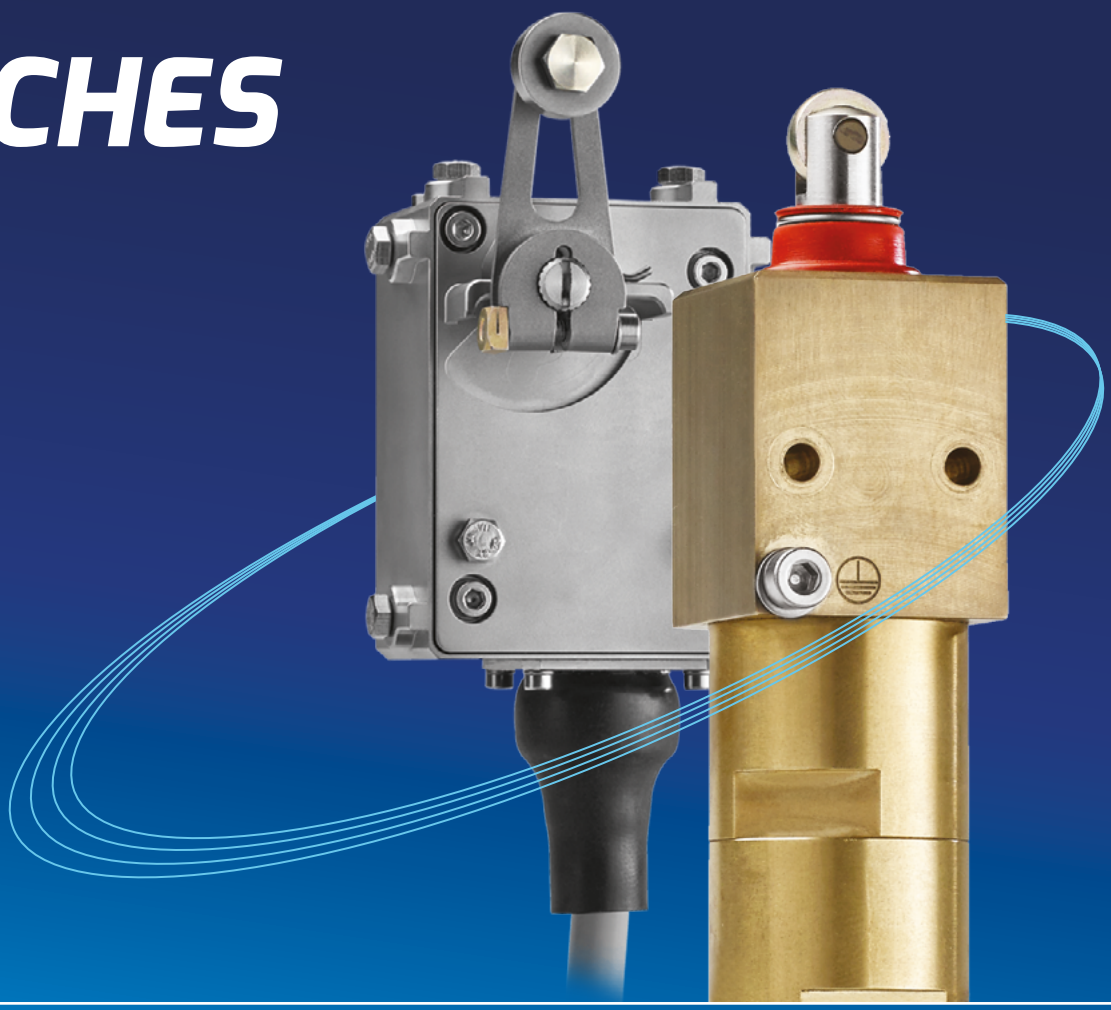
CROUZET

WE ARE **NUCLEAR LIMIT SWITCHES**



Robust sensing solutions making nuclear power plants safer than ever

Manufacturing the future of nuclear power plants by delivering certified and safety Position Sensors withstanding the most severe conditions (IEEE, RCC-E 2005, RCC-E 2012)

