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Braking / Traction Current Meter for Battery-powered Locomotives

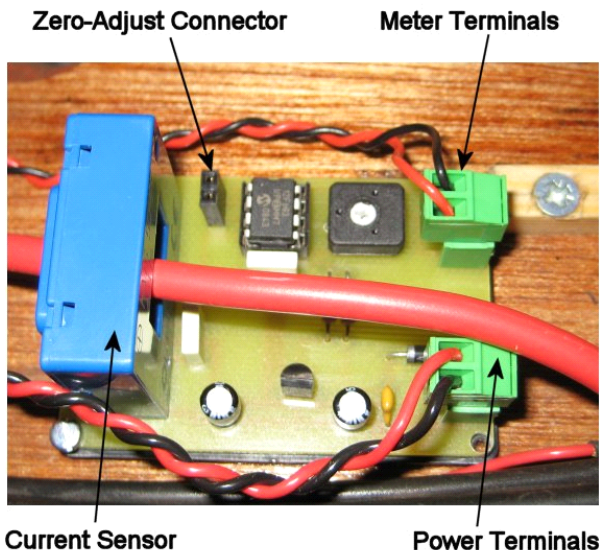


Standard Features:

- Displays Traction Current and Re-generative Braking Current
- Uses Hall-effect Transducer mounted inside the Locomotive.
- Current Sensing is independent of Battery Voltage
- Easy to Install - no need to cut any Battery leads
- Safe to use – no Electrical Connection to High Currents
- Quality Moving-Coil Meter – 70 mm x 60 mm
- Dual-microprocessor technology ensures reliability
- Reverse Polarity protected
- Standard scale as shown. Other scales available.

The Current Transducer works by sensing the magnetic field caused by a current flowing through the sensing aperture (Blue component in Picture). The sensor outputs a very low voltage which is proportional to the strength of magnetic field, and hence the current which causes it. This voltage is processed by the microprocessor, which develops a corresponding output signal to drive the meter. There is absolutely NO ELECTRICAL CONNECTION between the high-power Locomotive current and the unit..

The whole sensing unit (refer to the picture below) consists of a PCB (Printed Circuit Board) of dimensions 63 mm X 43 mm, on which all the components are mounted. There are 2 pairs of terminals – 1 pair (top right of PCB) for connecting the ammeter, and 1 pair (bottom right) for a suitable power source for driving the electronics. The main Battery positive lead is passed through the Transducer's Sensing Aperture .



The PCB is mounted in the Lid of a plastic box, to give a lower profile. The box itself is used to protect the assembly during transit. You may use the box to fashion a protective cover for the unit after installation, if required, since it has no further use.

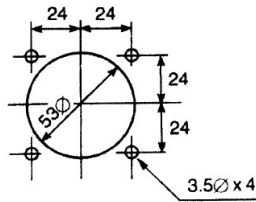
Installation

1. Ammeter

Check that the number written on the back of the meter matches the number written on the Transducer Assembly.

Cut holes to mount the Ammeter as shown below

Run two wires from the Meter + and – terminals to the Sensing unit's Meter POSITIVE and Meter NEGATIVE terminals respectively; looking at the picture on Page 2, the **NEGATIVE** terminal has a **BLACK** wire, and the **POSITIVE** terminal has a **RED** wire.



2. Transducer Unit

Position the Current Transducer in a suitable location within the Locomotive.

DISCONNECT THE BATTERIES before the next step!!

Take one end of the Main Battery POSITIVE cable. Pass the cable through the sensing aperture in the Current Sensor as shown in the picture on page 2. Re-connect the cable. The aperture is marked on one side with a 'plus' symbol inside a circle (that's on the side to the RIGHT in the picture) The cable should pass through the sensing aperture such that the current flows FROM the battery, through the right side of the aperture, and out of the left side. If you get the direction wrong, it won't cause any harm, but the Ammeter will not show any current!

Finally, connect the Transducer unit's POWER terminals to a suitable DC supply – anything from 8-30V will do. On the picture on Page 2, these are the terminals on the lower right. Again, the **BLACK** wire show the **NEGATIVE** terminal, and the **RED** wire the **POSITIVE**. The unit is protected against reverse-connection – it simply won't operate unless the polarity is correct.

Connect power

Whenever power is applied to the unit, the Ammeter needle will swing fully to the right, and back to zero, after which it will lie on the zero point. This is a confidence check that everything's working.

Perform Zero-adjust

The unit is calibrated at final assembly to read zero when no current is flowing through the transducer aperture. However, when it is installed in *YOUR* locomotive, there will be a small current flowing from the battery, which is being consumed by the Locomotive's Controller, handset and other accessories. If you don't want this current to be shown on the meter, then simply take a piece of wire, and short the terminals of the Zero-Adjust connector. The meter needle will move to Zero. Remove the link – the meter won't operate whilst it's connected. You only have to do this ONCE. The software will 'remember' what that current was, and permanently subtract it from the reading. However, if you add something new to the Loco, you may repeat it if required. Current flowing OUT OF the battery will move the needle to the RIGHT of centre, whilst current flowing INTO the battery will move the needle to the LEFT.

Compensating for Accessories

It may be that you have accessories (eg, Air horns, Fans, Smoke Generator, lights, etc) that you do not wish to show on the meter when you use them. If this is the case, you will need to provide a separate power feed for them, whose cable does not pass through the sensing aperture.

Document Revision

17 Dec 2009 Initial Release