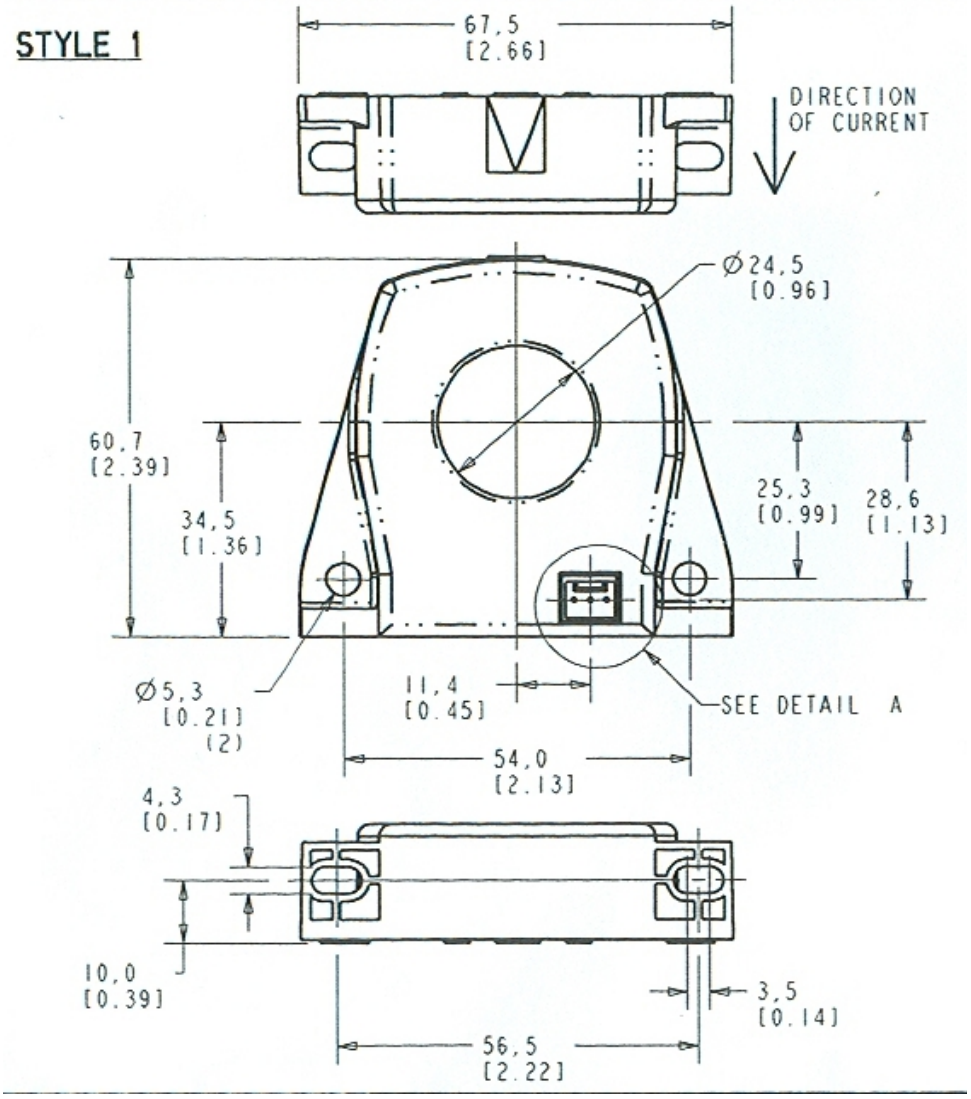




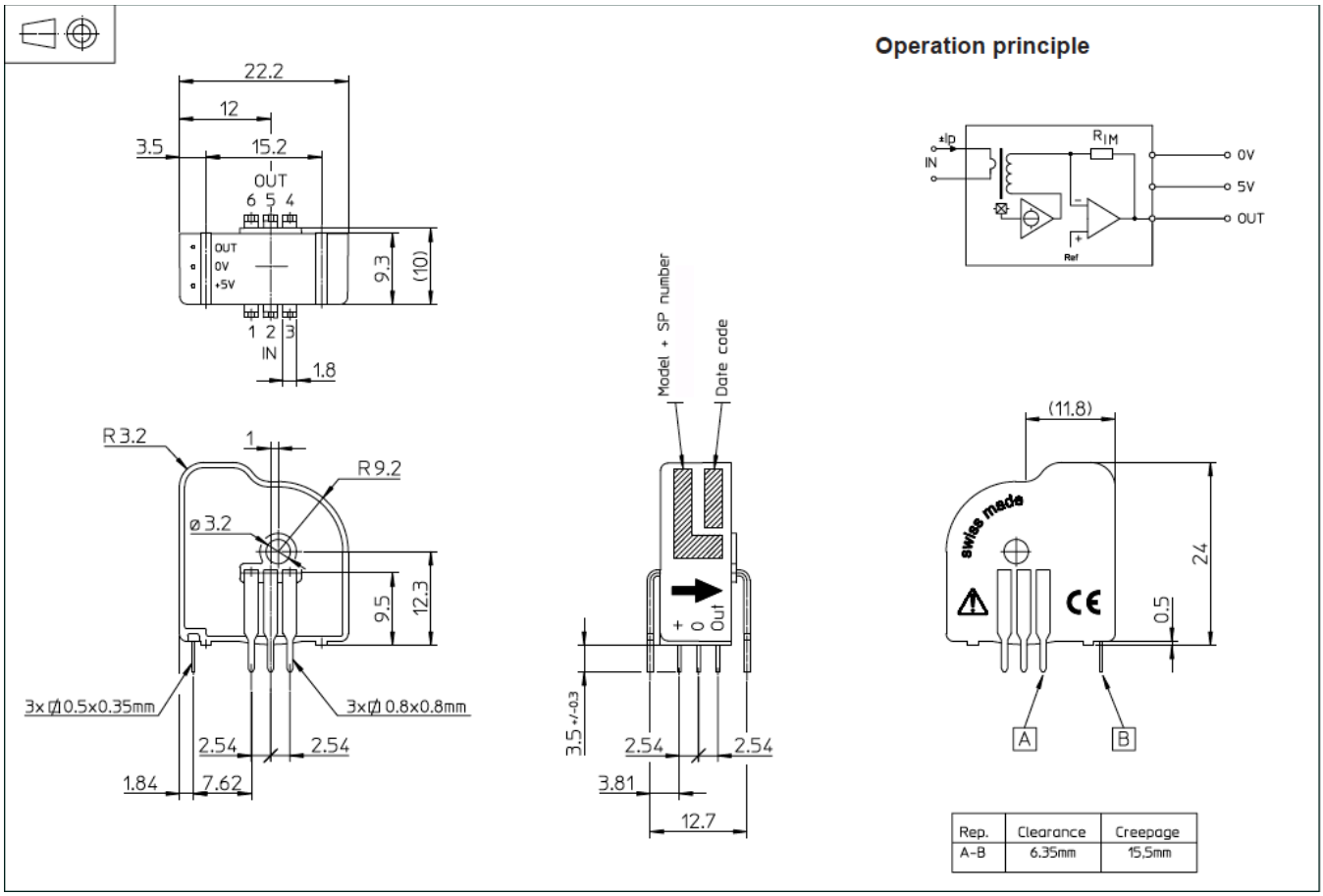
CTH Current sensor Type 1 (non split)



