SWITCHES & SENSORS
FOR VALVES & ACTUATORS

- Microswitches for Industrial applications
- Limit switches for Explosive atmospheres
- Limit switches for Nuclear environments
ABOUT CROUZET SWITCHES

With over 60 years involvement in highly demanding markets where security and reliability are requested, Crouzet Switches, specialist in snap-action technology, brings peace of mind to design engineers through expert product support, in-depth knowledge of application design constraints and related standards and approvals issues.

Crouzet Switches is a brand of Custom Sensors & Technologies (CST).

MARKETS
Crouzet Switches has worked for decades with customers who design products for highly technical applications that demand superior quality, reliability and meet national and international regulatory standards. Crouzet’s switches and sensors are utilized in a wide spectrum of applications in the following markets:

- Industrial Valve & Pumps
- Nuclear Industry
- Energy Distribution
- Trains
- Specialty Vehicles

WHO ARE WE?
Crouzet Switches is a specialist in snap-action technology with its detection solutions, and offers ranges of microswitches, limit switches, manually operated switches and sensors.

Crouzet Switches contact elements are intended for machine manufacturers, parts manufacturers, OEM distributors and integrators.

Designed for the most severe environments they are used in domestic, industrial, explosive atmospheres and in nuclear valves & actuators.

Crouzet Switches works closely with its customers to design its products to meet their specific requirements, while complying with the most rigorous quality requirements, thus providing the best solution in terms of both technical features and cost.

For explosive atmospheres, nuclear environments, and harsh environments, Crouzet Switches offers 2 valve and actuator product ranges:

- Snap-action microswitches
- Limit switches

Crouzet Switches is a Custom Sensors & Technologies (CST) brand.

QUALITY
To support this demanding market, Crouzet Switches put in place and maintains the highest level of quality approval:

- ISO 9001, ISO 14001
- EDF certified
- ATEX, IECEx
- OHSAS 18001

Custom Sensors & Technologies (CST) is a specialist in designing and manufacturing sensing, control and motion products.

Through its brands, BEI Kimco, BEI Sensors, BEI PSSC, Crouzet, Crydom, Kavlico, Newall and Sytron Donner Inertial, CST offers customizable, reliable and efficient components for mission-critical systems in Aerospace & Defense, Transportation, Energy & Infrastructure, Medical, Food and Beverage and Building Equipment markets.

Focused on premium value offers and committed to excellence, CST, with 4,500 employees worldwide and sales of $600 M US in 2013, is the dependable and adaptable partner for the most demanding customers.

www.cstsensors.com
Crouzet Switches has worked closely with its customers for many years in the design and production of switching and detection components.

With a presence in the valves field, Crouzet Switches makes its technical and industrial expertise available to its customers, that is based on a wide range of microswitches and limit switches. These are for use in the most demanding systems, in explosive atmospheres (ATEX/ IECEx) and in nuclear environments (K1/ K2/K3) complying with RCCE regulations.

From adapted components to specific products, Crouzet Switches has just the solution for the technical and economic requirements of applications ranging from switching high currents to integration into the latest generation mechatronic modules to the development of robust products for severe environments.

Throughout the lifetime of the application, Crouzet Switches conducts qualification/ approval tests and monitors the characteristics of its products. The Crouzet Switches laboratory is compliant with NF EN ISO 17025.

It is certified:
- CTDP (Client Test Data Program) by Underwriters Laboratory (UL) for electrical tests in accordance with UL1054 standard and CSA C22.2N°55.
- SMT (Supervised Manufacturer’s Testing) by Laboratoire Central des Industries Electriques (LCIE) for electrical tests in accordance with EN 61058-1 and IEC 61058-1.

Crouzet Switches currently supplies electromechanical components to more than 60 valve and actuator manufacturers worldwide, including the market leaders.

The application areas (industrial, explosive atmospheres, nuclear, etc.) require very high quality levels. Crouzet Switches products comply with the standards and certifications established by national and international bodies.

### Microswitches for Industrial Applications

- **83106** Double break bi-stable microswitch
- **83133** Double break bi-stable microswitch
- **83161** V3 standard miniature microswitch
- **831607** V3 miniature microswitch with positive opening action
- **83170** V4 standard subminiature microswitch
- **83181** V4 sealed subminiature microswitch
- **83200** V5 sealed sub-subminiature microswitch
- **831395** Low temperature sealed double break microswitch
- **831392** Double insulated sealed double break microswitch
- **831398** 2-pole synchronised switching microswitch

### Limit Switches for Explosive Atmospheres

- **831391** Sealed double break microswitch
- **8389 Ex** Family
  - SP3941 Aluminium & bronze limit switches
  - SP3969 Aluminium & bronze limit switches
  - SP3900 Stainless steel limit switch

### Limit Switches for Nuclear Environments

- **83151** Hermetically sealed cell
- **8399 Nuc** Nuclear family
  - SP4522 Nuclear limit switch, aluminium or bronze
  - SP4813 Nuclear limit switch, cylindrical with cable output
  - SP4863 Nuclear limit switch

* Approval pending
DETECTION FOR INDUSTRIAL VALVES & ACTUATORS

There are several types of industrial valves:

› Pneumatic
› Electric
› Hydraulic
› Manual valves

For electrical operation totally integrated in the valve body, the position of the motorized device is detected mechanically by microswitches and their function is to directly cut the phases of the motor (for example, an asynchronous motor).

