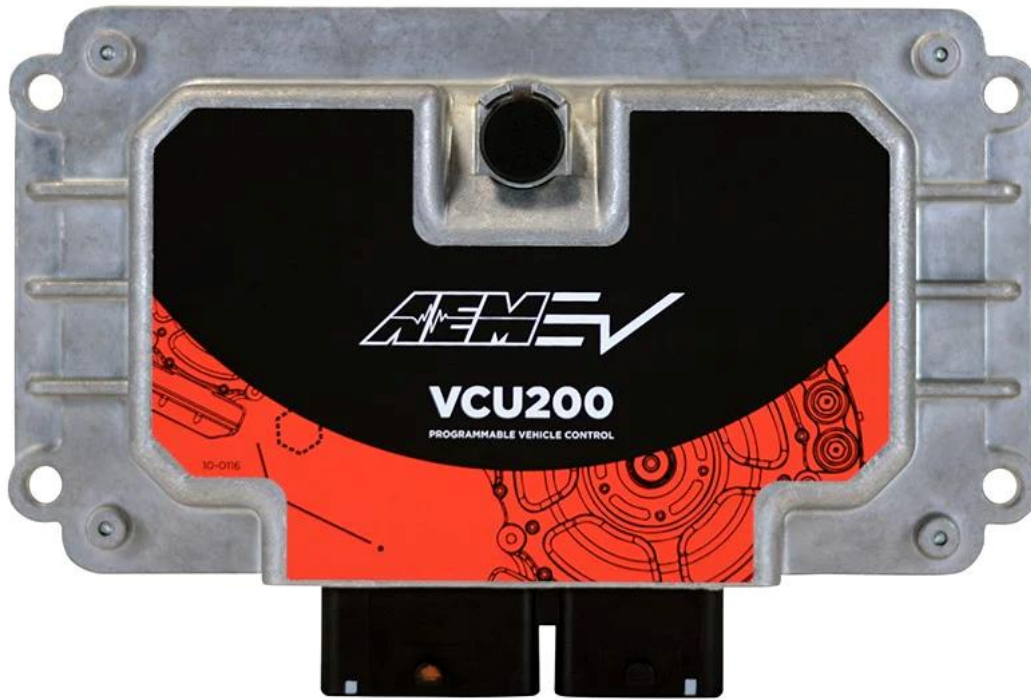# AEM VCU200 EV Vehicle Control Unit

Overview

AEM EV Vehicle Control Units (VCUs) are the missing link for high-performance EV street-conversion motorsports applications. They allow the calibrator to create customized torque management strategies applicable to a wide range of EV systems and component combinations. They integrate EV systems and unify the tuning experience providing motorsports- and conversion-ready features presented in a high feature, modern and customizable interface. Be In Control with AEM EV.

Specifications – AEM VCU200 EV Vehicle Control Unit

General

- **User Interface:** AEMcal
- **Pin Count:** 80
- **Clock Speed:** 64 MHz
- **Motor Control:** 1
- **Inverter Control:** 1
- **CAN Buses:** 4

Inputs

- **Analog Inputs:** 13
- **Digital Inputs:** 15
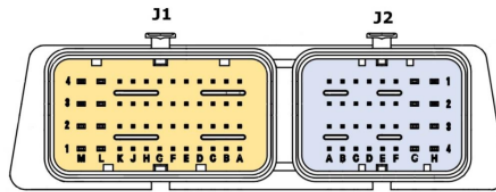- **Frequency Inputs:** 4

Outputs

- **Low Side Outputs:** 12
- **High Side Drivers:** 6
- **H-Bridges:** N/A
- **1/2 Bridges:** 4 LS PWM or 4 HS Drivers
- **Main Power Relay Driver:** N/A

Environmental

- **Enclosure Rating:** IP6K7 (Waterproof)
- **Enclosure Material:** Aluminum
- **Operating Voltage:** 9-16V DC
- **Overvoltage Protection:** 16V DC
- **Operating Temp Range:** -40C to +105C

Pinout Diagram – AEM VCU200

Hardware Pinout

Pin #	Pin Function	Range	Conditioning	Type	Application Notes
J1-A1	Ground				
J1-A2	Sensor Power1			5V Supply	100mA max
J1-A3	Ground				
J1-A4	Sensor Power2			5V Supply	100mA max
J1-B1	Ground				
J1-B2	Sensor Power3			5V Supply	50mA max
J1-B3	Ground				
J1-B4	Sensor Power4			5V Supply	50mA max
J1-C1	Input 9	0 – 5V	1.3k Pullup	Analog	RESERVED
J1-C2	Ground				
J1-C3	Cooling Pump Control Relay Driver			Low Side	500mA max
J1-C4	Output 22			Low Side	500mA max, RESERVED
J1-D1	Negative Contactor FB	0 – 5V	10k Pullup	Analog	Switch to ground
J1-D2	Ground				

