RaceGrade

Specification

Document Number	RG_SPEC-0099			
Title	6 Channel Current Module			
CAN Speed:	**Base CAN ID:**	**Tx Rate:**	**Serial Number:**	**Checked By:**
Revision	**Date**	**Prepared By**	**Change History**	
1.0	06/02/2020	O. Zelaya	Initial Release	
1.1	07/13/2020	O. Zelaya	Corrected pinout for current channels	

The RaceGrade 6 Channel Current Module contains six individual current sensors used to monitor in-line current of individual circuits.

Part # RG.DV.PV0170

Specifications:

Current Range:	5A per channel[1]
Resolution:	2.5 mA
Software Filter:	Adjustable filter gain
CAN ID:	0x310[2]
CAN bus speeds:	1 Mbps[2]
Transmit Rate:	500 Hz[2]
Supply Voltage:	8 - 28 VDC
Supply Current:	100 mA
Temperature Range:	-20°C to +85°C
Dimensions:	102 x 69 x 36 mm
	4.0 x 2.70 x 1.42 in
Ingress Protection Rating:	IP 68 Potted
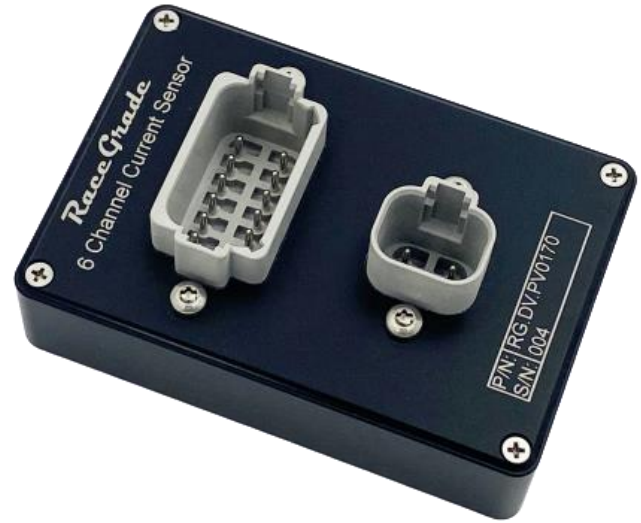
*(1) Reverse (negative) current values are not supported; circuits must be connected as shown in the **Connection** section of this document to ensure current flows in the correct direction through the device.*

*(2) Custom ID, CAN bus speed, and data transmit rates are available upon request at time of order. These can also be set by the user at any time with the RaceGrade Manager software (see **Manager** topic)*

CAN Messaging (TX):

CAN ID	Channel	Start Bit	Bit Length	Byte Offset	Byte Length	Multiplier	Adder	Unit	Endian
Base ID	Current Channel 1	0	16	0	2	1/5000	-1	A	
	Current Channel 2	16	16	2	2	1/5000	-1	A	
	Current Channel 3	32	16	4	2	1/5000	-1	A	
	Current Channel 4	48	16	6	2	1/5000	-1	A	
Base ID + 0x01	Current Channel 5	0	16	0	2	1/5000	-1	A	Motorola
	Current Channel 6	16	16	2	2	1/5000	-1	A	
Base ID + 0x04	Firmware Version	0	16	0	2	1/100	0	Integer	
	Temperature	16	16	2	2	1/10	-40	C°	
	Serial Number	32	16	4	2	1	0	Integer	

Connection:

The current module must be placed in series with the circuit of the device you are measuring. The module can be placed anywhere in the circuit, but it must interrupt the circuit when the 12-pin connector is unplugged from the RaceGrade Current Module. In the 12-pin connector you will find two terminals are used per channel. One is positive (+) and one is negative (-). This defines the polarity of the current flow through the current sensor. The current sensor measures positive current, so if the circuit is completed in reverse then the measurement will always be zero amps. The correct direction for the measurement is current flow entering the positive terminal and exiting the negative terminal. See the wiring chart and wiring examples below for reference.

Mating Connector	DT-12SK
Pin Number	Function
1	Channel 1 (+)
2	Channel 2 (+)
3	Channel 3 (+)
4	Channel 4 (+)
5	Channel 5 (+)
6	Channel 6 (+)
7	Channel 6 (-)
8	Channel 5 (-)
9	Channel 4 (-)
10	Channel 3 (-)
11	Channel 2 (-)
12	Channel 1 (-)

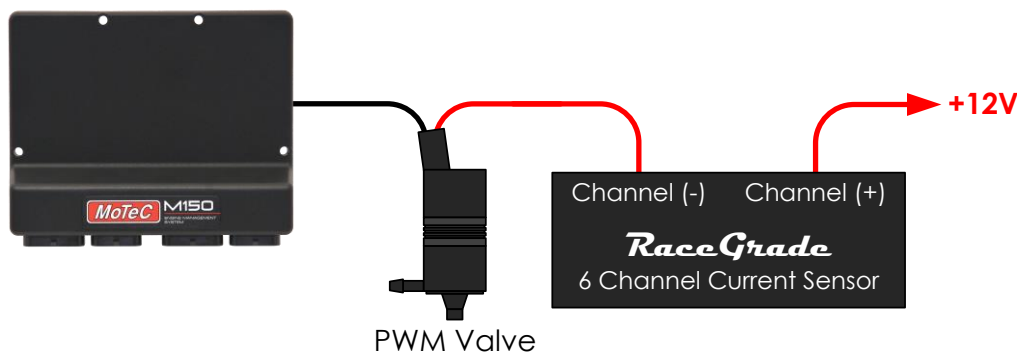| Mating Connector	DT-4SK
Pin Number	Function
1	Ground
2	CAN Lo
3	CAN Hi
4	+12V

