Sensors Appliance Applications
Dishwashers

**SENSOR APPLICATIONS**

1) **Door latch/lock sensor** – Detects if door is closed. Appliance will not operate if door is open.
2) **Spray arm rotation** – Detects rotation of spray arm. Signals user if spray arm is stuck.
3) **Water level sensor** – Safety device for plugged drain.
4) **Water softener tray sensor** – Measures water softener level.
5) **Sprayer Diverter sensor** – Detects position of diverter as it rotates.

**MARKET TRENDS**

- Appliances are being upgraded to include microprocessor controls, which have low level switching loads.
- These loads create many new opportunities for Reed and Hall effect non-contact technologies.

**Suggested Products:**
- 59165 over-molded reed switch
- 59025 reed sensor
- 55100 Hall effect sensor
- Custom-designed sensor

**Suggested Products:**
- MDSM-4 reed switch
- 59140 reed sensor
- 55140 Hall effect sensor
- Custom-designed sensor

**Suggested Products:**
- 59630 float sensor
- 59140 reed sensor
- 59165 over-molded reed switch
- Custom-designed sensor

**Suggested Products:**
- 59025 reed sensor
- 59165 over-molded reed switch
- Custom-designed sensor

**Target Customers:**
- Electrolux - NC
- GE - KY
- Whirlpool - MI
- Mabe - Mexico
- Bosch – NC
- SubZero/Wolf – WI
- Alliance – WI
- Hobart – OH
- Viking – MS
- KitchenAid

**Power Control Products:**
- Q60xx Triac
  - Safety Latch, Drying Fan, Valve Control, Heater Element, AC Motor

**Circuit Protection Products:**
- Touch Screen/Display Panel
  - SP1001, SP1003, MLV
- Control Board Protection
  - TR5/TE5 Fuse, SMD PTC
  - P4KE, SMAJ TVS
- AC mains
  - TMOV, LA, UltraMOV MOV
  - 3AG, 5x20mm Fuse
  - Holders, Blocks, Clips
**SENSOR APPLICATIONS**

1) **Door sensor** for Freezer and Refrigerator– Senses if door is open and turns on light.
2) **Freezer compartment lid sensor** – Senses if internal compartment lid is closed.
3) **Ice bucket level sensor** – Detects when ice bucket is full, deactivating the icemaker.
4) **Compartment tray detection sensors** – Detects if produce, meat, butter, etc. trays are closed.
5) **Temperature dial sensor** – Detects rotational position of selector dial used for setting the desired temperature.
6) **Level sensor for drain pan** – detects when water level is too high.

**Suggested Products:**
- 59140 reed sensor
- 55100 Digital Hall effect

**Target Customers:**
1) Electrolux - NC
2) GE - KY
3) Whirlpool - MI
4) Mabe - Mexico
5) U-Line – WI
6) Electrolux – MN
7) SubZero/Wolf – WI
8) Danby – CT
9) Big Chill – CO
10) Viking - MS

**Power Control Products:**
- Q60xx Triac
- AC Compressor
- Evaporator/Condenser Fan
- Defrost Heater
- QxNx Triac
- Light Control
- Ice Maker
- Valves

**Circuit Protection Products:**
- Touch Screen/Display Panel
- SP1001, SP1003
- MLV
- Control Board Protection
- TR5/TE5 Fuse , SMD PTC
- P4KE/SMAJ TVS
- AC mains
- 3AG, 5x20mm Fuse
- TMov, LA , UltraMOV MOV
- Holders, Blocks, Clips
Clothes Washing Machines

SENSOR APPLICATIONS

1) **Door latch or Lid sensor** – Detects if door/lid is closed. Wash cycles will not operate if door/lid is open.
2) **Rotary selector dial/switch** – Senses rotational position of the dial/switch used to choose the desired wash cycle.
3) **Drum speed sensor** – Measures rotational drum speed of the washer.
4) **Water level sensor** – Measures water level in the drum.

