Powertek

Instructions and installation for the CTA 1 ph and CTA3ph 5A current probe

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Company Profile

Powertek has two divisions; Powertek US Inc Holbrook NY USA, Powertek UK Ltd Reading United Kingdom. These offices support a network of worldwide service centers, distributors and representatives.

Powertek specializes in the design and manufacture of electrical power, voltage and current measuring instrumentation: Measurement Transducers, Current Probes, Wattmeters, Power Analyzers, phase measuring measurement equipment along with multifunction calibration standards. The Sensor Division offers a range of ac/dc current/voltage sensors, current shunts, wideband current probes, current transformers and ac/dc power related transducers. PC based software solutions allow the Powertek measuring instruments and transducers to be controlled via Ethernet, RS232, RS485 and IEEE-488 interfaces. Various display and storage options are available to suit the customer need. An “in house” software customization service is available.

Powertek’s customer base includes heavy industrial plants, avionics, positional control, military systems, power electronics & power conversion (inverters, switching power supplies, UPS, variable speed motor drives), single/three phase ac motors, ac generators, electroluminescent displays (EL displays), power transformers, electrical process control equipment, office and household appliance testing, electrical supply utilities and calibration.

All Powertek products are supplied CE marked with measurement uncertainties traceable to UKAS (UK) or NIST (USA) in accordance with ISO9001 2008. Our support includes application support, technical advice, servicing, repair and calibration.

Powertek US Inc is a CAGE coded Military supplier, Cage code 4S5P4. Read more about our activities with US Defense on https://www.sam.gov

Introduction

The CTA-5A module converts and conditions a CTA flexible current sensor voltage output to a 0- 5Arms output. Useful for interfacing Powertek Rogowski coil current sense technology with traditional or 0-5A legacy metering. The CTA3ph will produce a linear 0-5A current output proportional to Flexible sensor output voltage. The actual CTA3ph current range is indicated on the transducer label. The CT A-5A uses a 1 /5A current transformer to provide its 5Arms output and for double insulation. It is supplied with twin Din Rail power supplies creating ±15.0Vdc to power the conditioning electronics. Typically the CTA3ph device is used when a voltage output current probe/current sensor requires connection to existing 1A or 5A metering circuits.

Installation and safety

Installation should be carried out by authorised personnel, familiar with potential danger of electric shock hazards. The CTA-5A transducer should only be used in dry indoor environments. To prevent damage, check for correct connection of the CTA-5A psu, inputs and outputs. Allow a minimum warm up period of 5 minutes. Ensure that the CTA casing ventilation slots are not obstructed otherwise the CTA3ph may go in overheat shutdown. If the internal fan cannot be heard running, or if the airflow cannot be felt, do not use the CTA3ph module.

Specification

Maximum input voltage is 18Vpk / Input impedance 100k ohm
Recommended measurement range is 5% to 100% range

Output rating is 5VA, eg the load circuit impedance (burden) should not exceed 0.2 ohms at 5Arms

Minimum de power supply rail is 13.5Vdc, maximum de power supply rail is 15.5Vdc

Accuracy class is ±0.5%, ±1 % or ±3%, depending on model (temperature range 23°C ± 8°C)

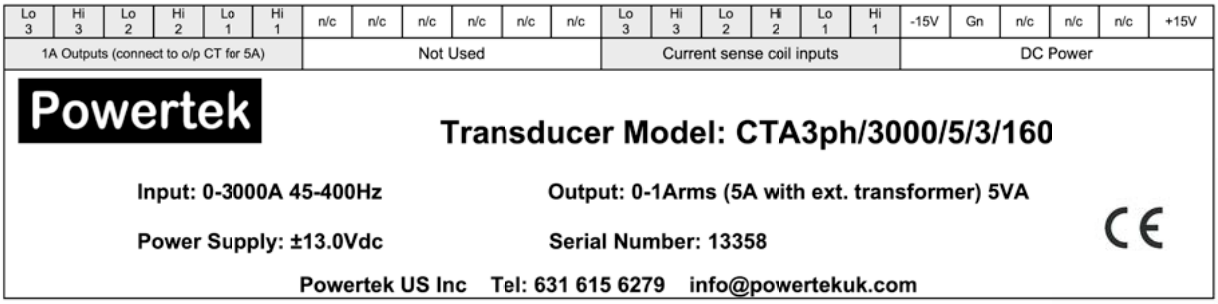
Sensor insulation: 1000V CE Cat III and UL approved