Pin #	Pin Function	Range	Conditioning	Type	Application Notes
J1-D3	Cooling Fan 1 Relay Driver			Low Side	500mA max
J1-D4	Cooling Fan 2 Relay Driver			Low Side	500mA max
J1-E1	Enable Switch	0 – 5V	10k Pullup	Analog	Switch to ground
J1-E2	Ground				
J1-E3	Output 7			Low Side	500mA max, RESERVED
J1-E4	Output 8			Low Side	500mA max, RESERVED
J1-F1	Coolant Temp 1	0 – 5V	2k Pullup	Analog	
J1-F2	Ground				
J1-F3	Output 5			Low Side	500mA max, RESERVED
J1-F4	Oil Pump Relay Driver			Low Side	500mA max
J1-G1	Parking Lamp Switch	0 – 5V	2k Pullup	Analog	Switch to ground
J1-G2	Ground				
J1-G3	HVIL Main Output			Low Side	100mA max, 100Hz, 50% DC
J1-G4	HVIL Charge Cable Output			Low Side	100mA max, 100Hz, 50% DC
J1-H1	Head Lamp Switch	0 – 5V	2k Pullup	Analog	Switch to ground
J1-H2	Ground				
J1-H3	Output 1			Low Side	100 mA max, RESERVED
J1-H4	Safety Light Relay Driver			Low Side	500 mA max
J1-J1	LIN1				RESERVED
J1-J2	CAN1+				PC Comms
J1-J3	Output 17			High Side	500mA max, RESERVED
J1-J4	NOT USED				
J1-K1	Output 14			Low Side	500 mA max, RESERVED
J1-K2	CAN 1-				PC Comms
J1-K3	Output 15			High Side	500 mA max, RESERVED
J1-K4	Cooling Pump Wake			High Side	500 mA max
J1-L1	Pre-Charge Contactor Driver			High Side	3.3 A max
J1-L2	Positive Contactor Driver			High Side	3.3 A max
J1-L3	Inverter 12V Power Relay Driver			Low Side	3.3 A max
J1-L4	Output 13			Low Side	3.3 A max, RESERVED
J1-M1	12V Battery Power (Permanent)				
J1-M2	12V Battery Power (Permanent)				
J1-M3	Ground				
J1-M4	Negative Contactor Driver			Low Side	3.3 A max
J2-A1	CAN 2-				Peripheral Comms
J2-A2	Ignition Switch	0 – 12V	3.3k Pulldown	Digital	Switch to Batt, 12V = ON
J2-A3	Wake Input 2	0 – 12V	3.3k Pulldown	Digital	RESERVED
J2-A4	Wake Input 1	0 – 12V	3.3k Pulldown	Digital	Switch to Batt, 12V = ON
J2-B1	CAN 2+				Peripheral Comms
J2-B2	IMD Input	0 – 12V	3.3k Pulldown	Digital	
J2-B3	Brake Switch 2	0 – 12V	3.3k Pulldown	Digital	
J2-B4	Wake Input 3	0 – 12V	3.3k Pulldown	Digital	RESERVED
J2-C1	CAN 3-				VCU Data Transmit
J2-C2	Park Switch	0 – 12V	3.3k Pullup	Digital	
J2-C3	Reverse Switch	0 – 12V	3.3k Pullup	Digital	

Pinout Diagram AEM VCU200(cont.)

Pin #	Pin Function	Range	Conditioning	Type	Application Notes
J2-C4	Brake Switch 1	0 – 12V	3.3k Pullup	Digital	
J2-D1	CAN 3+				VCU Data Transmit
J2-D2	Neutral Switch	0 – 12V	3.3k Pullup	Digital	
J2-D3	Drive Switch	0 – 12V	3.3k Pullup	Digital	
J2-D4	Input 23	0 – 12V	3.3k Pullup	Digital	RESERVED
J2-E1	CAN 4-				RESERVED
J2-E2	Input 28	0 – 12V	3.3k Pullup	Digital	RESERVED
J2-E3	Input 27	0 – 12V	3.3k Pullup	Digital	RESERVED
J2-E4	Start Switch	0 – 12V	3.3k Pullup	Digital	
J2-F1	CAN 4+				RESERVED
J2-F2	Accel Pedal 2	0 – 5V	10k Pulldown	Analog	
J2-F3	Accel Pedal 1	0 – 5V	10k Pulldown	Analog	
J2-F4	Input 10	0 – 12V	33k Pulldown	Analog	RESERVED
J2-G1	Input 16	0 – 5V	100k Pulldown	Analog	RESERVED
J2-G2	Manual Regen Lever 2	0 – 5V	100k Pulldown	Analog	
J2-G3	Manual Regen Lever 1	0 – 5V	100k Pulldown	Analog	
J2-G4	Brake Pressure	0 – 5V	10k Pulldown	Analog	
J2-H1	Non-Driven Wheelspeed	0 – 5V	10k Pulldown	Frequency	20 – 2000 Hz
J2-H2	Driven Wheelspeed	0 – 5V	10k PU/PD	Frequency	20 – 2000 Hz
J2-H3	HVIL Charge Cable Input	0 – 5V	10k PU/PD	Frequency	20 – 2000 Hz
J2-H4	HVIL Main Input	0 – 5V	10k PU/PD	Frequency	20 – 2000 Hz