Regardless of the type of operation used, some valves are equipped with a positioning unit that is used to display the open/closed state of the valve and send this information electrically to its actuator control, and also to perform supervisory functions.

It is therefore necessary to have very precise detection. The switching directly affects the kinematics of the valve, and thus the flow of the fluid.

Crouzet Switches microswitches are designed to perform snap-action switching.

The switching from one state to another takes place in a few milliseconds, over several million cycles with excellent repeatability.

DETECTION/SWITCHING FOR ELECTRIC VALVE ACTUATORS

For electric geared motors, Crouzet Switches offers mainly the 83139 microswitch and its variants.

With its special format and variety of fixings, it is easy to integrate in a mechanism that may require maintenance. This microswitch can switch high currents (6 A max.), and has a dust and liquid proof casing.

› IP 67
› Double break switching
› Low temperature version (-40 °C)
› Double insulated version
› 2-pole version with synchronized switching

DETECTION FOR INDUSTRIAL VALVES & ACTUATORS

DETECTION/SWITCHING UNITS FOR POSITIONING

For positioning units, Crouzet Switches offers a range of compact microswitches and several connection configurations specially designed for electronic boards and wave soldering.

Crouzet Switches products have been qualified over millions of cycles to ensure their switching reliability even after many years of operation.

› Compact size
› Special connections for printed circuits
› Wide range of levers
› IP 67 sealed versions
› UL approved, EN 60947-5-1 compliant

NON-CONTACT DETECTION TECHNOLOGY

Crouzet Switches also offers detection components with non-contact action for even longer service lives.

› Microswitches
  - 83106
  - 83132
  - V3 83161
  - 83181
  - 83170
  - 83200

› Sensors
  - Inductive proximity sensors
The family of 8399 Ex limit switches have been developed and certified for use in potentially explosive atmospheres, taking into account the standards:

- EN60079-0 - EN60079-1 for the European zone (ATEX)
- IEC 60079-0 and IEC 60079-1 for international area (IECEx).

It comes in three different types: SP3941, SP3969 and SP3990.

All types are built with the same hermetically sealed microswitch encapsulated in a sealed box and called a «hermetic cell».

All products have the same electrical characteristics. The mechanical properties vary depending on the type of SP.

Variations between each type of SP include:
- Material: Stainless steel, aluminium and bronze
- Typical operating style: linear or rotary
- Typical output: wires or cable
- The temperature ranges: different for ATEX and IECEx see tables on the right.

All materials can be combined with all models of operating and output connections. In these combinations, you can add different wires and cables that can be installed on the products.

Example of 1/4 turn ATEX valve, equipped with 831591 ATEX microswitches on the electric geared motor to detect intermediate positions.
Crouzet Switches has been involved in the nuclear industry for 35 years, and offers a range of special limit switches. Classified as Electrical Safety Systems, these products are certified in accordance with the RCCE regulations (rules regarding the design and construction of electrical equipment for nuclear islands).

The limit switches comprise a hermetically sealed microswitch (83151) which combines a snap-action switching system, and a high degree of resistance to shocks and vibration. The hermetically sealed microswitch filled with an inert gas (hydrogenated nitrogen) protects the contacts and allows the limit switches to be used in low level circuits and also at higher currents.

This technology enables Crouzet Switches limit switches to be approved for severe environments inside and outside the reactor containment and to meet the requirements of the associated specific tests: Thermal ageing, relative humidity, seismic tests, irradiation ageing tests (K2), irradiation accident tests (K1), resistance tests to thermodynamic and chemical accident conditions (K1).

### DETECTION FOR NUCLEAR ENVIRONMENTS

#### VALVES & ACTUATORS

**Example of a valve located close to a nuclear reactor, equipped with K1 SP4522 certified limit switches**

**LIMIT SWITCHES FOR VALVE MOTORIZATION IN K3 ENVIRONMENTS**

- Operates up to a pressure of 1 bar
- Mechanically very robust
- Flexible roller lever fixed to the body
- High seismic resistance
- Operating temperature -55 °C to +105 °C

**CLASSIFICATION SUMMARY**

<table>
<thead>
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<th>8399 Nuc</th>
<th>K1-K2</th>
<th>K3</th>
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**POSITION DETECTION ON THE MAIN VALVE SHAFT IN K1/K2/K3 ENVIRONMENTS**

8399 Nuc (nuclear family) limit switches are mounted on the valve frame to detect the positions of the main shaft.

That includes 3 valve positions (open, closed, intermediate) which will provide a very high level of reliability.

- Operates up to a pressure of 6 bar
- Mechanically very robust with stainless steel body
- Plunger or roller lever that is spring returned to rest position, providing excellent resistance to vibration
- Single-pole or 2-pole circuit
- Lever adjustable over 360°
- Special cables
- Operates within pressures of between 1 and 6 bar
- CW / CCW actuation
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