# **CONSTRUCTION VEHICLES**

## **Advanced Sensing Technologies**

### **Boom/Stick Tilt**

• Hall-effect position sensor

### **Smart Position Sensors**

- Inertial measurement unit
- Limit switch

# Hydraulic/Pneumatic System

- Pressure switch
- Pressure sensor

### Wheels and Suspension

- Speed sensor
- Magnetic sensor



### **Operator Controls**

- Key switch
- Toggle switch
- Pushbutton switch
- Stalk controls
- Basic switch

### **Cabin Environment**

- Air quality
- Magnetics
- Basic switch

# Engine, Fuel and Transmission

- Thermal switch
- Pressure sensor
- Pressure switch
- Speed sensor
- Temperature probe

	Non-contact position sensing	Temperature sensing	Pushbutton switches	Rotary position	Pressure switches	Toggles and rockers	ed sensors	Shifters and turn signals	ic switches	Pressure sensors	it switches	Air quality monitors	switches	Magnetics	
	Nor pos	Tem	Pus swit	Rot	Pres	Tog	Speed	Shif	Basic	Pre	Limit	Air e	Key	Mag	IΜU
Operator controls			$\checkmark$	✓		✓		✓	✓				$\checkmark$		
Cabin environment		$\checkmark$										$\checkmark$		$\checkmark$	$\checkmark$
Wheels & suspension	✓			✓			✓							✓	
Engine management	✓	✓		✓	✓		✓			✓				✓	
Braking systems		✓			✓		✓		✓	✓				✓	
Hydraulics/ pneumatics		✓			✓					✓					
Boom/stick position	✓			✓					✓		✓			✓	✓

MACHINE OPERATION AND RELIABILITY							
Application		Growth Factor	Primary Products	Secondary Products			
Cabin management		Provide a clean, safe operating environment with reliable control interface	<ul><li>Key switches</li><li>Toggle switches</li><li>Pushbutton switches</li><li>Shifters</li><li>Temperature sensors</li></ul>	<ul><li>Magnetic ICs</li><li>Turn signals</li><li>Transportation IMU</li><li>Air quality sensors</li></ul>			
Engine management		Implementation of means to monitor and control engine operation and performance	<ul><li>Pressure switches</li><li>Pressure sensors</li><li>Speed sensors</li></ul>	<ul><li>Temperature probes</li><li>Temperature switches</li></ul>			
Tracks and suspension		Development of improved monitoring and reliability	<ul><li>Speed sensors</li><li>Rotary position sensors</li></ul>	AMR magnetic IC			
Braking systems		Preventative maintenance routines to monitor effectiveness to reduce downtime	<ul><li>Pressure sensors</li><li>Speed sensors</li></ul>	AMR magnetic IC			

FUNCTIONAL PERFORMANCE AND SAFETY							
Application		Growth Factor	Primary Products	Secondary Products			
Boom and stick systems	The state of the s	Increased machine monitoring to maintain safe operation for greater levels of automation	Magnetic position sensors	<ul><li>Transportation IMU</li><li>Rotary position sensors</li><li>Basic switches</li></ul>			

MACHINE INTERFACE								
Application		Growth Factor	Primary Products	Secondary Products				
Operator controls		Reliable performance even exposed to vibration and shock in wet or dusty environments	Toggle switches	Pushbutton switches				

### **WARRANTY/REMEDY**

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