

Miondrive 170-100S

Solar car motor controller datasheet

Preliminary Rev A | 15 October 2026

Revision	Release date	Change summary
A	15 October 2026	Revision designation A.

1 Product overview

The Miondrive 170-100S is a silicon MOSFET three-phase motor controller for solar racing and other efficiency-sensitive electric drivetrains. VESC-based field-oriented control supports PMSM and BLDC motors with sensorless or Hall-sensor feedback. Vehicle commands and telemetry use native VESC CAN; VESC Tool provides configuration and diagnostics.

Parameter	Specification
DC bus operating range	10–170 VDC
Peak motor current	150 Apeak
Continuous motor current	56 Arms with no external cooling; subject to thermal limits
Peak measured inverter efficiency	99.31% at 110 VDC and a vehicle speed of 90 km/h
Auxiliary supply	9–36 VDC; auxiliary power and CAN isolated from the HV domain
Vehicle communication	Native VESC CAN; two internally connected M12 connectors
Mass	1,730 g
Enclosure dimensions	190 × 180 × 60 mm

Control and integration

- Current, duty-cycle, speed and position control; forward and reverse operation.
- Regenerative braking with separate motor-current and battery-current limits.
- Sensorless and Hall-based control, motor parameter detection and field weakening.
- Independent hardware overcurrent shutdown, firmware protection and temperature derating.
- Aluminium enclosure with a base cooling interface for an external heatsink or water-cooled cold plate.
- Internal USB-C connection for configuration and diagnostics.



2 Electrical specifications

Absolute maximum ratings

Maximum DC bus voltage: 170 VDC. This limit must not be exceeded, including during regenerative braking, switching ripple and supply transients. Select the normal operating voltage with sufficient margin below this limit.

Electrical ratings

Parameter	Min	Typ	Max	Unit
Input voltage	10	130	170	VDC
Input current			150	A DC
Regenerative braking current			150	A DC
Continuous motor current ¹		80		A
Peak motor current ²			150	Apeak
PWM switching frequency ³	7.5	20	30	kHz

Current definitions

Input current is drawn from the battery to drive the motor. Regenerative braking current is returned to the battery. The listed 150 A DC values are peak limits. Motor current is specified separately as RMS current or peak amplitude.

¹ Rated continuous motor current: 80A (56 Arms) without external cooling, subject to thermal limits. ² Peak motor current: 150 Apeak, approximately 106 Arms for sinusoidal current. Available current and peak duration depend on cooling, ambient temperature and operating conditions. Current is reduced at the configured thermal derating threshold; 150 Apeak remains the maximum regardless of cooling.

³ The specified PWM switching frequency is the actual switching frequency. VESC Tool uses the zero-vector frequency, which is twice the actual switching frequency. For 20 kHz actual switching frequency, enter 40 kHz in VESC Tool.

DC link

Characteristic	Value
Nominal capacitance	Approximately 1.7 mF total, including bulk and film capacitance
Stored energy at 170 V	Approximately 25 J, calculated from nominal capacitance
Precharge completion	External precharge is mandatory; no internal precharge circuit is fitted. Before closing the main contactor, precharge the DC link close to the battery voltage. Select the permitted voltage difference so that the resulting inrush current remains within the ratings of the contactor and connected components.

3 Motor interface and protection

Motor and sensor interface

Parameter	Specification
Motor types	PMSM and BLDC; sensorless or Hall-sensor feedback
Motor output voltage	120 Vrms line-to-line at a stated DC bus voltage
Motor inductance	Operation demonstrated with a 10 μ H motor; poor efficiency reported under the tested conditions. Recommended minimum 50uH
Hall sensor supply	12 V
Hall inputs	Three Hall inputs with internal 2.2 k Ω pull-ups to 3.3 V. Intended for open-collector/open-drain Hall outputs; no external pull-ups required.
Motor temperature sensor	VESC Tool options: NTC 10 k Ω at 25 °C; PTC 1 k Ω at 100 °C; KTY83/122; NTC 100 k Ω at 25 °C; KTY84/130; custom NTC; custom PTC; PT1000
Motor temperature setting	80 °C recommended, or lower if required by the motor
Sensor electrical reference	Hall interface is battery/HV referenced.

Operation with a 10 μ H motor does not establish a recommended minimum-inductance rating. Efficiency and thermal performance depend on the motor, DC bus voltage, switching frequency and operating current.

Auxiliary supply

Parameter	Specification
Input voltage	9–36 VDC
Typical input power	1.1 W changes by switching frequency
Isolation	Auxiliary supply isolated from the HV domain

Protection functions

Function	Implementation and limits
Current	Configurable motor and battery limits; firmware absolute-current protection; independent hardware overcurrent shutdown.
DC voltage	Firmware undervoltage and overvoltage protection.
Temperature	Three PCB MOSFET sensors and a motor-temperature input; configurable current derating.
Firmware temperature ceiling	110 °C MOSFET protection setting; not an operating or junction-temperature rating.

4 CAN communication and connections

Vehicle control and telemetry

The vehicle control interface is native VESC CAN. Both M12 connectors connect to the same CAN bus and auxiliary supply. No internal 120 Ω termination is fitted; terminate the vehicle CAN network at both ends.