Wiring Examples:

The following examples show how to correctly wire the device in a circuit for proper current measurement

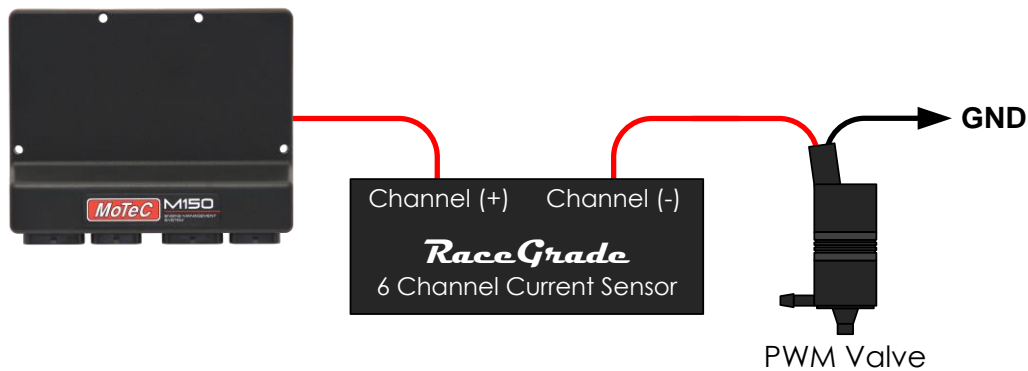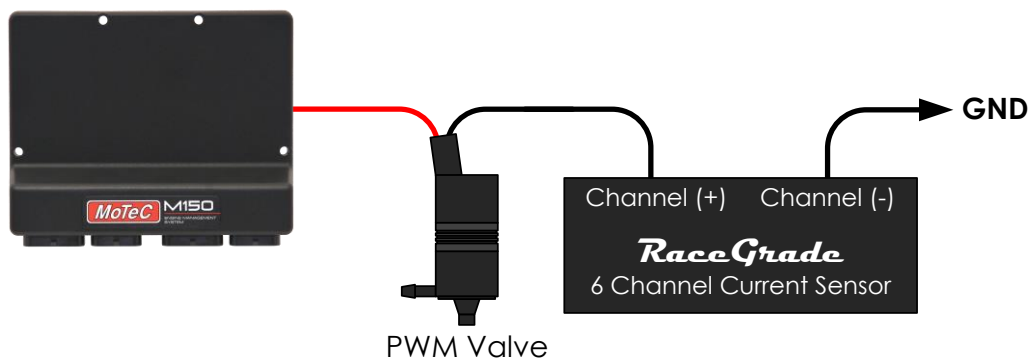Low Side Control Example A
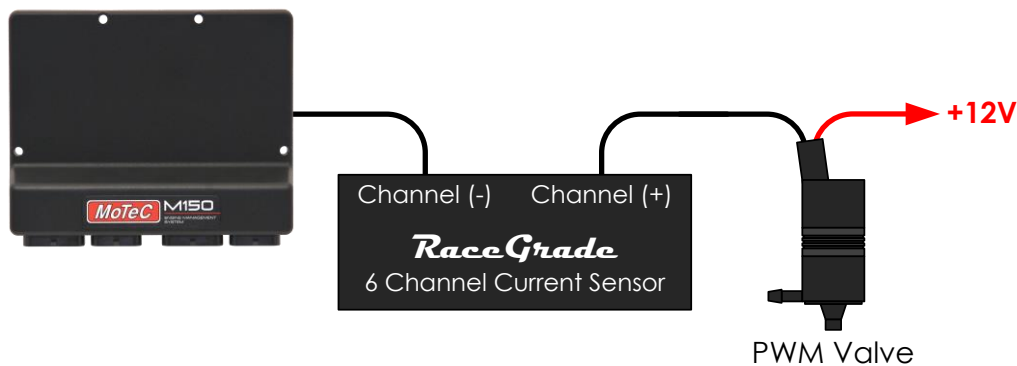
Low Side Control Example B

High Side Control Example A

High Side Control Example B

Mounting Considerations:

Do not firmly mount sensor to the chassis as this will induce unwanted engine vibration. Use the soft type of hook & loop tape for mounting. Mount on a solid structure of the chassis. Do not mount on any type of thin sheet metal. It is highly recommended that the unit is mounted away from heat sources.

Zeroing:

The device can be zeroed using either RaceGrade Manager (see information below) or by sending the following CAN message:

CAN ID	Channel	Start Bit	Length	Value	ASCII	Endian
Base ID + 0x02	Zero All Channels	0	32	0x4F464653	OFFSZERO	Motorola
		32	32	0x5A45524F		

It is important to zero the current module when the mounting location has changed as the orientation of the module heavily affects the zero point.

Manager:

The manager software used is RaceGrade Manager and the software uses a PCAN-USB by [Peak Systems](http://www.peak-systems.com) to communicate with the current module over CAN. RaceGrade Manager lets the user change transmit rate from 4Hz to 1000Hz, CAN base ID to one of their choosing, or select the alternate CAN bus speed of 500kbps. Additionally, the manager provides an easy means to zero the current sensors once the unit is mounted.

To download the latest version of RaceGrade Manager, go to: http://www.racegrade.com/downloads.html