Only install CTA-3ph sensors on dry, insulated cables and busbars

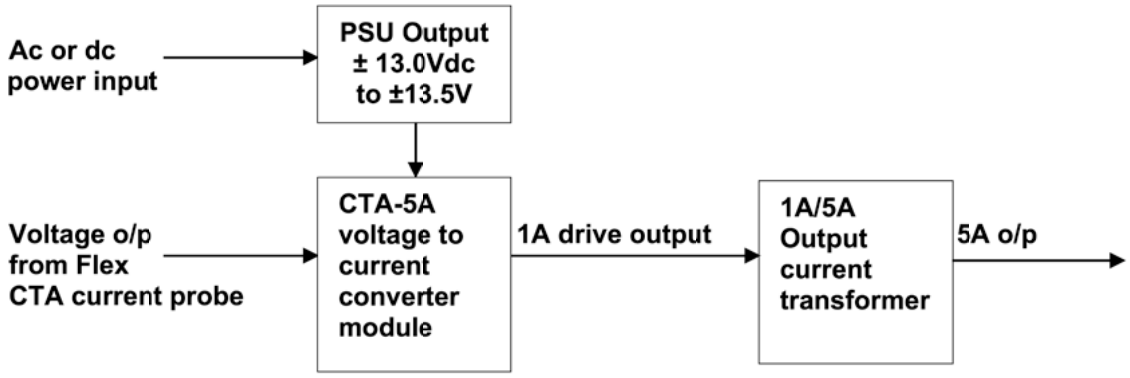
Connections and installation

Screw terminals are provided for the power input and output connections. The terminal block connections are labelled. Typically reference to a user manual is not required. The CTA-5A is DIN rail or wall mountable.

CTA3ph Connections



CTA3ph Block diagram of operation - for clarity shown as 1 phase

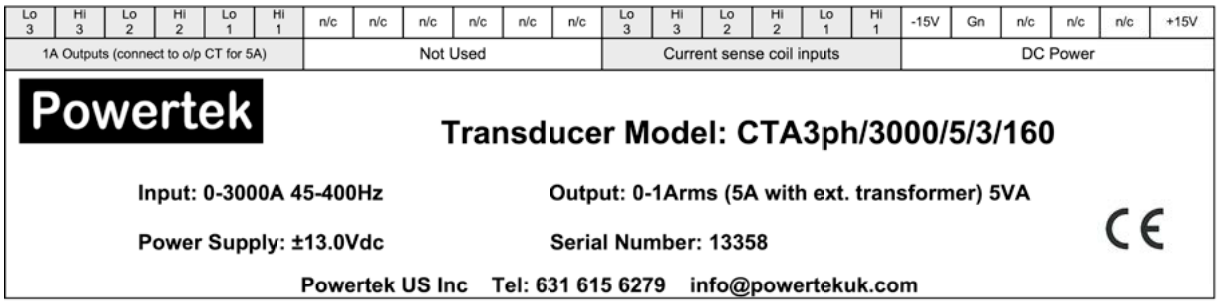


CTA3ph Protection

Max input voltage is 18Vac/dc. Only use with Powertek CTA Sense Rogowski coils. Accidental connection of inpuVoutput terminals to either a de or ac voltage source, >18Vpk, may result in damage.

Note: On the signal conditioner, there is no electrical isolation between any of the terminals, all terminals are referenced to an internal ground. The internal drive amplifier has thermal shutdown protection.

CTA3ph Connections



Gain and Offset adjust and calibration

The CTA-5A signal conditioners and associated output transformers are supplied calibrated and certified. Internal adjustment of dc offset and gain is possible. These adjustments should only be carried out by trained personnel using the correct calibration procedure.

Although yearly calibration adjustment is not required, it is recommended that yearly comparisons are made to known calibration standards. Refer to maintenance manual

