### Switches and Sensors Solutions for Industrial Applications

#### Heavy-Duty Limit Switches
- HDLS
- HDLS Fully Potted
- HDLS Stainless Steel

#### Global Limit Switches
- GLA
- GLC
- GLD
- GLE
- GLL

#### Compact Precision Limit Switches
- BZE6/V6

#### Miniature Limit Switches
- LS
- NGC
- 14CE/914CE
- S2L-VL-S

#### Safety Switches
- 2 CCP
- 1 CPS

#### Hazardous Area Limit Switches
- BX/LSX
- BX2 Stainless
- CX
- EX
- VPX

#### Gas Sensors
- 4 Series
- 5 Series

#### Temperature Sensors
- Honeywell HumidIcon™
- Humidity/Temperature Probes
- 192 Series Thermistors
- 134 Series Thermistors
- 2A/55R Series Thermostats
- N670X Series 2D Scan Engines
- VuQuest 3330g
- SwiftDecoder™ Software

#### Bar Code Scan Engines, Modules and Software

#### Pressure Sensors – Heavy Duty
- SS360/SS460
- SS41K6
- SM Series Nanopower
- 103SR
- Model 41
- MicroForce FMA
- FSA
- TruStability™
- ABP/ABP2.0
- MicroPressure MPR

#### Toggle Switches
- V7
- V15
- V19
- V15W/V15W2

#### Large Basic Switches
- BZ/B/BA/IM/BE/DT/6AS
- DM

#### Miniature Basic Switches
- V7
- V15
- V19
- V15W/V15W2

#### Subminiature Basic Switches
- SM
- SX

#### Magnetic Sensors
- HD/HD1
- ZD
- ZM/ZM1
- ZW
- ZX

#### Load Cells and Force Sensors

#### Pressure Sensors – Board Mount

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**Note:** The images and symbols have been converted to text using natural language processing for readability.
MANUFACTURING EQUIPMENT

Robots
- Presence: Limit switches are used to sense presence of welding rods. If the rod is not present or not in the correct position, the switch sends a signal to the computer and the weld process stops.
- Safety: Cable-pull switches provide long-span emergency stop protection
- End-Stop: Limit switches provide end-stop detection if the equipment reaches end-of-travel. The switch can turn power off or give the controller a signal that end-of-travel has been reached

Linear and Angular Position: Magnetic sensors are used for linear and angular position sensing. Magnetic sensors help maintain a high level of accuracy and precision in factory automation
- Pressure: Pressure sensors measure the pressure of the air or fluid in the lines that are used to control, lubricate or provide power to robotic equipment
- Scanning: Barcode scan engines and software enable robots to track and trace the manufacturing of subassemblies and goods on manufacturing lines
- Temperature: Thermistors are integrated into temperature chambers for product testing. The temperature sensors provide feedback to the chamber controller to ensure temperature is maintained at the proper levels
- Control: Basic switches are used for operator control assemblies in the form of push buttons and custom operator interfaces. Various control functions can be accomplished through the input assemblies developed with basic switch components
- Force: Force sensors can be used in end-effectors/grapples for controlling the gripping force while handling objects

Machinery
- Position: Limit switches are used for sensing the position of the various moving parts of a CNC machine, such as drilling and milling tools
- Interlocks: Limit and basic switches are used as access panel interlocks. If an access panel is open, the switch can prevent the machine from operating
- Speed: Magnetic sensors are used as position and speed sensors
- Pressure: Pressure switches and sensors are used to monitor lubricating oils to ensure they are full and at the right pressure
- Scanning and Calibration: Barcode scan engines and software can be used to identify and track the processed parts, and can also be used to support the automatic calibration of the tools
- Temperature: Thermistors provide temperature measurement to ensure operating conditions are at adequate levels
- Control: Toggle switches are used for operator controls where momentary or maintained switching is needed to control the system

Packaging & Pallet Equipment
- Weight: Limit switches can be used to detect if packages are filled to their desired weight. When the package reaches the desired weight, the limit switch will activate and signal to the controller that the package is full
- Counting: Basic and limit switches can be used to count packages as they pass on conveyors
- Pressure: Pressure switches and sensors are used to monitor pneumatic pressures to ensure the system is at specified operating levels
- Scanning: Barcode scan engines read labels to ensure that packaging process is operating as desired

3D Printing
- End-Stop: Basic switches provide end-stop detection if the equipment reaches end-of-travel, the switch can turn power off or give the controller a signal that end-of-travel has been reached
- Linear and Angular Position: Magnetic sensors are used for linear and angular position sensing. Magnetic sensors help maintain a high level of accuracy and precision
- Temperature: Thermistors are used to monitor extrusion nozzle temperatures to ensure they are within operating conditions and requirement levels
- Speed: Back-embedded hall sensors can be used to detect the speed of a ferrous gear-tooth target wheel or a ferrous disk with a hall pattern
- Position and Fan Control: Magnetic position sensors are non-contact sensing products used for motor/fan control, position sensing, linear and angular displacement and speed sensing for moving parts