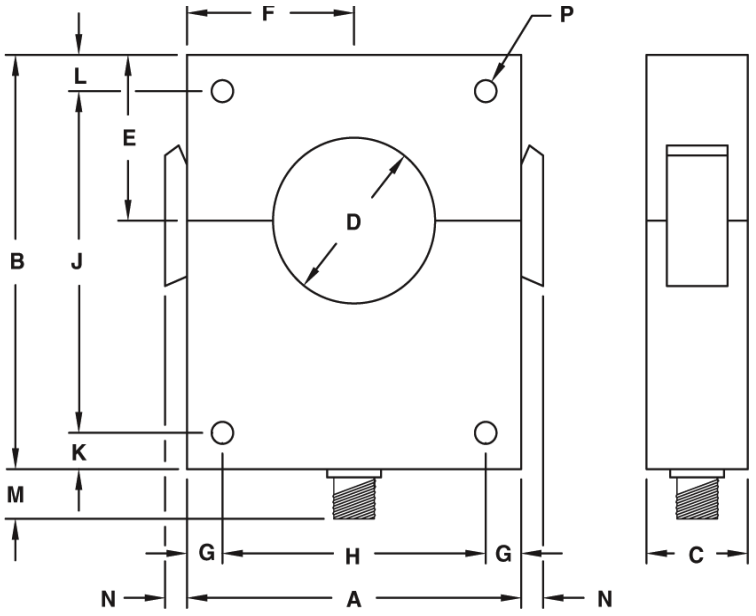
CTH Current sensor Type 2 (non split)



CTH Current sensor Type 3 (Obsolete)

