ALLEGRO microsystems

REINVENTING THE RIDE

Enhancing Efficiency and Durability in Combustion Motorcycles

While electrification makes headlines, the Internal Combustion Engine (ICE) motorcycle remains the workhorse of global transportation, particularly in emerging markets. However, these vehicles are undergoing a massive technological transformation to meet stringent new emission regulations and consumer expectations for modernization. The challenge for manufacturers is to revitalize the traditional powertrain with advanced electronic controls for cleaner combustion, while simultaneously integrating modern conveniences like digital dashboards and LED lighting into a cost-effective platform.

Modernizing these bikes demands precise crankshaft and camshaft sensing to optimize fuel injection timing for cleaner emissions. The electronics must also provide stable power for new digital clusters and LED lighting, all while withstanding the extreme heat, oil exposure, and high-frequency vibration inherent to a combustion engine environment.

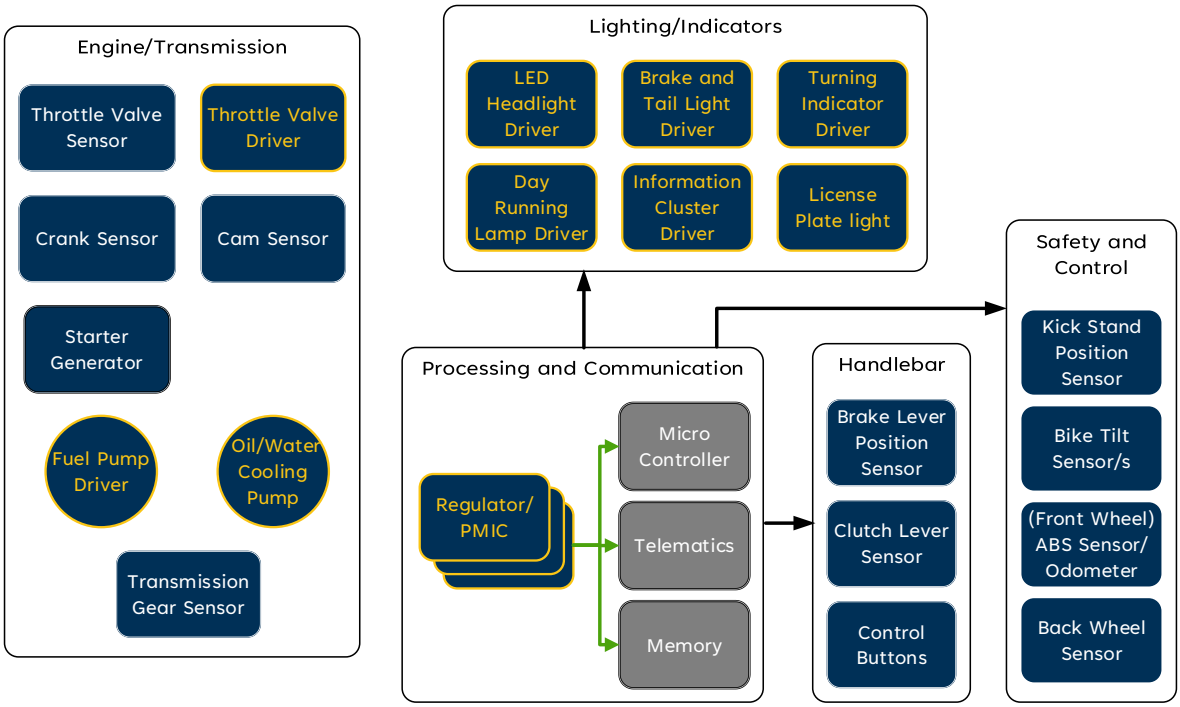
What You Can Achieve with Allegro Solutions:

- **Built for Harsh Environments:** Our magnetic sensors withstand intense heat, vibration, and dirt. They provide the precise, contactless feedback needed for critical safety systems like ABS, ensuring reliability even in extreme riding conditions.
- **Maximized Efficiency:** Advanced drivers and sensors enable precise control over fuel pumps and electronic throttles. This results in smoother acceleration, lower emissions, and improved fuel economy, supporting frictionless engine performance
- **Compact Integration:** With space at a premium, our highly integrated solutions combine multiple functions into small packages. This reduces component count and system weight while simplifying design layouts for lighting and body control.

Stricter environmental regulations are forcing a universal transition from carburetors to advanced Electronic Fuel Injection (EFI) systems.

Allegro is the trusted partner for this modernization, providing the robust sensing essential for clean EFI implementation. We help manufacturers meet emission targets while enhancing vehicle reliability and rider experience.

Block Diagram



Key Products and Solutions

Subsystem	Component	Allegro Parts	Key Differentiator
Engine & Transmission	Crank & Camshaft	A1696	Precise timing during cold cranking
	Fuel Pump	A89303	Silent, sensorless, efficient pumping
	ETC	A4990	Precise throttle valve control
		A31315	Redundant, safety-critical 3D sensing
	Starter Generator	A4939, A4994	Seamless stop-start operation
		CT310	High-bandwidth TMR for efficient motor commutation
	Transmission	A1468	Vibration-immune for smooth shifting
	Gear Position	A31315	Single-chip 3D gear detection
Safety and Control	ABS Wheel Speed	A/TS19200	Industry-standard 2-wire protocol with vibration immunity
	Kickstand & Tilt	APS11203	Robust, solid-state reliability under high vibration
Handlebar	Brake Lever	A31316	Stray-field immune 3D sensing for precise modulation
	Clutch & Buttons	APS11203	Wear-free, contactless operation
Power Systems	PMIC	A4411/2	Stable power during cranking dips
Lighting	Headlight	A6213/7	Flicker-free dimming for premium headlamps
	Backlight	A6263/4	Multi-channel fault detection meets safety regulations
	LCD Bias	A8603	Generates all LCD voltage rails from a single supply
	LCD Backlight	A80601	Noise-free dimming & high sunlight contrast

To learn more about the Allegro family of products and to explore available design resources, visit allegromicro.com