**Suggested Products:**
- 59165 over-molded reed
- 59140 reed sensor
- 55100 Digital Hall effect
- Custom-designed sensor

**Suggested Products:**
- 55300 rotary analog Hall effect sensor
- 55250 rotary analog Hall effect sensor
- Custom-designed rotary Hall effect sensor

**Suggested Products:**
- 59165 over-molded reed
- 59140 reed sensor
- 55100 Digital Hall effect
- Custom-designed sensor

**Suggested Products:**
- 55100 Digital Hall effect
- Custom-designed Pulse Wave Guide (PWG) analog output sensor (new technology)

**Power Control Products:**
- Q60xx Triac
  - AC Motor Control
  - Heater Control
  - Waste Pump
- QxNx Triac
  - Safety Latch
  - Water Valve
  - Light Control

**Circuit Protection Products:**
- Touch Screen/Display Panel
- SP1001, SP1003
- MLV
- Control Board Protection
- TR5/TE5 Fuse, SMD PTC
- P4KE/ SMAJ TVS
- AC mains
  - 3AG, 5x20mm Fuse
  - TMOV, LA, UltraMOV MOV Holders, Blocks, Clips

**Target Customers:**
1) Electrolux - NC
2) GE - KY
3) Whirlpool - MI
4) Mabe - Mexico
5) Alliance – WI
6) Hobart – OH
7) Staber – OH
8) Danby - Can
9) Summit
Clothes Dryers

SENSOR APPLICATIONS

1) Door sensor – Ensures door is closed prior to operating (for safety).
2) Rotary selector dial/switch – Senses rotational position of the dial/switch used to choose the desired drying cycle.
3) Lint filter sensor – Detects when filter is in proper position.

Suggested Products:
• 59165 over-molded reed
• 59140 reed sensor
• 55100 Digital Hall effect

Suggested Products:
• 55300 rotary analog Hall sensor
• 55250 rotary analog Hall sensor
• Custom-designed rotary Hall sensor

Power Control Products:
Q60xx Triac
AC Motor Control
Heater Control
QxNx Triac
Gas Valve
K2400G SIDAC
Igniter

Circuit Protection Products:
Touch Screen/Display Panel
SP1001, SP1003
MLV
Control Board Protection
TR5/TE5 Fuse, SMD PTC
P4KE/SMAJ TVS
AC mains
3AG, 5x20mm Fuse
TMOV, LA, UltraMOV MOV
Holders, Blocks, Clips

Target Customers:
1) Electrolux - NC
2) GE - KY
3) Whirlpool - MI
4) Mabe - Mexico
5) Alliance – WI
6) Staber – OH
7) Hobart – OH
8) Danby - Can
9) Summit
Stove/Oven and Range Hood

SENSOR APPLICATIONS

1) **Door closure sensor** – Ensures LED light is off. Prior to operating oven.
2) **Door lock sensor** – Ensures oven is door is closed prior to high temperature oven clean mode is activated, for safety.
3) **Exhaust Fan speed control sensor** – selector switch for fan speed.

**Suggested Products:**
- 55300 rotary analog Hall sensor
- Custom-designed rotary Hall sensor

**Suggested Products:**
- 59135 reed sensor along with the mating 57135 actuator, both for high temperature applications.
- Custom-designed sensor and actuator.

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- 59135 reed sensor along with the mating 57135 actuator, both for high temperature applications.
- Custom-designed sensor and actuator.

**Power Control Products:**
- Q601Ex Triac
- Safety Latch
- Convection Fan
- Light Control
- Q6040K7 Triac
- Heater Element
- K2400G SIDAC
- Igniter (Gas Range Oven)

**Circuit Protection Products:**
- Touch Screen/Display Panel
- SP1001
- SP1003
- MLV
- Control Board Protection
- TR5/TE5 Fuse, SMD PTC
- P4KE/SMAJ TVS
- AC mains
- TMOV/LA /UltraMOV MOV
- 3AG/5x20mm Fuse
- Holders, Blocks, Clips

**Target Customers:**
1) Electrolux - NC
2) GE - KY
3) Whirlpool - MI
4) Mabe - Mexico
5) Bosch – NC
6) Subzero/Wolf – WI
7) Viking – MS
8) American Range – CA
9) Broan- WI
10) Dacor- CA
11) American Range- CA
Coffee Machines

**SENSOR APPLICATIONS**

1) **Pod detection sensor** – Detects when the coffee pod is in position to start the brewing cycle.
2) **Carafe detection sensor** – Detects when the carafe is in position to start the brewing cycle.
3) **Water fill level sensor** – Detects when water or milk level is low in the tank and alerts user.
4) **Selector switch sensor** – Detects position of the brew cycle selector switch.