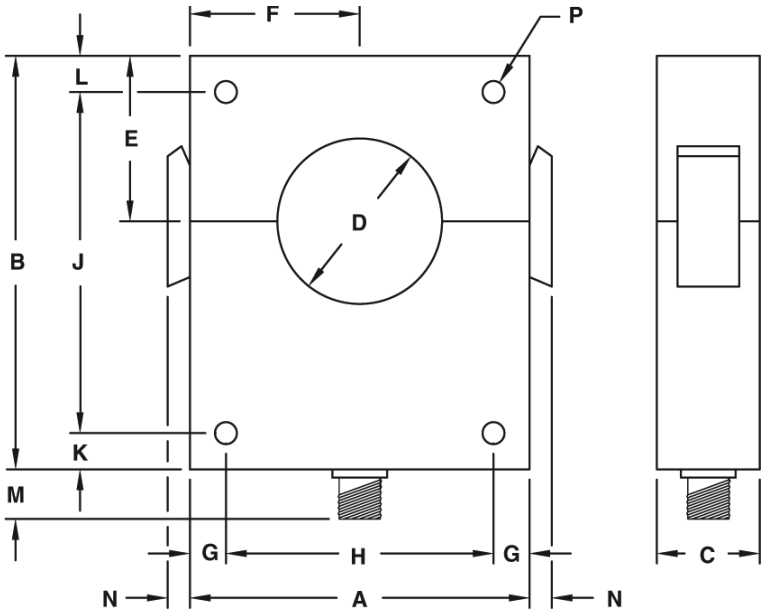


CTH Current sensor 2” hole - Type 4 (non-split) & Type 8 (split core)



SENS SIZE	SENSOR DIMENSIONS inches and mm														WT. LBS
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	
inches	3 1/8	5	1 1/4	2	2	2 1/16	7/16	3 1/4	3 1/4	7/16	7/16	5/8	5/16	17/64	2
mm	79.38	127	31.75	50.8	50.8	52.39	11.11	82.55	82.55	11.11	11.11	15.88	7.94	6.75	2

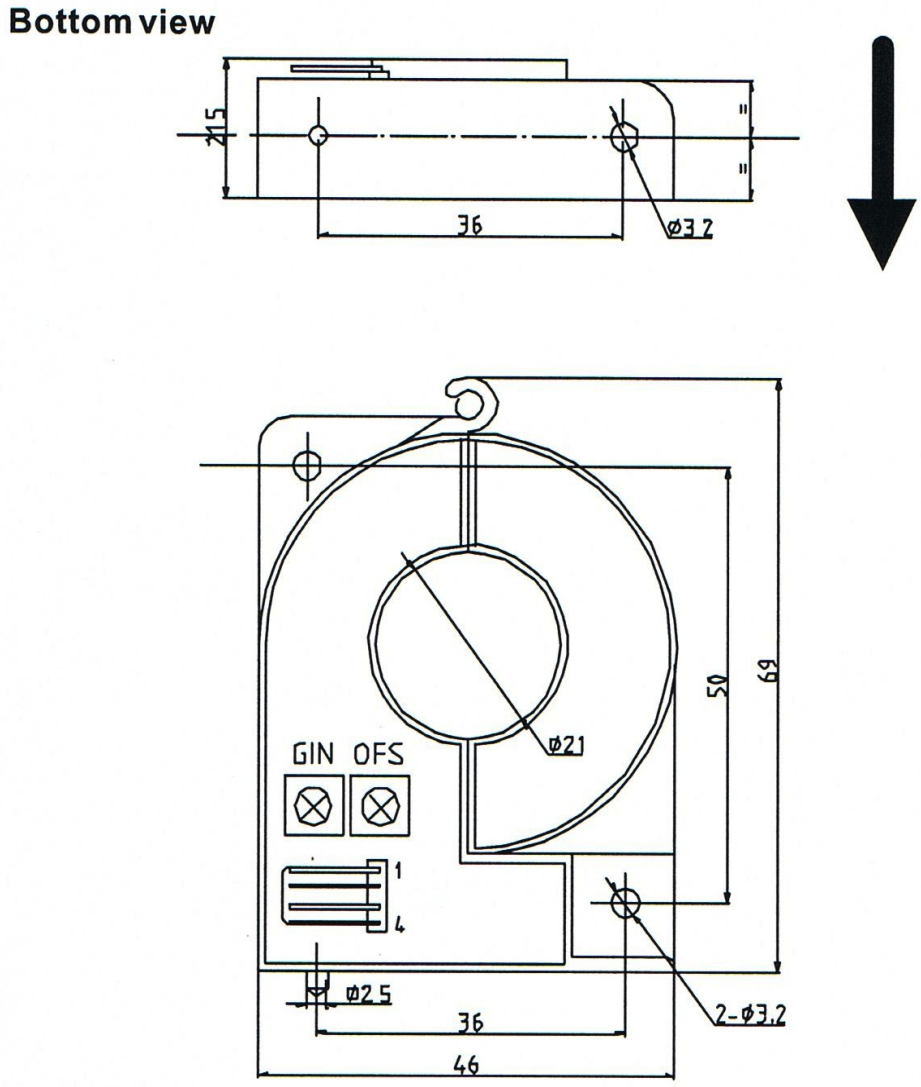
CTH Current sensor 1.125” hole: Type 4 Mini (non split) and Type 8 Mini (split core)