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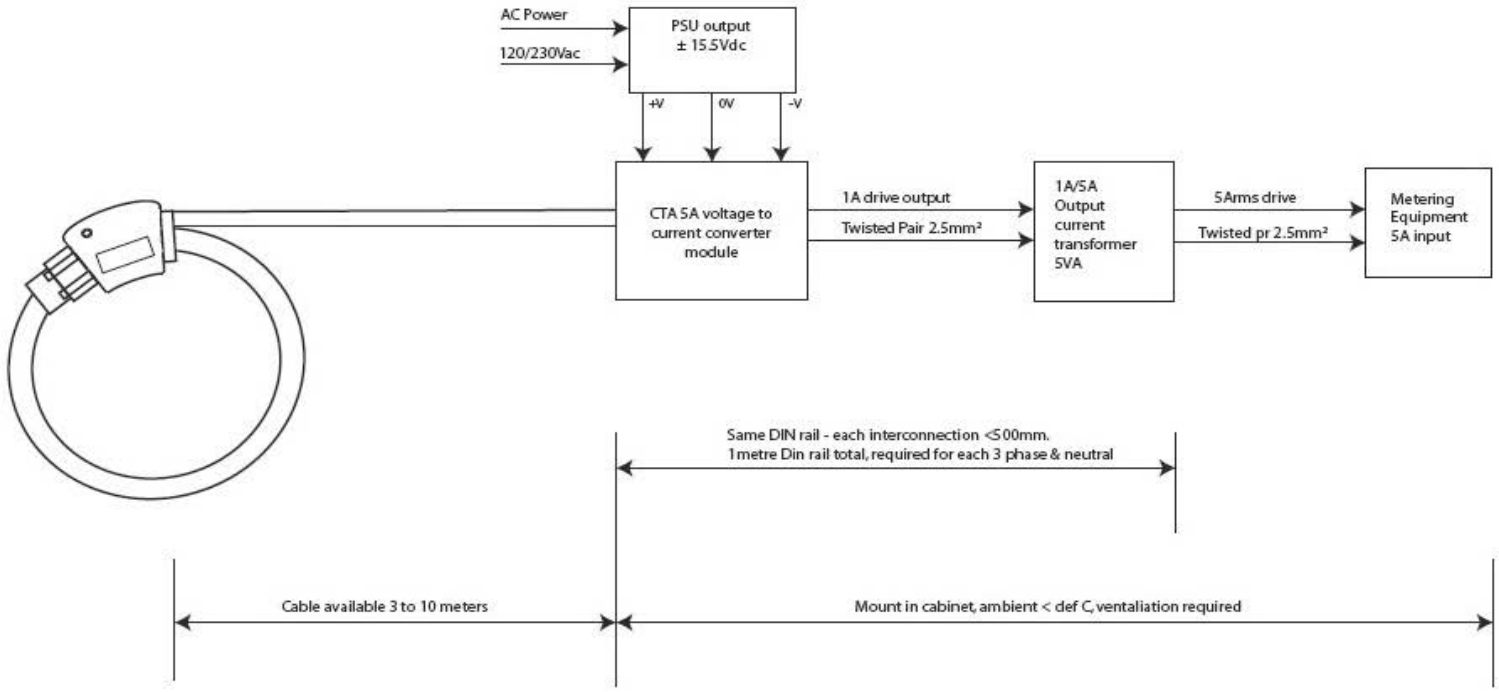
Installation schematic of CTA Flexible Current Sensor Porbes, producing a 1A or 5Arms current output, ensuring compatibility with 1A/5A metering circuits

Diagram below shows how the CTA flexible current probe is used with a CTA module, to produce a standard 1A or 5Arms output (not to scale)



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Notes
Rogowski sense coil A marked for each unit
All 3 metre cable length

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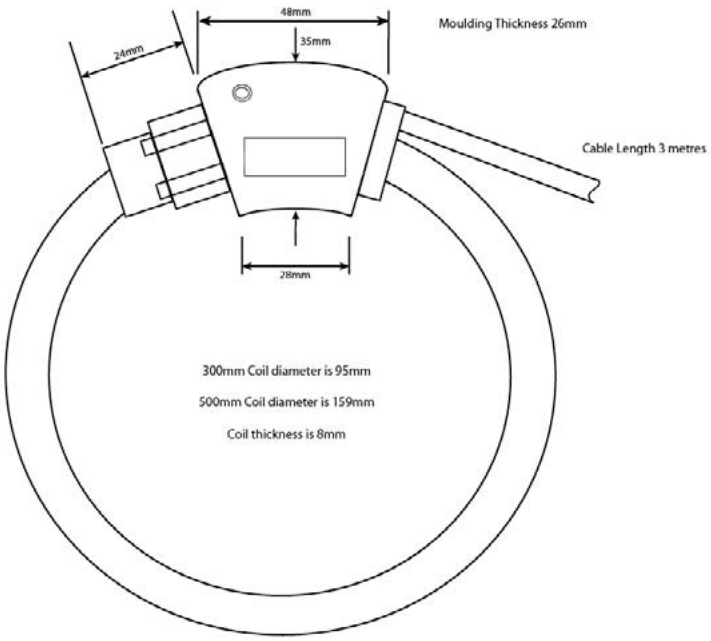
CTA Coil Drawing