40+ years' experience in the nuclear market

100k+ Limit Switches installed

87 Nuclear reactors equipped worldwide

WE ARE CROUZET

100 YEARS MANUFACTURING THE FUTURE *Together*

€ 250 MILLIONS
YEARLY TURNOVER

1,860
EMPLOYEES

9 SALES OFFICES

10 PRODUCTION SITES

6 R&D CENTERS

Crouzet is an independent company **manufacturing mechatronic components for demanding applications in Aerospace & Transportation, Energy, Building and Machinery Industry.**

Crouzet provides **Switches & Sensors, Electromechanical Actuators, Electrical Control & Protection Equipment, Flight Control Equipment, Automation Controllers & Relays, and Instrumentation Services.**

Since 1921, Crouzet has a heritage of close collaboration with customers in the development of products, from standard components to fully customized solutions.

Since 2023, STPI is a brand of Crouzet.

WE ARE NUCLEAR

*BOTH OUR **LIMIT SWITCHES & HERMETICALLY SEALED RELAYS** ARE CURRENTLY INSTALLED IN THE*

57 NPPs
IN FRANCE

+6 UPCOMING **EPR2**

+60,000
***LIMIT SWITCHES** CURRENTLY INSTALLED IN CHINA*

***OUR HERMETICALLY SEALED RELAYS** ARE COMPATIBLE WITHOUT MODIFICATION WITH THE 32 FOLLOWING CHINESE NPPS:*

Quinshan 1-2-3-4, Fangjiashan 1-2, Changjiang 1-2, Daya Bay 1-2, Ling Ao 1-2, Ling Ao 1-2-3-4, Ningde 1-2-3-4, Yangjiang 1-2-3-4-5-6, Guangxi 1-2, Changjiang 1-2, Hongyanhe 1-2-3-4 and Taishan1-2

CROUZET **IN THE NUCLEAR SECTOR**

With more than 40 years' experience in the nuclear industry, we are committed to delivering solutions to improve the safety of nuclear sites.

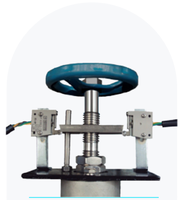
- 100000 Nuclear Switches
- Proven Performance & Safety
- Worldwide presence in more than 40 Nuclear Power Plants
- RCC-E (AG, K1/K2/K3, K3AD), IEEE/KBE

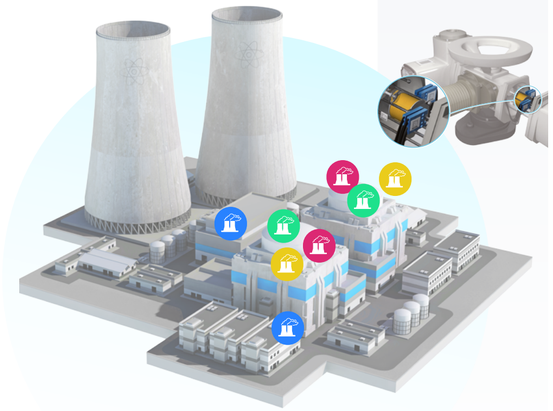
"Designed to detect positions and switch high or low currents in the most severe conditions, Crouzet's switches are solutions where failure is not an option."

HIGH PERFORMANCE INSIDE & OUTSIDE OF THE REACTOR BUILDING

Crouzet's microswitches, limit switches & sensors withstand the most challenging **AG, K1, K2, K3AD, K3 ATEX, K3** environments to switch current and detect position of:

- Main valve shaft
- Motorized valve actuators
- Hoists
- Gates
- Generators
- Safety guards
- HVAC





AG CATEGORY
Equipment required to perform its function under severe accidents.

K1 CATEGORY
Equipment required to perform its function under normal service conditions, earthquake, normal service radiation, accidental and post-accidental conditions.

K2 CATEGORY
Equipment required to perform its function under normal service conditions, normal service radiation and earthquake.

