

KSH Controller

KSH-012-048-VC, KSH-012-072-VC, KSH-012-096-VC

The KSH series motor controller for brushless DC motor (BLDC) or permanent-magnet synchronous motors (PMSM) offers best in class energy efficient design in compact form-factor. To achieve high reliability and efficiency in demanding load cycling requirements encountered in eV traction applications, these controllers utilise latest generation Top-side cooled MOSFET. This packaging efficiently remove heat from drain of MOSFET to heat-sink and keep them cool in harsh ambient temperature thus significantly increasing efficiency and lifetime of controller.

Key features:

- Max Torque Per Amp Vector Control & efficient Flux Weakening Algorithm
- Advance Space Vector modulation PWM scheme with Synchronous rectification (to by-pass current from body diode to MOSFET channel to reduce conduction losses)
- Built-in vehicle electronic control unit (ECU) for on-road eV 3wheeler Passenger(L5M), 3 & 4-Wheeler Cargos (L5N & N1), Off-road golf-carts and e-tractors etc.
- Regeneration on Brake and at Zero Throttle
- Hill-Hold for 10 seconds, thereafter controlled roll-off hill assist ease out drivability in up and down gradients
- Functional Safety as per ARAI AIS-038 and Smart protection feature- Stall and Over-Speed Protection, Over-current & Under Voltage Protection
- Smart Limp-Home Temperature foldback scheme above 85degC Heat-sink temperature & Over-Temperature Protection above 100degC Heat-sink Temperature
- CAN 2.0 Compliant



Controller P/N	KSH-012-048-VC	KSH-012-072-VC	KSH-012-096-VC
Control mechanism	Vector control with advance space vector modulation	Vector control with advance space vector modulation	Vector control with advance space vector modulation
Rotor position sensing	Sine/Cosine analog encoder	Sine/Cosine analog encoder	Sine/Cosine analog encoder
Input voltage range	36V ~ 60V	60V ~ 80V	84V ~ 110V
Continuous line current (S2-60 Minute)	190 Arms	125 Arms	95 Arms
Peak line current (S2 – 2 Minute)	340 Arms	225 Arms	175 Arms
PVM frequency	10KHz Nominal (Configurable)	10KHz Nominal (Configurable)	10KHz Nominal (Configurable)
Fundamental frequency range	0 ~ 400Hz	0 ~ 400Hz	0 ~ 400Hz
Efficiency	>95%	>95%	>95%

Propelling up and ahead

Storage ambient temperature	-30°C to +75°C	-30°C to +75°C	-30°C to +75°C
Operating ambient temperature	-20°C to +60°C	-20°C to +60°C	-20°C to +60°C
Thermal cutback	Controller linearly derates maximum current limit when baseplate temperature raises from 80 to 90°C. Thermal cutback occurs above 90°C & below -30°C	Controller linearly derates maximum current limit when baseplate temperature raises from 80 to 90°C. Thermal cutback occurs above 90°C & below -30°C	Controller linearly derates maximum current limit when baseplate temperature raises from 80 to 90°C. Thermal cutback occurs above 90°C & below -30°C
Ingress protection	IP65	IP65	IP65
Withstand voltage between heatsink & DC/AC power terminals	500V DC/Resistance ≥ 7 M Ω as per IS 18590:2024	500V DC/Resistance ≥ 7 M Ω as per IS 18590:2024	500V DC/Resistance ≥ 7 M Ω as per IS 18590:2024
Isolation resistance between heatsink & DC/AC power terminals	500 Ω /Volt of the working voltage, as per AIS-038/IS 18590:2024	500 Ω /Volt of the working voltage, as per AIS-038/IS 18590:2024	500 Ω /Volt of the working voltage, as per AIS-038/IS 18590:2024
EMC	ECE R10/AIS-004 Part-2 Immunity & Part-3 Emission	ECE R10/AIS-004 Part-2 Immunity & Part-3 Emission	ECE R10/AIS-004 Part-2 Immunity & Part-3 Emission
Functional safety	As per AIS-038/IS 18590:2024	As per AIS-038/IS 18590:2024	As per AIS-038/IS 18590:2024
Vibration	IEC 60068-2-6, 5G 10-500Hz, 3 Axes	IEC 60068-2-6, 5G 10-500Hz, 3 Axes	IEC 60068-2-6, 5G 10-500Hz, 3 Axes
Weight	4Kg	4Kg	4Kg
Dimension (W x L x H)	155mm x 212mm x 86mm	155mm x 212mm x 86mm	155mm x 212mm x 86mm
Power connector	5 x M8	5 x M8	5 x M8
Signal interface	35 POS Ampseal connector	35 POS Ampseal connector	35 POS Ampseal connector
Communication	2 independent channels for standard CAN & CANFD	2 independent channels for standard CAN & CANFD	2 independent channels for standard CAN & CANFD

Related products:

Our **KSH** series high-performance, high torque, heavy duty EV motors as below:

- 1 KSH-012-060
- 2 KSH-012-072
- 3 KSH-012-096
- 4 KSH-012-384



Propelling up and ahead

Other products:

Our **PRV** series high-performance, compact sized, light-weight drone motors as below:

- 1 PRV-040-400
- 2 PRV-016-100LA (Low altitude)
- 3 PRV-016-100HA (High altitude)
- 4 PRV-007-100LA (Low altitude)
- 5 PRV-007-100HA (High altitude)
- 6 PRV-007-52
- 7 PRV-002-44



Our **PRV** series best in class, small form factored drone controllers (ESC) as below:

- 1 PRV-016-100-TC
- 2 PRV-007-100-VC