SENS SIZE	SENSOR DIMENSIONS inches and mm														WT. LBS
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	
inches	3 1/8	4	3/4	1 1/8	1 1/2	1 9/16	1/2	2 1/8	NA	3/8	1/4	3/8	1/4	5/16	0.75
mm	79.38	101.6	19.05	28.58	38.1	39.69	12.7	53.98	NA	9.53	6.35	9.53	6.35	7.94	0.75

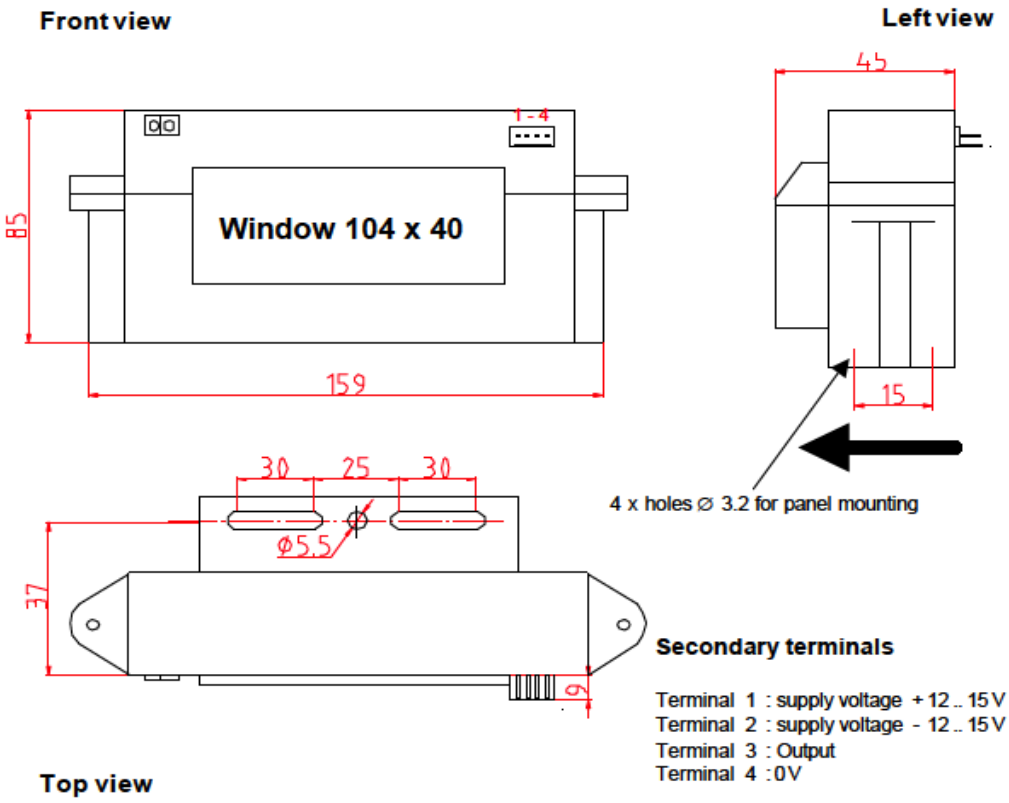
CTH Current sensor Type 5 (split core)

Dimensions in mm, 1mm = 0.0394 inch



CTH Current sensor Type 6 (split core)

