

# APS3

## Steer-by-wire controller for 24-80V

The 3rd generation Advanced Power Steering (APS) controller from Inmotion Technologies is meticulously engineered to fulfill the latest requirements set forth by the European standards for functional safety. The APS combines redundant input and output with a second CPU running dedicated supervising functionality developed and maintained in accordance with Automotive SPICE® to ensure highest possible reliability.

The APS directly interfaces a variety of steering input devices and motor types. It can function and operate in a stand-alone steering system, or as a part of an overall CANopen based vehicle system. The product range covers a wide variety of vehicle applications including Class 1, 2, and 3 lift trucks.



Regal Components is proud to be the only distributor today that can offer unique know-how and years of application experience of working with the ACS/APS family. In combination with the Schabmüller range of motors, gearboxes, pumps and complete drivelines, Regal supplies complete world-class solutions for most battery powered applications.

### SPECIFICATIONS

<b>Motor types</b>	Induction AC, Synchronous AC, Brushless DC (supporting dual motor feedback sensors for redundant supervision)
<b>Feedback types</b>	Incremental, sinusoidal, six-step
<b>Inputs</b>	3 digital in (pull-down), 1 digital in (pull-up), 2 Analog in, 1 High side input
<b>Outputs</b>	3 Open drain outputs (2A), 1 open drain output (0.1A), 1 High side output
<b>Communication</b>	CAN (ISO 11898-2), 125, 250, 500, 800 and 1000 kbps
<b>Switching frequency</b>	8 kHz (4, 12 or 16 kHz optional)
<b>Operating stator frequency</b>	0-250 Hz
<b>Control mode</b>	Position, Speed (rpm), Current ( $A_{RMS}$ ). (Steering wheel/Tiller steering)
<b>Connector</b>	AMPSEAL 35 pin
<b>Operating temperature</b>	-40°C to +55°C
<b>Storage temperature</b>	-40°C to +70°C, ambient humidity 95%
<b>Protection class</b>	IP65
<b>Standards</b>	UL583 and EC declaration of incorporation of partly completed machinery according to EN1175-1

2016-01-11, specifications subject to change without notice

ISO 9001  
BUREAU VERITAS  
Certification



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- Rugged design suited for most electric vehicles
- The standard APS controller can control both AC induction, AC synchronous and BLDC motors
- Hundreds of internal and external parameters are continuously monitored with configurable reaction to any deviation
- Powerful primary ARM processor and operating system allows parallel execution of customized vehicle control tasks and motor control tasks
- Second ARM processor for redundant supervision according to ISO13849-1, category 3.
- High side output with dual switches controlled by main and supervision functions for redundant execution of safety function
- CANopen or J1939 with option to configure the CAN protocol to support custom slave-master or peer-to-peer communication.
- Dual redundant CAN nodes for distributed system architectures
- The ACS protects itself and other powertrain components from damage by limiting the output as a function of motor speed, motor and controller temperature, battery voltage, DC power and/or motor torque at configurable levels
- Auto-tuning simplifies the matching of motor and controller
- Software quality is sustained through processes complying with Automotive SPICE®

### Current and power ratings

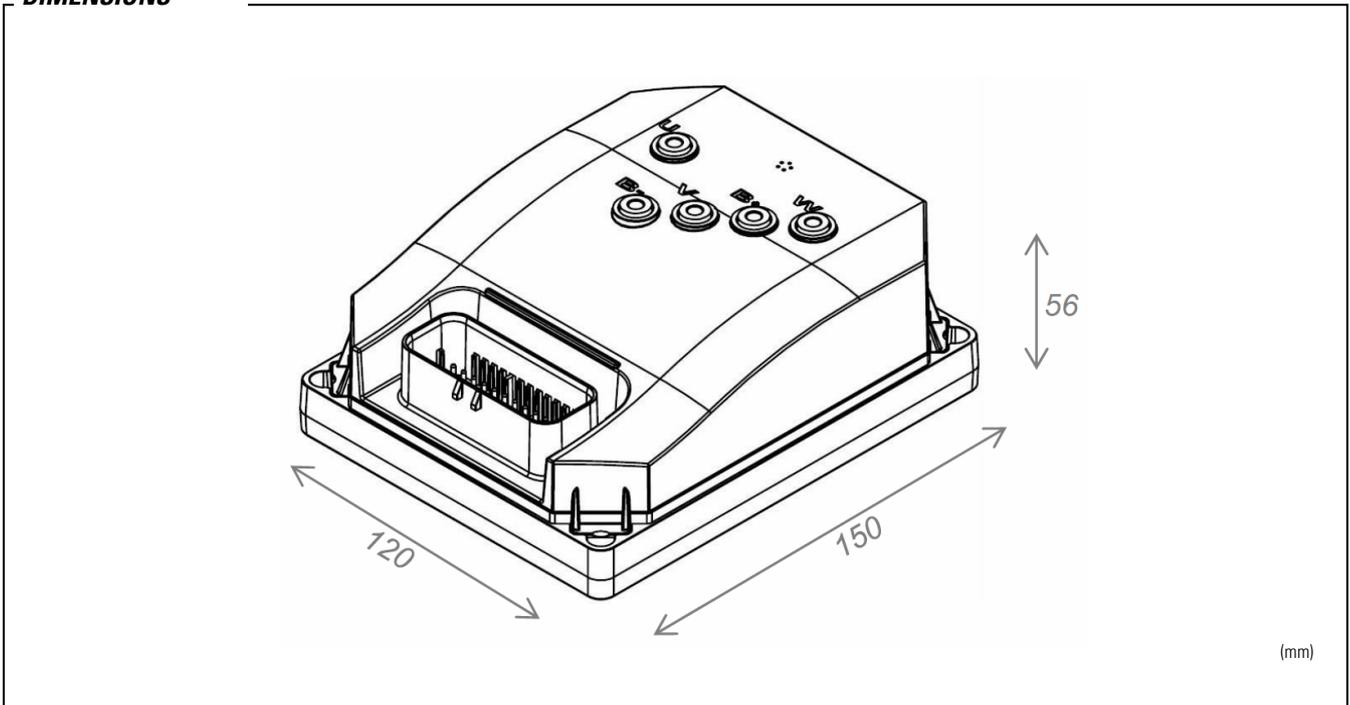
APS Model	Nominal DC voltage	Rated current $A_{RMS}$ S2, 2min	Rated current $A_{RMS}$ S2 60min	Rated power kVA S2, 2min	Rated current kVA S2 60min
24 M	24	70	30	2,1	0,8
24 L	24	90	40	2,6	1,2
48 M	48	70	30	4,1	1,8
80 M	80	40	20	3,9	2,0

2min rating at 8 kHz switching frequency and 25°C ambient temperature.

60min rating at 8 kHz switching frequency, 40°C ambient temperature

Ratings available for 36V<sub>DC</sub> at request

### DIMENSIONS



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