# Switches and Sensors Solutions for Industrial Applications

## Heavy-Duty Limit Switches
- HDLS
- HDLS Fully Potted
- HDLS Stainless Steel
- GLA
- GLC
- GLD
- GLE
- GLL

## Compact Precision Limit Switches
- BZE6/V6
- LS
- NGC
- 14CE/914CE
- S2L-3L-S

## Miniature Limit Switches
- HAZARDOUS AREA LIMIT SWITCHES
  - BX/LXK
  - BX2 Stainless
  - CX
  - EX
  - VPX
- PRESSURE SWITCHES
  - 5000
  - LE
  - LP
  - ME
  - MH
  - HE
  - HP
- LARGE BASIC SWITCHES
  - BX/BA/IM/BE/BT/6AS
  - DM
- MINIATURE BASIC SWITCHES
  - V7
  - V15
  - V19
  - V15W/V15W2
- SUBMINIATURE BASIC SWITCHES
  - SM
  - SX
  - HD/HD1
  - ZD
  - ZM/ZM1
  - ZW
  - ZX

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

## Global Limit Switches
- GLOBAL LIMIT SWITCHES
  - BZE6/V6
  - LS
  - NGC
  - 14CE/914CE
  - S2L-3L-S

## Compact Precision Limit Switches
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## Temperature Sensors
- TEMPERATURE SENSORS
  - Honeywell HumidIcon™ Humidity/Temperature Sensors
  - 500 Series Packaged Temperature Probes
  - 192 Series Thermistors
  - 194 Series Thermistors
  - 2455R Series Thermostats
  - N670X Series 2D Scan Engines
  - VuQuest 3330g

## Gas Sensors
- GAS SENSORS
  - VuQuest 3330g

## Magnetic Sensors
- MAGNETIC SENSORS
  - SS360/SS460 SS41K6
  - SM Series Nanopower

## Pressure Transducers - Heavy Duty
- PRESSURE TRANSDUCERS – HEAVY DUTY
  - 13 mm
  - 19 mm

## Load Cells and Force Sensors
- LOAD CELLS AND FORCE SENSORS
  - Model 41
  - MicroForce FMA
  - FSA

## Pressure Sensors – Board Mount
- PRESSURE SENSORS – BOARD MOUNT
  - TruStability™
  - ABP/ABP2.0
  - MicroPressure MPR

## Barcode Scan Engines, Modules and Software
- BARCODE SCAN ENGINES, MODULES AND SOFTWARE
  - VuQuest 3330g
  - SwiftDecoder™ Software
MANUFACTURING EQUIPMENT

Robotics
• Force: 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.

Pressure
• Pressure: Pressure sensors and switches are used to monitor lubricating oil lines to ensure they are full and at the right pressure.

Temperature
• Thermistors: Thermistors ensure that system temperature is precisely controlled for the drying cycle of a dryer or dishwasher.

Scanning
• Barcode scan engines and software enable robots to track and trace the moving parts of a manufacturing system. They can provide e-stop functionality for the robot.
• Magnetic sensors are used for motor/fan control, position sensing, linear and angular displacement and speed sensing for moving parts.
• 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.

Position and 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.
• Force: Force sensors can be used in end-effectors/grippers 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 oil lines to ensure the system is at specified operating level.

3D Printing
• 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.
• Thermistors: Thermistors provide temperature measurement to ensure operation conditions are at adequate levels.
• Control: Toggle switches are used for operator controls where momentary or maintened position is needed for control of 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 level.

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CONTROL VALVES AND ACTUATORS
• Position and Control: Limit switches are used to monitor the mechanical end-of-travel position of valves, providing an electrical signal to the controller to indicate the valve is open or closed.
• 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 icemaker fan in ice 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.
• Pressure: Magnetic sensors provide non-contact door closure indication, to ice maker on/off indication, position of icemaker for fan dispensing ice and pitchfork fill 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 used for air-proving switching assemblies or as a float switch switching piping systems.
• Pressure: Pressure switches are used for system over-pressure indication and system low-pressure indication. The pressure switch will either cut power to the system in the case of over-pressure 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.
• Magnetic sensors provide electric motor controls for pumps and grinders, DC motor control.
• Force: Force sensors provide force and pressure detection for fluid use, with sensors placed in the coffee beans and grounds.
• Scanning: Barcode scan engines and software read the watermark or barcodes onto coffee doses to identify and calibrate the coffee machine correctly (e.g. water pressure 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 dispenser 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 floating 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-mount 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 in force from pressure on the tubing.
• 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
• Interlocks and Control: Basic switches provide lock indication in door interlock assemblies.
• Position and Control: Basic switches and magnetic sensors are also integrated in fixed 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 dishwasher.
• Scanning: Appliances can be equipped with barcode scan engines and software either for calibration purposes or for service and repair management.
• Force and Pressure: Force sensors can be used as an electrical signal to the controller to be sent by the throttle controller to control the speed of the blender based on the throttle input.