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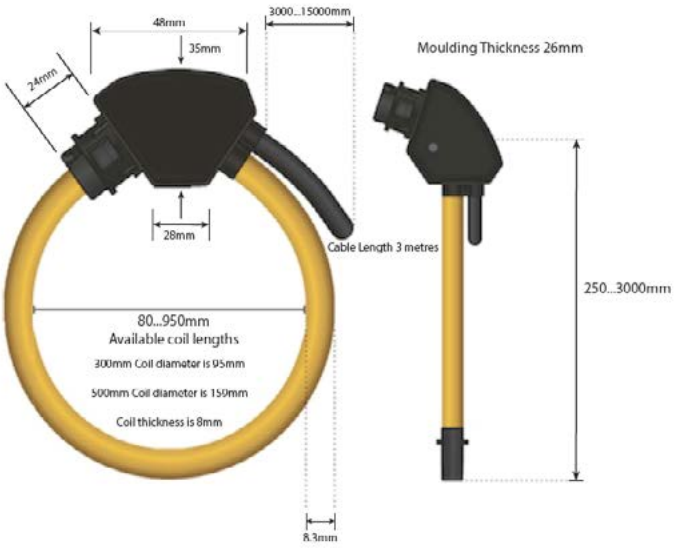
CTA Coil Drawing 2



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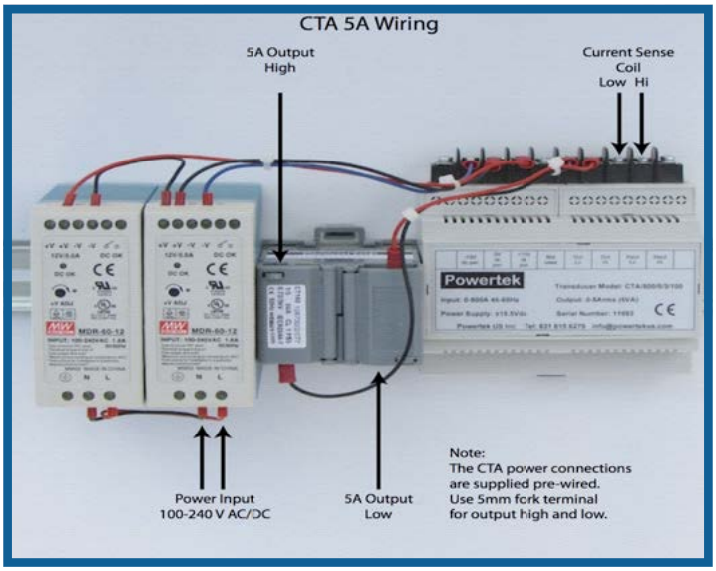
Single phase integrator



CTA3ph three phase Integrator signal conditioner

Warning: For cooling purposes the clip-in terminal access panels should be configured like the above image, where air enters from the top left and lower left clip in panels, then exits from fan.

All clip in panels should be fitted in this configuration to ensure correct airflow and optimum cooling.

Power Consumption Table

Example: With 4 meters between current transformer and ecosine active sync, the line length in the CT circuit is 8 meters. If 2.5mm² cables are used, the CT output power need to be at least 2.86VA.

Table 18 Power consumption of the CT lines valid for copper wires

Cross section	**AWG**	Distance **between current transformer and ecosine active sync vs.** CT 1 Amp **Secondary Burden in** VA **(Twin Wire)** (Consider forward and return lines!)					
		10 m	**20 m**	**40 m**	**60m**	**80 m**	**100m**
1.0 mm²	18	0.35	0.71	1.43	2.14	2.85	3.57
1.5 mm²	16	0.23	0.46	0.92	1.39	1.85	2.31
2.5 mm²	14	0.14	0.29	0.57	0.86	1.14	1.43
4.0 mm²	12	0.09	0.18	0.36	0.54	0.71	0.89
6.0 mm²	10	0.06	0.12	0.24	0.36	0.48	0.60
10.0 mm²	8	0.04	0.07	0.14	0.21	0.29	0.36

Example: With 20 meters between current transformer and ecosine active sync, the line length in the transformer circuit is 40 meters. If 1.5mm² cables are used, the CT output power need to be at least 1.85VA.

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