

Meter Shunt Fabrication - Parameters and Calculations



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Type: **RLM6-RLM6-10AWG-0Mx-xRx (shunt)**

General Data

Description:

This brief overview of current-shunt design for analogue meters illustrates the typical schematic and associated calculations to make a shunt to match the required measuring parameters to a specific meter.

Required Parameters:

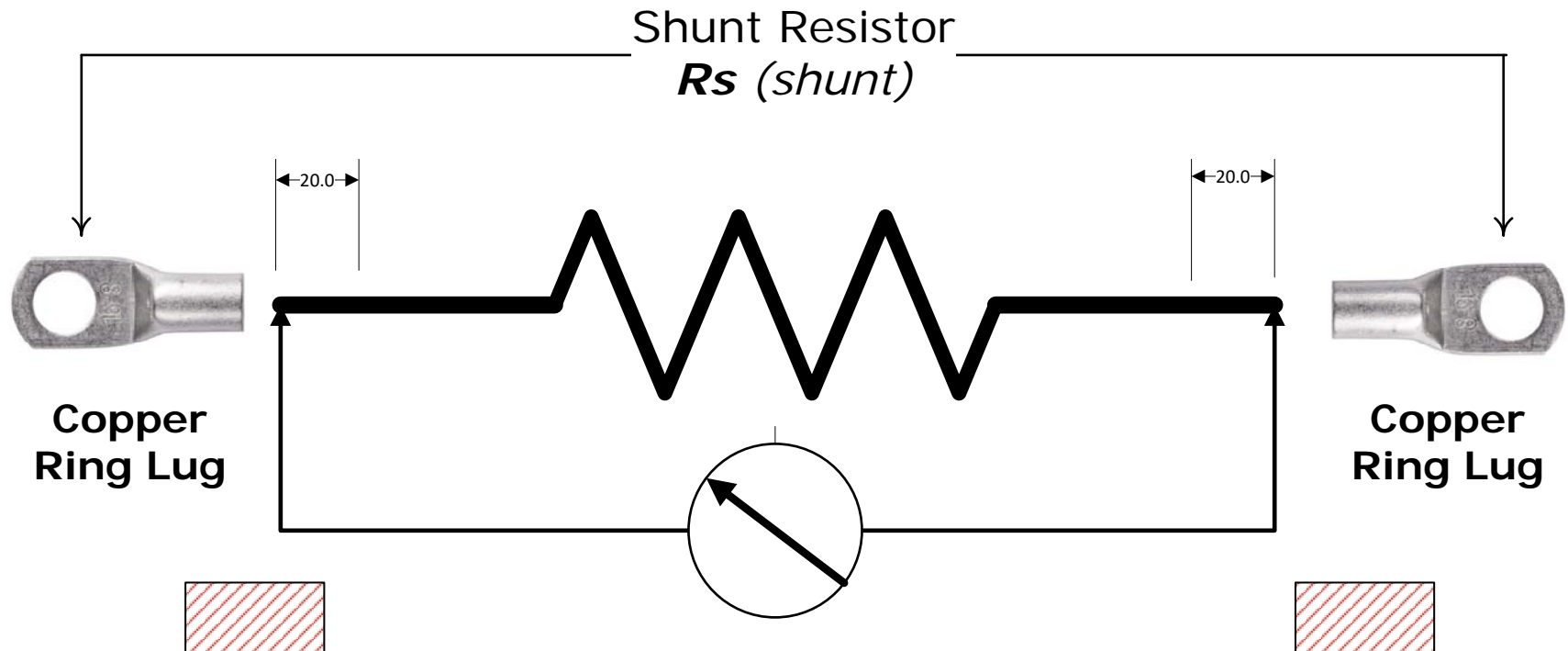
I_{fs} = The required full scale reading eg 30 Amps

I_m = Meter sensitivity = FSD eg 1 mili-Amp

R_m = Meter Internal Resistance eg 50 Ohms

Notes: There are practical considerations relating to the choice of meter, especially with regard to the manufacture, or supply, and power rating of the shunt resistor, and the native scale.

Leads from the shunt to the meter may contribute errors if not factored in.



Heatshrink

Meter (*movement*) Sensitivity

I_m

Internal Resistance of meter

R_m

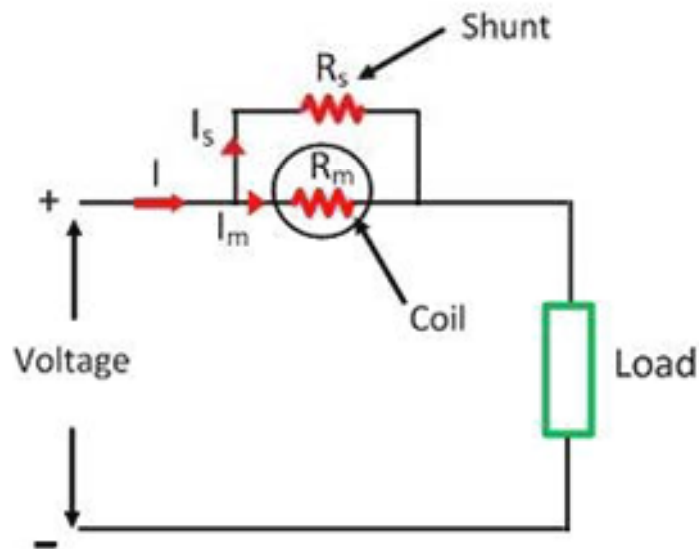
Required Full-Scale Reading

I_{fs}

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The formula for calculating the required current shunt resistance R_s (Ohms) to enable a meter with a full-scale sensitivity of I_m (Amps) and internal resistance R_m (Ohms) to measure I_{fs} (Amps) is:

$$R_s = (R_m * I_m) / I_{fs}$$

Where:

R_s = Current shunt resistance (Ohms)

I_m = Full-scale sensitivity of the meter (Amps)

I_{fs} = Current to be measured (Amps)

R_m = Internal resistance of the meter (Ohms)

Example – 1 (Shunt to suit a 100uA 50 Ohm meter)

R_s = Current shunt resistance (Ohms to be determined)

0.0001 I_m (100uA) = Full-scale sensitivity of the meter (Amps)

30 I_{fs} (30 Amps) = Current to be measured (Amps)

50 R_m (50 Ohms) = internal resistance of the meter (Ohms)

$R_s = (0.0001 / 30) * 50 = \mathbf{0.00016666 \text{ Ohms}}$ (1.7 uOhms)

Example – 2 (Shunt to suit a 5A 50 Ohm meter)

R_s = Current shunt resistance (Ohms to be determined)

0.001 I_m (1mA) = Full-scale sensitivity of the meter (Amps)

5 I_{fs} (5 Amps) = Current to be measured (Amps)

50 R_m (50 Ohms) = Internal resistance of the meter (Ohms)

$R_s = (0.001 / 5) * 50 = \mathbf{0.010 \text{ Ohms}}$ (10 mOhms)