**MARKET TRENDS**

- Coffee brewers have been the fastest growing market in the appliance market.
- There is a need for several reliable reed switch vendors to supply this market with non-contact reed switches or sensors that are highly reliable.
- Low cost conductive sensors are replacing reeds in the level sensing area.

**Suggested Products:**
- 59165 over-molded reed
- 59140 reed sensor
- 55100 Digital Hall effect
- Custom-designed sensor

**Target Customers:**
1) Keurig - MA
2) Cuisinart - CT
3) Black and Decker
4) Mr. Coffee/Jarden – FL
5) Bunn-O-Matic
6) Presto
7) Lance Larking
8) Whirlpool – MI

**Power Control Products:**
- Q60xx xH6Triac
- Heater Control

**Circuit Protection Products:**
- Touch Screen/Display Panel
- SP1001, SP1003
- MLV
- AC mains
- 3AG, 5x20mm Fuse
- TMOV, LA, UltraMOV MOV
- Holders, Blocks, Clips
Blenders/Food Processors

SENSOR APPLICATIONS

1) Jar detection sensor – Detects when the mixing jar is in position to start the blending mixing cycle.
2) Rotary selector switch – Rotary switch for selecting proper mix cycle.
3) On-Off slider switch – Turns blender on or off.

MARKET TRENDS

➢ Food Blenders and Processors used to puree, mix, food and other substances are being upgraded with more controls for the user.

1) Jar detection sensor
2) Rotary selector switch
3) On-Off slider switch

Power Control Products:
Q60xx xHxTriac
VS Motor Control

Circuit Protection Products:
Touch Screen/Display Panel
SP1001, SP1003
MLV
AC mains
3AG, 5x20mm Fuse
TMOV, LA, UltraMOV MOV

Target Customers:
1) Vitamix - OH
2) Cuisinart - CT
3) Oster -
4) Blendtec – CO
5) Waring – CT
6) NutriBullet
7) Breville
8) Black and Decker
9) Kitchen Aid
10) Ninja/Europro – MA

Suggested Products:
• 59025 reed sensor
• 59140 reed sensor
• 55100 Digital Hall effect
• Custom-designed sensor

Suggested Products:
• 55300 rotary Hall effect sensor
• Custom-designed sensor

Suggested Products:
• 59165 over-molded reed
• 59140 reed sensor
• 55100 Digital Hall effect
Water Softeners

SENSOR APPLICATIONS

1) Water flow sensor – Measures water usage.
2) Float level sensor – Measures water level in brine tank.

MARKET TRENDS

- Water softeners are following the energy savings trend by monitoring water usage. Also, control of flow is desired so to optimize the softening blend. Salt free softeners are becoming popular.

Suggested Products:
- Custom-designed flow rate sensor with Hall or reed-based unit.
- 59025 reed or 55100 digital Hall effect sensor that can operate with customer impeller that has magnet attached.

Suggested Products:
- Level sensor within brine tank such as a 59630 digital reed level sensor
- A custom reed/resistive ladder.

Circuit Protection Products:
- Touch Screen/Display Panel SP1001, SP1003 MLV
- Control Board Protection TR5/TE5 Fuse, SMD PTC P4KE/SMAJ TVS
- AC mains 3AG, 5x20mm Fuse TMOV, LA, UltraMOV MOV Holders, Blocks, Clips

Target Customers:
1) Clack – WI
2) Pelican – CA
3) Grundfos – KY
4) Pentair/Tyco Flow - FL/CA
5) Culligan – WI
6) Everpure
7) Aquasana
8) Crystal Clear
9) Pur
10) Steripen
Rice Cookers

**SENSOR APPLICATIONS**

1) **Lid lock sensor** – Detects if lid is properly locked for pressure cooking. (Note: only for pressurized version of rice cooker)

**MARKET TRENDS**

- Pressurized Rice cookers have two solutions for the Lid switch, a Micro-switch version, and a non-contact solution; Reed switch/sensor. Modern technology solutions are moving into the contactless type solutions, for more reliability.
- Typically, Hamlin sells the bare reed switch to the sensor manufacturer.