K3, K3 ATEX, K3AD CATEGORY
Equipment required to perform its function under normal conditions and earthquake.

NUCLEAR SWITCHES

QUALIFIED PRODUCTS

	HARSH ENVIRONMENTS – WITH ACCIDENT CONDITIONS*						HARSH ENVIRONMENTS – WITHOUT ACCIDENT CONDITIONS**		MILD ENVIRONMENTS			
Aprox. body size (mm)	Ø31x148	94x22x22	90x70x50	90x70x50	64x35.5x12.8	90x70x50	90x70x50	90x70x50	90x70x50	160x46x45	90x70x50	42x36x13
TYPE	83999033 → 03X	83999036	SP916200 → 09	SP916210 → 40	SP481611	SP452210 & 20	SP916250 → 80	SP452255 → 59	SP452252 → 99	SP3991	SP452250 & 60	SP4863
Typical applications	Valves	Valves	Safety Valves	Regulation Valves	HVAC Dampers & Actuators	Regulation Valves	Valves	Steam Valves	Regulation Valves	ATEX Valves	Valves	Actuators & generators
Voltage - Current - Power factor	110 V⎓ / 50 mA		29 V⎓ - 1.5 A - L/R: 5 ms 137 V⎓ - 200 mA - L/R: 40 ms				29 V⎓ - 3 A - Resistive 220 V∿ - 400 mA - Cos: 0.8		48 V⎓ - 1 A - L/R: 5 ms 220 V∿ - 1 A - Cos: 1			
Circuit diagram	Form C	Form C	Form C	Form C	Form C	Form C	Form C	Form C	Form C	Form C	Form C	Form C
Number of poles	1	1	1	1	1	1 or 2	1	1 or 2	1 or 2	1	1 or 2	1
Degree of protection	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IPX7	IP67	IP67
Temperature range min. & max.	+5 °C +200 °C	+5 °C +200°C	+10 °C +53 °C	+10 °C +53 °C	-55 °C +105 °C	+10 °C +53 °C	+10 °C +53 °C	-25 °C +175 °C	-25 °C +55 °C	-20 °C +60 °C	+10 °C +53 °C	-55 °C +105 °C
Radiation level (KGy)	114	114	1950	500	850	850	500	250	50			
Operating force max. (N)	54	54	29	29	30	35	29	29	29	20	35	8.5
Differential travel max. (mm)	0.10	0.10	1	1	0.3	1	1	1	1	0.08	1	0.5
Housing material	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Bronze	Stainless Steel	Aluminium	Aluminium	Bronze	Aluminium	Aluminium
Weight without cable (g)	200	200	1020	1010	130	1400	1010	650	650	640	550	42
Mechanical life (cycles)	11 000	8 000	20 000	100 000	50 000	30 000	100 000	20 000	100 000	100 000	30 000	50 000
Connections – Connector			●	●			●		●			
Connections – Cable	●			●	●	●	●	●	●	●	●	●
Connections – Wires		●										●
Approvals	UL CE	UL CE	EDF UL CE	EDF UL CE	UL CE	UL CE	EDF UL CE	EDF UL CE	EDF UL CE	EDF UL CE Ex	UL CE	UL CE
Nuclear qualification	LOCA	LOCA	AG	K1 Ambience 6	K1	K1	K2	K3AD family C+F	K3 family C+F	K3 / ATEX	K3	K3
Nuclear standard	IEEE/KBE	IEEE/KBE	RCC-E 2012	RCC-E 2012	RCC-E-2005	RCC-E-2005	RCC-E 2012	RCC-E 2012	RCC-E 2012	RCC-E 2012	RCC-E-2005	RCC-E-2005