Motors and Drives
- Motor Control: Basic switches function as motor start switches, indicating when a user wishes to start or stop a motor. For the process in which the motor is operated. Magnetic sensors are used for commutation control in brushless DC motors
- Temperature: Thermistors provide motor temperature indication. When the motor works to a level that could potentially damage the motor or create an unsafe situation for any operators nearby, the thermistor provides feedback to ensure that the motor ramps down to a safe level
- Speed: Back-embedded hall sensors can be used to detect the speed of a ferrous gear-tooth target wheel or a ferrous disk with a hall pattern
- Position and Fan Control: Magnetic position sensors are non-contact sensing products used for motor/fan control, position sensing, linear and angular displacement and speed sensing for moving parts

CONVEYOR BELTS
- Presence: Limit switches are used at hazardous location switches reliably indicate position for system controls. These signals can be used to control the belts on/off status. They can also be used for counting of items passing by on the conveyor
- Safety: Cable-pull switches are used to provide required emergency stop signaling along the conveyor line for personal safety protection. They can provide e-stop functionality for local stops and machine stops
- Scanning: Barcode scan engines and software automatically identify, read and transmit the barcode information of goods on the conveyor

CONTROL VALVES AND ACTUATORS
- Position and Control: Hazardous location switches are used to monitor the mechanical position of valves, providing an electrical signal to the control system to indicate the valve open or closed position
- Pressure: Pressure switches and sensors monitor and indicate pressure in pipes and boilers, detecting failures such as open circuits, cut wires, etc. and shutting down the system due to overpressure
- End-Of-Travel: Basic switches indicate end-of-travel for the hydraulic and pneumatic actuators. The switches send a signal to the actuator control system when the actuator reaches the end of its usable stroke to prevent damage due to the actuator reaching its mechanical stop. As an alternative, magnetic sensors can be used to indicate end of travel for actuation cylinders

REFRIGERATION
- Interlocks: Basic switches are installed for door closure indication, ice maker on/off indication and position of the ice maker for ice in dispensing processes
- Temperature: Thermistors ensure system temperature control in refrigeration use cases. The thermistor provides feedback such that precise control of the temperature can be maintained throughout the refrigeration cycle
- Position: Magnetic sensors provide non-contact door closure indication, (ice maker on/off indication, position of ice maker for for dispensing ice and pitch fork) filled level
- Pressure: Pressure sensors and switches can sense and monitor environmental conditions and ensure the equipment is working properly
- Humidity: Humidity sensors monitor the amount of moisture in the air so that the system controllers can adjust as necessary to ensure the equipment is running optimally

HVC
- Airflow: Basic switches are useful for air-proving switching assemblies or as a flat switch that interrupts piping
- Pressure: Pressure switches are used for system overpressure indication and system low-pressure indication. The pressure switch will either cut power to the system in the case of overpressure or allow power to a pump or compressor to increase pressure in the case of a low-pressure indication
- Temperature: Thermistors provide system temperature control such that the desired temperature for the heating or cooling cycle is achieved and precisely maintained
- Gas Sensing: Gas sensors can be used for occupancy detection to reduce energy cost. CO2 gas is exhaled by humans during breathing. Once occupancy is detected, a feedback is provided to the HVAC system for room cooling. This is called demand controlled ventilation
- Position: Magnetic sensors are used to enable efficient control of electric motors that drive fans, blowers and pumps in HVAC systems
- Fan Control and Monitoring: Magnetic sensors are rugged non-contact sensing products used for motor/fan control, position sensing, linear and angular displacement and speed sensing for moving parts

HIGH END CONSUMER ELECTRONICS

Coffee Machine
- Temperature: Thermistors provide temperature control of automated heating cycle, ensuring precise temperature is maintained throughout the cycle
- Magnetism: Magnetic sensors provide signal for brake band and synchronizer DC motor control
- Force: Force sensors provide feedback and pressure detection for fluids, coffee beans and grounds
- Scanning: Barcode scan engines and software read the barcode on coffee beans to ensure the coffee machine correctly (e.g. water level and quantity)

Beverage Dispenser
- Position and Control: Basic switches are used for dispenser start switch assemblies. The user engages the switch by pressing a cup or container against a dispensing lever and the switch indicates to the controller to initiate the dispensing process
- Flow Rate: Magnetic sensors are used for liquid flow rate sensing when paired with a 1200g MAGNET
- Temperature: Thermistors provide temperature control of automated cooling cycle; ensuring precise temperature is maintained throughout the cycle
- Pressure: Pressure sensors monitor and sense the level of pressure in fluid lines and dispensing nozzles. Both packaged and board-mounted versions of pressure sensors can be used depending on packaging requirements
- Force: Force sensors can provide non-contact pressure and pressure detection by detecting the small changes in the diameter of tubing and piping as a result of increase force from pressure being put through the system
- Scanning: Barcode scan engines and software read and transmit customer coupons and loyalty cards for beverage dispensers, either on smart phone screens or paper

Large and Small Appliances
- Position and Control: Basic switches provide lock indication in door interlock assemblies. When the lock is engaged, the switch indicates to the appliance controller that the wash cycle can begin. Magnetic sensors provide non-contact door or lid detection
- Position and Control: Basic switches and magnetic sensors are also integrated in float switch assemblies for liquid indication in dishwasher/washer, off-balance switch for washer and belt-fail switch for dryer
- Temperature: Thermistors ensure that system temperature is precisely controlled for the drying cycle of a dryer or washer
- Scanning: Appliances can be equipped with barcode scan engines and software either for calibration purposes or for service and repair management
- Force: Force sensors can be used as an electrical signal to control the blenders to control the speed of the blender based on the throttle input

For more information
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