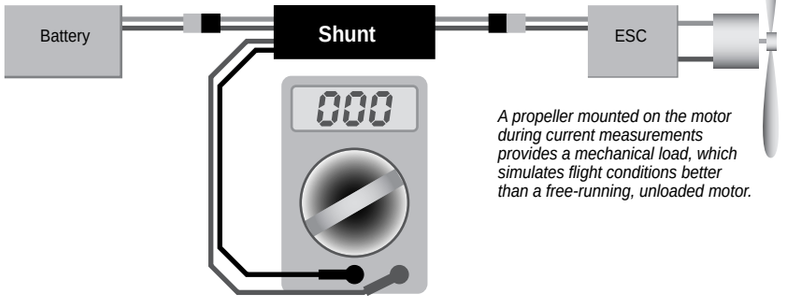
60A Current Shunt

Model DVM-SHUNT-60 for measuring electric propulsion system current with a standard digital voltmeter

- 0.001 ohm resistance for direct readout from a digital voltmeter (DVM) milliVolt scale.
- Handles 60A continuous current, and up to 100A for brief periods (<1 minute).
- Deans Ultra connectors for attaching to power system components, and standard probe connectors for attaching to almost any DVM.

Using the shunt



A propeller mounted on the motor during current measurements provides a mechanical load, which simulates flight conditions better than a free-running, unloaded motor.

1. Connect the shunt between the battery and ESC as shown above.
2. Connect the shunt's measurement leads to a DVM (red to +, black to –), such as FMA's DVM-VC890D laboratory-quality digital multimeter.
3. Set the DVM to read milliVolts.
4. **Important!** If the propulsion system is mounted in an aircraft, secure the aircraft so it will not move when the propeller is turning. If you are bench-testing a propulsion system, secure the motor so it will not move when the propeller is turning.
5. Turn on your transmitter. Move the throttle all the way down to its full off position.
6. Turn on the ESC and receiver. **Stay clear of the propeller!**
7. Advance the throttle to maximum, read the DVM display, then return the throttle to full off.
8. Turn off the ESC and receiver.
9. Turn off the transmitter.

Propulsion system current in Amps = DVM reading in milliVolts.

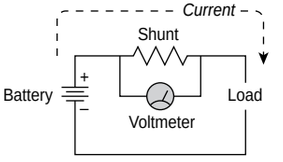
For example, if the DVM reads 37 milliVolts, then the propulsion system is drawing 37 Amps.

FMA, Inc. ● 5716A Industry Lane ● Frederick, MD 21704

Sales: (800) 343-2934 ● Technical: (301) 668-7614 ● www.fmadirect.com

Principle of operation

A shunt is a conductor with very low resistance in parallel with another device, in this case a voltmeter. As current flows through the circuit, the voltmeter measures the small voltage drop across the shunt. Since we know the shunt resistance (0.001 Ohms) as well as the voltage, we can calculate the current using Ohm's Law:



$$\text{current} = \frac{\text{voltage}}{\text{resistance}} \qquad \text{or in our case...} \qquad \text{Amps} = \frac{\text{milliVolts}}{0.001}$$

How you can use current data

- **Verify that components can handle the current.** Your battery pack, connectors, power wiring and ESC all have maximum current ratings. Once you know the system's current draw, check component specifications to make certain you are not exceeding maximum current.
- **Predict aircraft performance**. Many factors determine how your aircraft will perform in flight. Watts per pound is a simple calculation that may tell you how a particular airframe and propulsion system will fly.

  Remove the shunt from your propulsion system, then use the DVM to measure battery voltage under the same load as used to measure current. Use this formula to calculate watts per pound:

$$\text{watts per pound} = \frac{\text{Volts x Amps}}{\text{model weight, pounds}}$$

  Modelers using electric power have developed rough guidelines relating power to weight. Your airplane's performance may vary.
  - 25 to 30 watts per pound: level flight.
  - 40 to 50 watts per pound: take off from smooth surfaces, climb.
  - 50 to 60 watts per pound: take off from grass, sport aerobatics.
  - 70 to 100 watts per pound: 3D, pattern aerobatics.

FMA limited warranty

FMA, Inc. warrants this product to be free of manufacturing defects for the term of 90 days from the date of purchase. Should any defects covered by this warranty occur, the product shall be repaired or replaced with a unit of equal performance by FMA or an authorized FMA service station.

Limits and exclusions

This warranty may be enforced only by the original purchaser, who uses this product in its original condition as purchased, in strict accordance with the product's instructions. Units returned for warranty service to an FMA service center will be accepted for service when shipped postpaid, with a copy of the original sales receipt or warranty registration form, to the service station designated by FMA.

This warranty does not apply to:
- Consequential or incidental losses resulting from the use of this product.
- Damage resulting from accident, misuse, abuse, neglect, electrical surges, reversed polarity on connectors, lightning or other acts of God.
- Damage from failure to follow instructions supplied with the product.
- Damage occurring during shipment of the product either to the customer or from the customer for service (claims must be presented to the carrier).
- Damage resulting from repair, adjustment, or any alteration of the product by anyone other than an authorized FMA technician.
- Installation or removal charges, or damage caused by improper installation or removal.

Call (301) 668-7614 for more information about service and warranty repairs.