Dimensions in mm, 1mm = 0.0394 inch

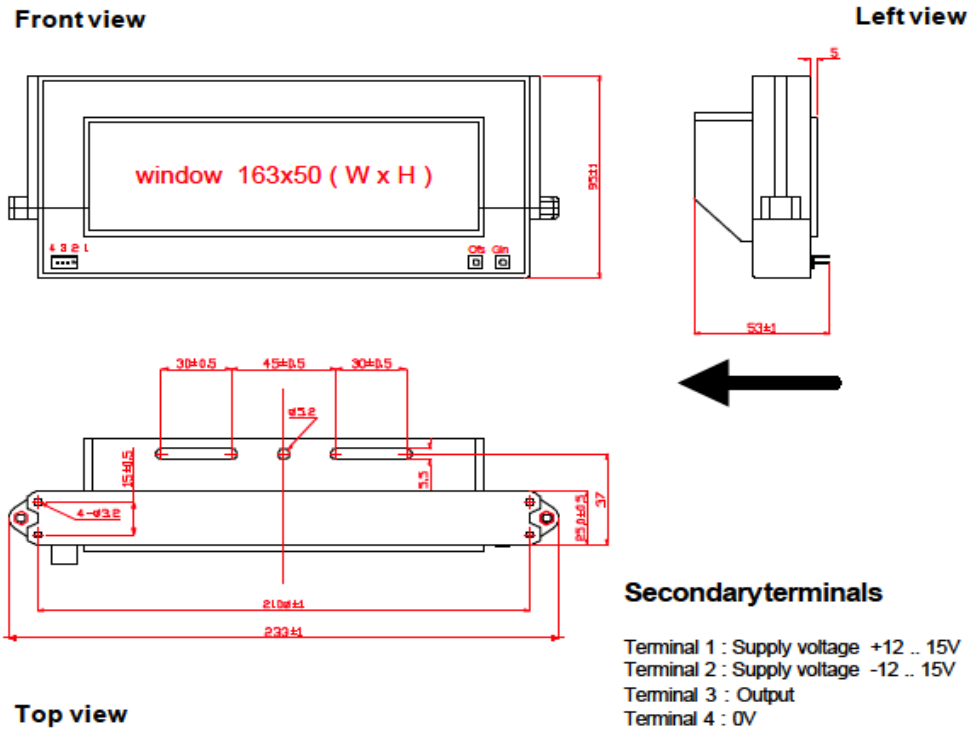


Secondary terminals

Terminal 1 : supply voltage +12 .. 15 V
Terminal 2 : supply voltage - 12 .. 15 V
Terminal 3 : Output
Terminal 4 : 0 V

CTH Current sensor Type 7 (split core)