SPECIFIC PRODUCTS

	IRRADIATED ENVIRONMENTS			
Aprox. body size (mm)	Ø15x63	Ø16x97	Ø11x15	28x16x10
TYPE	SP4813	SP 4743	83151*	83160
Typical applications	Overhead Crane	Underwater Detection	High Precision	Detection in Valve actuator
Voltage - Current - Power factor	220 V∿ 1A 0.4A cos: 0.8 29V⎓ 3A 1.5A L/R5 ms 250V⎓ 0.3A 48V⎓ 2A	220 V∿ 1A 0.4A cos: 0.8 29V⎓ 3A 1.5A L/R5 ms 250V⎓ 0.3A	250 V∿ 5A 24V⎓ 7A 250V⎓ 0.3A	125/250 V∿ 15A 125/250 V∿ 15A 0.75cos: 0.75 125/250 V∿ Lamp: 3A/2.5A
Circuit diagram	Form C	Form C	Form C	Form C
Number of poles	1	1	1	1
Degree of protection	IP65	IP68	Hermetic	IP40
Temperature range min. & max.	-25 °C +80 °C	-15 °C +60 °C	-55 °C +250 °C	-40 °C +150 °C
Radiation level (KGy)	200	1000	1000	2200
Operating force max. (N)	12	25	25	5
Differential travel max. (mm)	0.05	0.05	0.06	0.3
Housing material	Stainless Steel	Austenitic Steel	Stainless Steel	Plastic
Weight without cable (g)	60	80	10	10
Mechanical life (cycles)	100 000	100 000	200 000	10 000 000
Connections – Connector				
Connections – Cable	●	●	solder	screw
Connections – Wires			●	●
Approvals	UL CE EAC	UL CE EAC	UL CE EAC	UL CE EAC
Nuclear qualification	Qualification in customer application			
Nuclear standard				

STANDARD PRODUCTS

	NON CLASSIFIED ENVIRONMENT (NC)			
Aprox. body size (mm)	73x56x36	49x30x16	min. 100x30x30	min. Ø14x34
TYPE	SP958800 & 10	83873946 & 47	SP3941 SP3969	83770 83771
Typical applications	Valves & Actuators	Actuator Position	ATEX Actuators & Steam Turbines	Overhead Crane
Voltage - Current - Power factor	250 V∿ 10A 24V⎓ 10A 250V⎓ 0.6A	250 V∿ 10A 24V⎓ 10A 250V⎓ 0.8A	220 V∿ 1A 0.4A cos: 0.8 29V⎓ 3A 1.5A L/R5 ms 137V⎓ 0.2A L/R 0.2A	250 V∿ 4A 24V⎓ 3A 250V⎓ 0.3A
Circuit diagram	Form Za	Form Zb (separated contacts)	Form C	Form C
Number of poles	1	1	1	1 or 2
Degree of protection	IP66	IP66/IP67/ IP69	IP66/IP68/ IP69	IP66/IP68
Temperature range min. & max.	-40 °C +70 °C	-40 °C +70 °C	-55 °C +210 °C	-55 °C +250 °C
Radiation level (KGy)				
Operating force max. (N)	15	10	35	
Differential travel max. (mm)	0.7	1.1	0.05	
Housing material	Zamak	Zamak	Aluminium Bronze Stainless Steel	Stainless Steel
Weight without cable (g)	340	125	500	20
Mechanical life (cycles)	10 000 000	10 000 000	100 000	100 000
Connections – Connector			Cable Gland	
Connections – Cable	screw	●	●	●
Connections – Wires	●		●	●
Approvals	UL CE EAC	UL CE EAC	UL CE Ex	UL CE EAC
Nuclear qualification				
Nuclear standard				

** (LOCA, Radiation and Seismic Resistant) ** Radiation and Seismic Resistant*
The value of the technical characteristics may change.

CUSTOMER BENEFITS

Safety & Security

- Robust products compliant to the nuclear standards
- Regular quality tests in laboratories
- Expertise built up through long lasting partnerships with the leading nuclear manufacturers from France & China

Close Collaboration

- Convenience & time saving
- Best practices shared
- Flexibility & improved stability

Product Customization

- Meet specific needs more closely
- Customer satisfaction
- Production on demand
- Replacement of obsolete limit switches

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