Parameter	Specification
CAN protocol	Native VESC CAN using 29-bit extended identifiers.
Bitrates	10, 20, 50, 75, 100, 125, 250, 500 kbit/s and 1 Mbit/s
Isolation	CAN is isolated from the HV domain
Commands and telemetry	CAN control of motor current, braking current, duty cycle, electrical speed and position. Telemetry includes motor and battery current, DC bus voltage, electrical speed, duty cycle, MOSFET and motor temperatures, and consumed/regenerated Ah and Wh. Status messages and transmission rates are configurable in VESC Tool.
Command timeout	Configurable command timeout and timeout braking current. On timeout, the controller releases the motor or applies the configured braking current. Control commands must be refreshed periodically.
Enable and fault recovery	Motor commands are accepted after initialization, subject to fault and inhibit conditions. Faults disable motor drive; operation may resume in response to control commands after the fault clears and the configured fault-stop interval expires.
Battery current adjustment	Battery discharge and regenerative-charge current limits can be updated over CAN during operation. Temporary updates and persistent storage are supported.

Electrical connections

Connection	Interface	Required connection data
DC+ and DC–	Amphenol SurLok Plus; 5.7 mm RADSOK contacts	See mating power connectors below
Motor phases	U, V and W; Amphenol SurLok Plus, 5.7 mm	See mating power connectors below
CAN and auxiliary	2 × M12, 5-pin female; shared CAN bus and auxiliary supply	See female M12 pinout.
Motor sensors	8-pin M8; Hall signals and motor temperature	See M8 pinout
USB-C	Internal configuration and diagnostics	Not isolated

Mating power connectors

Amphenol SurLok Plus manufacturer part numbers. Select the cable plug for the conductor cross-section shown.

Color	Receptacle	Mating cable plug	Cable size
Orange	SLPRABPSO	SLPIPA16BSO	16 mm ²
Orange	SLPRABPSO	SLPIPA25BSO	25 mm ²
Black	SLPRABPSB	SLPIPA16BSB	16 mm ²
Black	SLPRABPSB	SLPIPA25BSB	25 mm ²
Red	SLPRABPSR	SLPIPA16BSR	16 mm ²
Red	SLPRABPSR	SLPIPA25BSR	25 mm ²

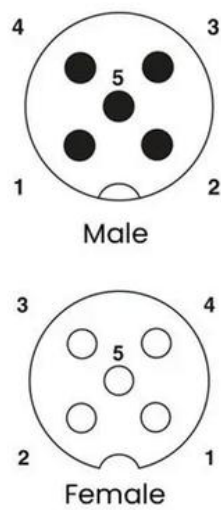
90° connectors are also available.

5 Connector pinouts

Female M12 connector

Five-pin female M12 connector for CAN communication and the auxiliary supply. Pin numbers and wire colors are listed below.

Pin	Wire color	Function	Electrical details
1	Brown	Shield	Internally not connected to GND
2	White	Auxiliary supply positive	+9–36 VDC
3	Blue	GND	Auxiliary supply return
4	Black	CAN H	CAN high
5	Gray	CAN L	CAN low



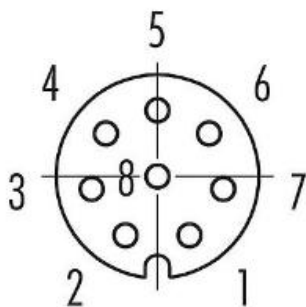
Connector reference — use the lower Female view.

6 Motor sensor pinout

Eight pin M8 connector

The M8 motor-sensor connector provides the 12 V supply, three Hall inputs, the motor-temperature input and two GND pins. Wire colors follow the supplied connector cable reference.

Pin	Wire color	Signal	Function
1	White	12 V	Sensor supply
2	Brown	Hall 1	Motor Hall input 1
3	Green	Hall 2	Motor Hall input 2
4	Yellow	Hall 3	Motor Hall input 3
5	Grey	GND	Sensor ground
6	Pink	Motor temperature	Motor-temperature sensor input
7	Blue	GND	Sensor ground
8	Red	NC	No connection; leave unconnected



M8 connector numbering reference

Pin arrangement as supplied, with the keyway at the bottom.

Inverter connector: Binder 76 6218 1111 00008-0200

Mating cable example: Binder 77 3405 0000 50008-0200

Electrical reference and limits

Connect Hall signals to pins 2, 3 and 4, and sensor ground to pins 5 and 7. Use Hall sensors with open-collector or open-drain outputs. Each Hall input includes a 2.2 kΩ pull-up to 3.3 V; external pull-ups are not required.

Connect the motor-temperature signal to pin 6 and select the matching sensor type and parameters in VESC Tool.

Sensor ground is connected to battery negative. The motor-sensor interface is not galvanically isolated from the battery circuit. Keep sensor wiring separate from the isolated CAN auxiliary return.

7 Mechanical

Mechanical properties

Parameter	Specification
Mass	1,730 g (1.730 kg)
Overall envelope	190 × 180 × 60 mm;
Enclosure	Aluminium; connectors on two sides; any mounting orientation
Ingress protection	IP54
Cooling interface	Enclosure base; external heatsink or water-cooled cold plate optional
Mounting	Ø4.5 mm mounting holes on an 85 × 182 mm pattern; see mechanical drawing