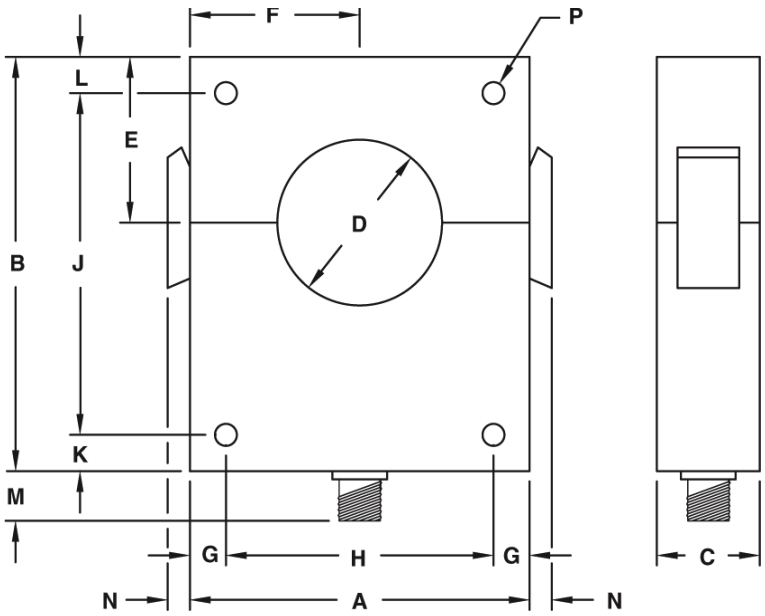
Dimensions in mm, 1mm = 0.0394 inch



Secondaryterminals

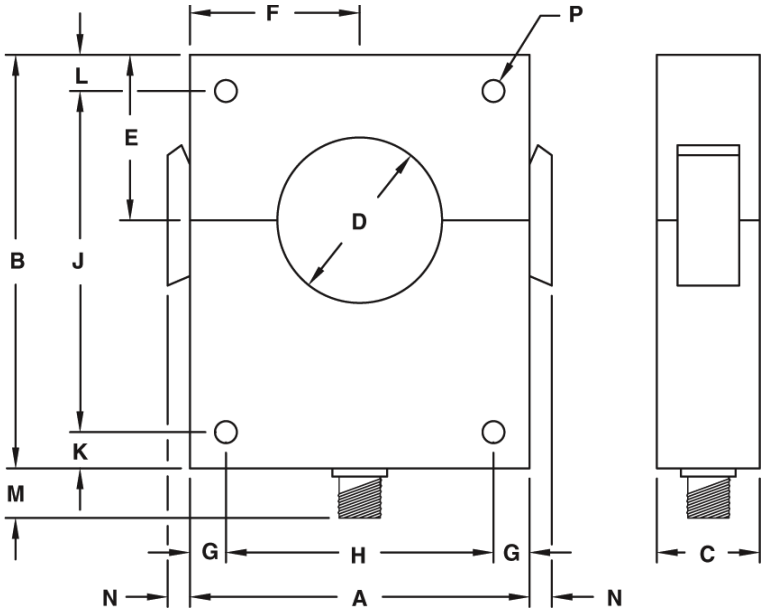
Terminal 1 : Supply voltage +12 .. 15V
Terminal 2 : Supply voltage -12 .. 15V
Terminal 3 : Output
Terminal 4 : 0V

CTH Current sensor 2” hole Type 8 (split core)



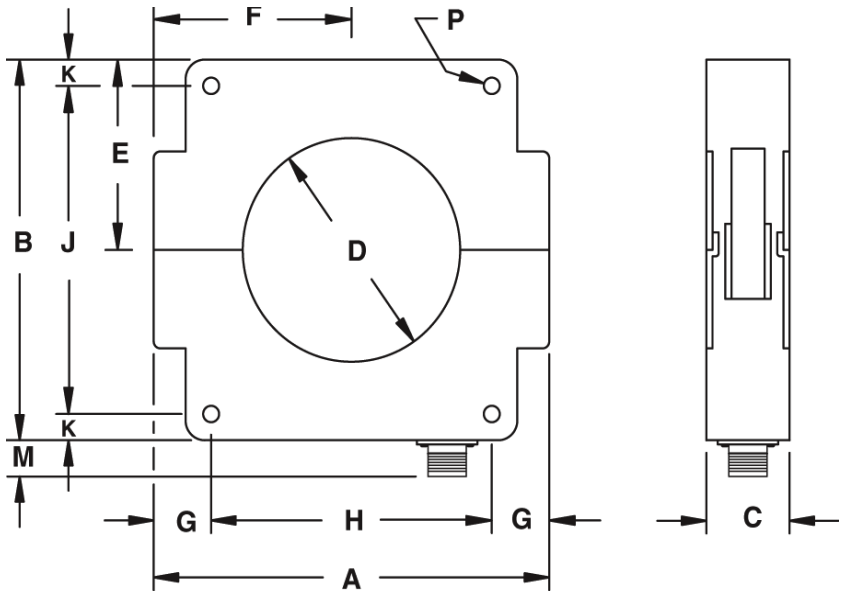
SENS SIZE	SENSOR DIMENSIONS inches and mm														WT. LBS
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	
inches	3 1/8	5	1 1/4	2	2	2 1/16	7/16	3 1/4	3 1/4	7/16	7/16	5/8	5/16	17/64	2
mm	79.38	127	31.75	50.8	50.8	52.39	11.11	82.55	82.55	11.11	11.11	15.88	7.94	6.75	2

CTH Current sensor 1.125” hole Type 8 Mini (split core)



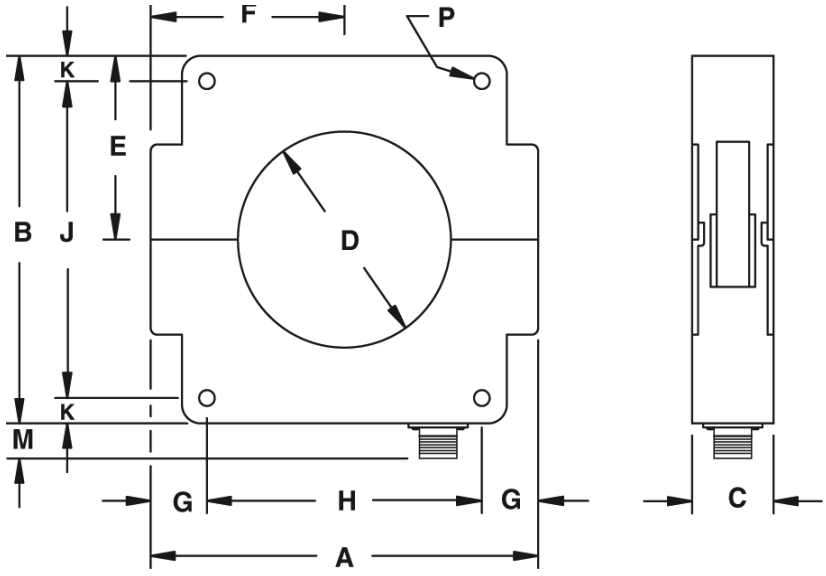
SENS SIZE	SENSOR DIMENSIONS inches and mm														WT. LBS
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	
inches	3 1/8	4	3/4	1 1/8	1 1/2	1 9/16	1/2	2 1/8	NA	3/8	1/4	3/8	1/4	5/16	0.75
mm	79.38	101.6	19.05	28.58	38.1	39.69	12.7	53.98	NA	9.53	6.35	9.53	6.35	7.94	0.75