**Suggested Products:**
- FLEX-14 and MDCG-4
- 59140 reed sensor

**Target Customers:**
1) Midea, China (won)
2) Super, China (won)
3) Triangle, China
4) Joyoung, China
5) POVOS, China
6) Tiger, Japan
7) Zojirushi, Japan
8) Panasonic - OKI now
9) Cuckoo - OKI now

**Power Control Products:**
- Q60xxxH6 Triac
- Heater Control

**Circuit Protection Products:**
- Touch Screen/Display Panel
- SP1001, SP1003
- MLV
- AC mains
- 3AG, 5x20mm Fuse
- TMOV, LA, UltraMOV MOV
- Holders, Blocks, Clips
Water Dispensers

**MARKET TRENDS**

- Water Dispensers are becoming very popular for assuring safe drinking water. These units can be placed anywhere in the home or work environments.

**SENSOR APPLICATIONS**

1. **Water level sensor** – Measures the water level at several points in the tank and signals if water level is running low.
2. **Float limit sensor** – Measures when water level has reached the full/empty limit.

**Suggested Products:**

- 59140 type reed sensor if attached to outside of tank.
- Custom designed reed switch ladder float level sensor for inside the tank.

**Circuit Protection Products:**

- Touch Screen/Display Panel SP1001, SP1003 MLV
- Control Board Protection TR5/TE5 Fuse, SMD PTC P4KE/SMAJ TVS
- AC mains 3AG, 5x20mm Fuse TMOV, LA, UltraMOV MOV Holders, Blocks, Clips

**Target Customers:**

1. Suzhou Oasis Electronic
2. QIDI Company
3. Midea
4. Brentorma
Room Air Conditioners

**SENSOR APPLICATIONS**

1) **Air filter position sensor** – Detects if air filter has been placed into position properly.

2) **Float level sensor** – Measures water height in the condensation pan, when water level is high enough the sensor activates turning on a pump to remove water from the pan.

**MARKET TRENDS**

- Room air conditioners has been a stable market. Condensation water level monitoring has been the mainstay application for several years.
- Another market are for outside A.C. units mounted on the roof or attic.

**Power Control Products:**
- Valve Control:
  - SP1001, SP1003
- AC Compressor Start Winding:
  - Q60xx Triac

**Circuit Protection Products:**
- Touch Screen/Display Panel
  - SP1001, SP1003
- MLV
- Control Board Protection
  - TR5/TE5 Fuse, SMD PTC
  - P4KE/SMAT TVS
- AC mains
  - 2AG, 5x20mm Fuse
  - TMOV, LA, UltraMOV MOV
- Holders, Blocks, Clips

**Target Customers:**
1) Samsung, China (Won)
2) Daikin, use Aleph level sensors
3) Gree, China
4) LG, Korea
5) Toshiba

**Suggested Products:**
- Custom-designed reed level sensor for condensation pan, such as the 59181-503 or -504
- Standard 59630 reed level sensor.
- Bare reed switches MDCG-4, FLEX-14 sold to level sensor manufacturers
Shower Toilets

### SENSOR APPLICATIONS

1. **Water flow rate sensor** – Measures water usage.
2. **Lid Closure sensor** – Ensure the toilet seat is in proper position.

### MARKET TRENDS

- Shower toilets, also known as bidets, offer an effective and refreshing clean, better than a conventional toilet.
- There are bidet seats sold also that may use lid sensors.

#### SENSOR APPLICATIONS

**Suggested Products:**
- Custom-designed flow rate sensor with Hall or reed-based unit.
- 59025 reed or 55100 digital Hall effect sensor that can operate with customer impellor that has magnet attached.

**Suggested Products:**
- Reed sensor for detecting toilet seat closure such as 59140 or 59025.

#### MARKET TRENDS

**Circuit Protection Products:**
- Push-button Panel
  - SP1001, SP1003
  - MLV
- AC mains
  - 3AG, 5x20mm Fuse
  - TMOV, LA, UltraMOV MOV
- Holders, Blocks, Clips

#### Target Customers:

**China**
- 1) Zhongtao Ceramics
- 2) Chaoan Zuzu Sanitary Ware
- 3) Royalking Sanitary Ware
- 4) Ningbo JT Accord Intelligent Sanitary Ware

**Korea**
- 1) Hyundai Wacor TEC
- 2) Paseco
- 3) Cheung Jung
- 4) Daewon Bidet