

APS3

The 3rd generation Power Steering Controller

Inmotion Technologies is a premier global supplier of AC-drives and related products to the vehicle industry. The 3rd generation Advanced Power Steering (APS) controller has been meticulously engineered to fulfill the requirements set forth by the European standards for functional safety.

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.



PRODUCT FEATURES

- **Best in class quality and reliability** achieved through superior design and manufacturing processes
- **Rugged design** suitable for the demanding environment of electric vehicles. Protected against ingress of dust and water
- Software quality by software development utilizing processes designed for **Automotive Spice**®
- Software platform allows extensive **functional customizations for optimal integration** in target vehicle, without compromising safety supervision functionality
- Powerful primary **ARM processor and operating system** allows parallel execution of customized vehicle control tasks and motor control tasks
- Redundant supervision according to **ISO13849-1, category 3**
- Extensive and powerful event handling and data logging simplifies troubleshooting and **minimizes vehicle down time**
- Supports AC induction, AC synchronous and brushless DC motors
- Small physical size with flat heat sink for **flexible integration**
- Available with a **35p AMP-SEAL** interface, supporting dual motor feedback sensors, dual steering wheel sensors, as well as several I/O's
- High side output with dual switches controlled by main and supervision functions for **redundant execution of safety function**
- Integrated CAN bus with support for **diagnostics and software download**
- Industry standard CANopen protocol for **reliable communication** in the vehicle
- Dual **redundant CAN nodes** for distributed system architectures
- **Peer to peer** communication allows master-less communication between nodes on CAN bus

GENERAL

Motor type	Induction AC, Synchronous AC, Brushless DC (supporting dual motor feedback sensors for redundant supervision)
Communication	CANopen 125, 250, 400, 500, 800 & 1 000 kbps
Switching frequency	8 kHz (optional 12 & 16 kHz)
Operating stator frequency	0-250 Hz
Control mode	Steering wheel/tiller steering modes (pos. speed or current motor control)
I/O Connector	AMP SEAL 35-pin
Inputs	3 digital inputs pull-down, 1 digital input pull-up, 2 analog inputs, 1 high side input
Outputs	3 open drain outputs 2A, 1 open drain output 0.1A, 1 high side output
Supported steering input devices	Dual incremental encoder, analog (sin-cos) or PWM steering wheel sensors. Stepper motor
Power Connector	M5 screw
Operating temperature	-40°C to + 55°C (-40°F to +131°F)
Storage temperature	-40°C to +70°C (-40°F to +158°F), ambient humidity of 95%
Protection class	IP65
Standards	UL 583 and EC declaration of incorporation of partly completed machinery according to EN1175-1

CURRENT AND OUTPUT RATINGS

Model	Nominal DC supply voltage U _{dc}	Rated current (S2, 2min) ARMS*	Rated current (S2, 1h) ARMS**	Rated power (S2, 2min) kVA*	Rated power (S2, 1h) kVA**
APS24M	24	70	30	2.1	0.88
APS24L	24	80 (90 peak***)	40	2.6	1.2
APS36M	36	70	30	3.1	1.3
APS36L	36	80 (90 peak***)	40	4.0	1.8
APS48M	48	70	30	4.1	1.8
APS80M	80	40	20	3.9	2.0

* 2 minute rating at 8 kHz switching frequency and 25 °C ambient temperature

** 1h rating at 8 kHz switching frequency and 40 °C ambient temperature

*** 24L and 36L peak current only for short time, i.e. boost in 30 sec

DIMENSIONS [mm]