CTH Current sensor 2.25” hole Type 8F (split core)



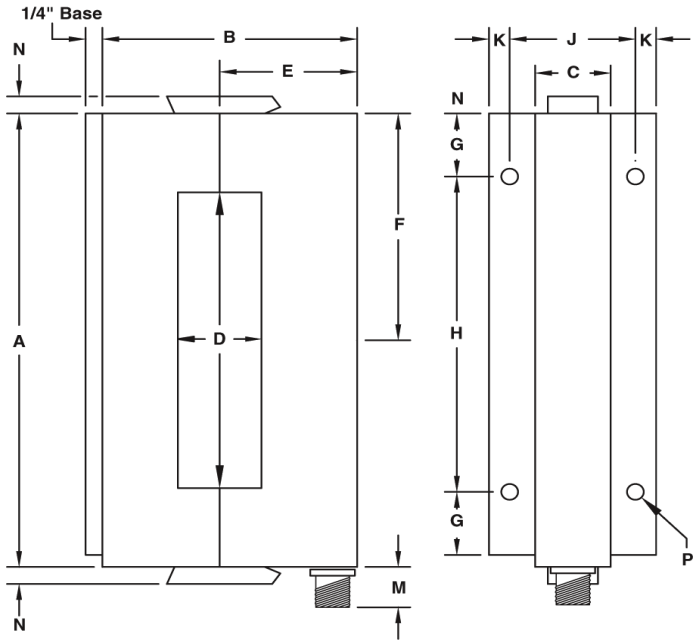
SENS SIZE	SENSOR DIMENSIONS inches and mm														WT. LBS
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	
inches	5 3/8	5 1/4	1 5/8	2 1/4	2 5/8	2 11/16	1 1/16	3 1/4	4 1/8	9/16	NA	5/8	NA	1/4	2.8
mm	136.53	133.35	41.28	57.15	66.68	68.26	26.99	82.55	104.78	14.29	NA	15.88	NA	6.35	2.8

CTH Current sensor 4.25” hole Type 8EE (split core)



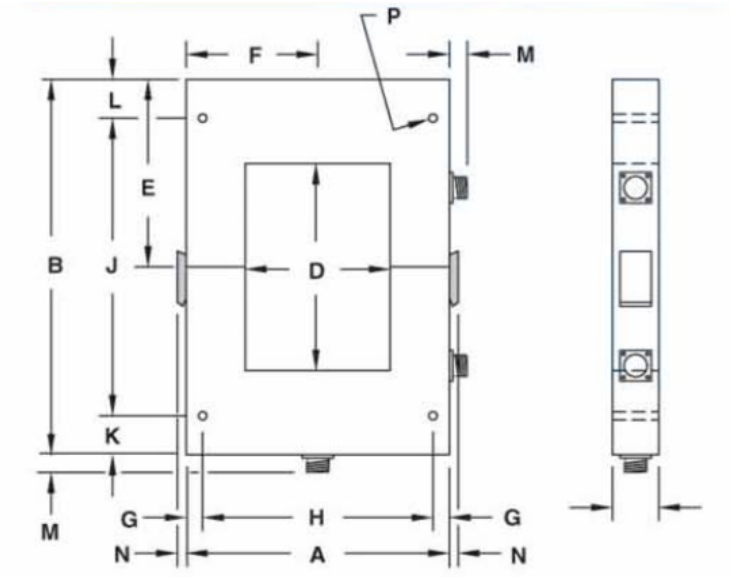
SENS SIZE	SENSOR DIMENSIONS inches and mm														WT. LBS
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	
inches	7 3/4	7 1/4	1 5/8	4 1/4	3 5/8	3 7/8	1 1/8	5/12	6/14	1/2	NA	5/8	NA	5/16	4.5
mm	196.85	184.15	41.28	107.96	92.08	98.43	28.58	10.58	10.89	6.35	NA	15.88	NA	7.94	4.