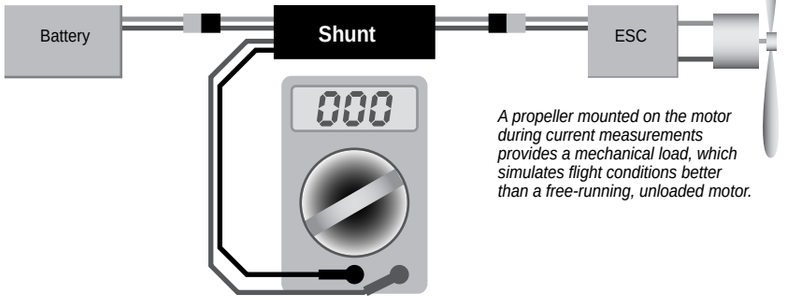
060201

60A Current Shunt

Model DVM-SHUNT-60 for measuring electric propulsion system current with a standard digital voltmeter

- 0.001 ohm resistance for direct readout from a digital voltmeter (DVM) milliVolt scale.
- Handles 60A continuous current, and up to 100A for brief periods (<1 minute).
- Deans Ultra connectors for attaching to power system components, and standard probe connectors for attaching to almost any DVM.

Using the shunt



A propeller mounted on the motor during current measurements provides a mechanical load, which simulates flight conditions better than a free-running, unloaded motor.

1. Connect the shunt between the battery and ESC as shown above.
2. Connect the shunt's measurement leads to a DVM (red to +, black to –), such as FMA's DVM-VC890D laboratory-quality digital multimeter.
3. Set the DVM to read milliVolts.
4. **Important!** If the propulsion system is mounted in an aircraft, secure the aircraft so it will not move when the propeller is turning. If you are bench-testing a propulsion system, secure the motor so it will not move when the propeller is turning.
5. Turn on your transmitter. Move the throttle all the way down to its full off position.
6. Turn on the ESC and receiver. **Stay clear of the propeller!**
7. Advance the throttle to maximum, read the DVM display, then return the throttle to full off.
8. Turn off the ESC and receiver.
9. Turn off the transmitter.

Propulsion system current in Amps = DVM reading in milliVolts.

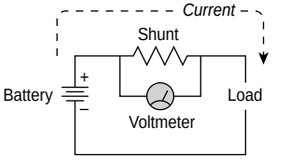
For example, if the DVM reads 37 milliVolts, then the propulsion system is drawing 37 Amps.

FMA, Inc. ● 5716A Industry Lane ● Frederick, MD 21704

Sales: (800) 343-2934 ● Technical: (301) 668-7614 ● www.fmadirect.com

Principle of operation

A shunt is a conductor with very low resistance in parallel with another device, in this case a voltmeter. As current flows through the circuit, the voltmeter measures the small voltage drop across the shunt. Since we know the shunt resistance (0.001 Ohms) as well as the voltage, we can calculate the current using Ohm's Law:



$$\text{current} = \frac{\text{voltage}}{\text{resistance}} \qquad \text{or in our case...} \qquad \text{Amps} = \frac{\text{milliVolts}}{0.001}$$

How you can use current data

- **Verify that components can handle the current.** Your battery pack, connectors, power wiring and ESC all have maximum current ratings. Once you know the system's current draw, check component specifications to make certain you are not exceeding maximum current.
- **Predict aircraft performance**. Many factors determine how your aircraft will perform in flight. Watts per pound is a simple calculation that may tell you how a particular airframe and propulsion system will fly.

  Remove the shunt from your propulsion system, then use the DVM to measure battery voltage under the same load as used to measure current. Use this formula to calculate watts per pound:

$$\text{watts per pound} = \frac{\text{Volts x Amps}}{\text{model weight, pounds}}$$

  Modelers using electric power have developed rough guidelines relating power to weight. Your airplane's performance may vary.
  - 25 to 30 watts per pound: level flight.
  - 40 to 50 watts per pound: take off from smooth surfaces, climb.
  - 50 to 60 watts per pound: take off from grass, sport aerobatics.
  - 70 to 100 watts per pound: 3D, pattern aerobatics.

FMA limited warranty

FMA, Inc. warrants this product to be free of manufacturing defects for the term of 90 days from the date of purchase. Should any defects covered by this warranty occur, the product shall be repaired or replaced with a unit of equal performance by FMA or an authorized FMA service station.

Limits and exclusions

This warranty may be enforced only by the original purchaser, who uses this product in its original condition as purchased, in strict accordance with the product's instructions. Units returned for warranty service to an FMA service center will be accepted for service when shipped postpaid, with a copy of the original sales receipt or warranty registration form, to the service station designated by FMA.

This warranty does not apply to:
- Consequential or incidental losses resulting from the use of this product.
- Damage resulting from accident, misuse, abuse, neglect, electrical surges, reversed polarity on connectors, lightning or other acts of God.
- Damage from failure to follow instructions supplied with the product.
- Damage occurring during shipment of the product either to the customer or from the customer for service (claims must be presented to the carrier).
- Damage resulting from repair, adjustment, or any alteration of the product by anyone other than an authorized FMA technician.
- Installation or removal charges, or damage caused by improper installation or removal.

Call (301) 668-7614 for more information about service and warranty repairs.

060201