CTH Current sensor Type 9z (split core)



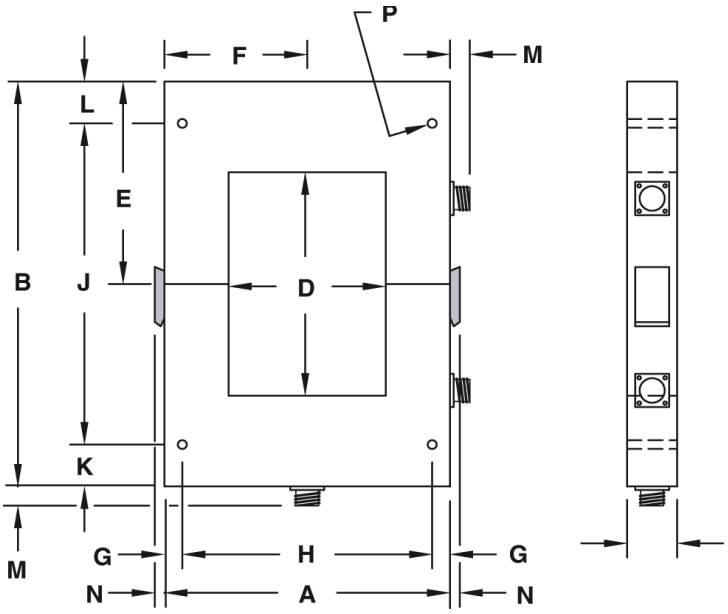
SENS SIZE	SENSOR DIMENSIONS inches and mm														WT. LBS
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	
inches	7 3/16	3 3/4	1 1/8	1 ¼ X 4 ½	2 1/16	3 1/2	1	5	1 7/8	5/16	NA	3/8	1/4	3/16	2.8
mm	182.56	95.25	28.58	31.75 X 107.95	52.39	88.9	25.4	127	47.63	7.94	NA	9.53	6.35	4.76	2.8

CTH Current sensor Type G (split core)



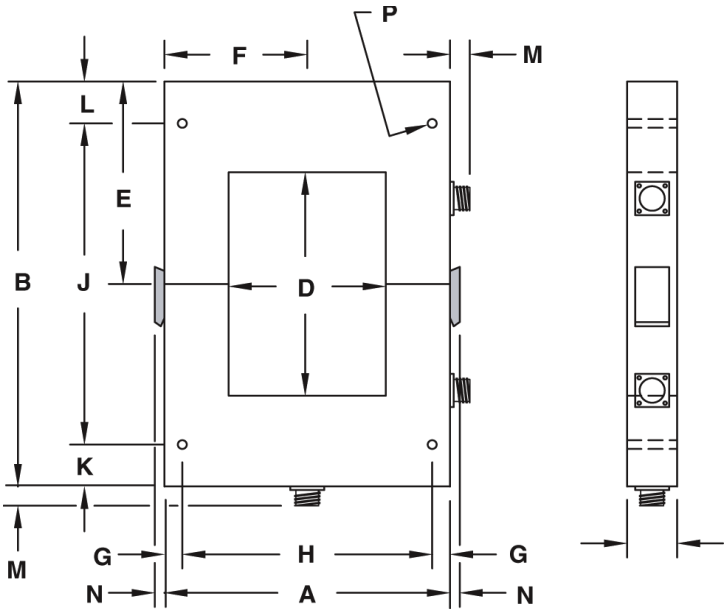
SENS SIZE	SENSOR DIMENSIONS inches														WT. LBS
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	
Type G	7 ¾	12	1 ¾	3 x 6 ½	6	3 7/8	5/8	6 ½	10 ¾	5/8	5/8	5/8	5/16	9/32	12.3

CTH Current sensor Type 10 (split core)



SENS SIZE	SENSOR DIMENSIONS inches and mm														WT. LBS
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	
inches	10	13 3/4	1 3/4	5 ½ X 6	6 1/2	5	5/8	8 3/4	11 1/2	1/4	1 1/2	5/8	5/16	9/32	13
mm	254	349.25	44.45	139.7 X 152.4	165.1	127	15.88	222.25	292.1	6.35	38.1	15.88	7.94	7.14	13

CTH Current sensor Type 11 (split core)



SENS SIZE	SENSOR DIMENSIONS inches and mm														WT. LBS
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	
inches	21	21	2	13 X 13	10 1/2	10 1/2	1 1/2	18	18	1 1/2	1 1/2	5/8	11/16	3/8	22
mm	533.4	533.4	50.8	330.2 X 330.2	266.7	266.7	38.1	457.2	457.2	38.1	38.1	15.88	17.46	9.53	22