Slow-make switching element

Switching system

The double-break, slow-make switching element is equipped with one or two independent contact systems, acting as normally open or normally closed contact. The normally closed contact has forced opening.
Slow-make contacts with forced action are ideal for high switch ratings.
Up to three switching elements can be snapped to each actuator.
For the emergency-stop pushbutton use the slow-make switching element (max. 3).

Material

Material of contact
Hardsilver, gold-silver, silver-palladium (for aggressive atmospheres)

Switch housing
Polycarbonate (PC)

Mechanical characteristics

Terminals
Screw terminals
Plug-in terminals 6.3 x 0.8 mm
max. wire cross-section 2 x 2.5 mm^2
max. wire cross-section of stranded cable 2 x 1.5 mm^2
For switches with plug-in terminals it is necessary to provide insulation sleeves and to maintain a spacing of 65 mm between rows (mounting cut-outs)

Tightening torque
Screws at the mounting flange max. 25 – 30 Ncm
Screws at switching element max. 50 Ncm

Actuating force
1 Normally closed 2 N
1 Normally open 3.1 N

Actuating travel
5.8 mm ± 0.2 mm

Rebound time
≤ 1 ms

Mechanical lifetime
(with 1 switching element)

Pushbutton maintained action	1.5 million Cycles of operation
Pushbutton momentary action	3 million Cycles of operation
Selector switch maintained action	1.25 million Cycles of operation
Selector switch momentary action	2.5 million Cycles of operation
Emergency-stop switch	50 000 Cycles of operation
Keylock switch maintained action	25 000 Cycles of operation
Keylock switch momentary action	50 000 Cycles of operation

Electrical characteristics

Standards
The switches comply with the “Standards for low-voltage switching devices” EN IEC 60947-5-1

Rated Insulation Voltage U_i
500 VAC/600 VDC, as per EN IEC 60947-5-1

Contact resistance
New state ≤ 50 mΩ as per DIN IEC 60512-2-4

Isolation resistance
≥ 10 MΩ between open contacts at 500 VDC, as per DIN IEC 60512-3-1

Electrical life
6050 cycles of operations

Conventional free air thermal current I_{th}
As per EN IEC 60947-5-1
6 A for plug-in terminals
10 A for screw terminals
the maximum current in continuous operation and at ambient temperature must not exceed the quoted maximum values.

Switch rating
At switch rating AC for gold-silver, silver-palladium and hardsilver contacts, service category AC-15, as per EN IEC 60947-5-1 (cosφ 0.3)

Voltage	230 VAC	400 VAC	500 VAC
Current	7 A	5 A	4 A

At switch rating DC for gold-silver and hardsilver contacts, service category DC-13, as per EN IEC 60947-5-1

Voltage	24 VDC	60 VDC	110 VDC	250 VDC
Current	10 A	5 A	2.5 A	0.6 A

Recommended minimum operational data
Gold-silver contacts:

Voltage	24 VDC	110 VDC
Current	5 mA	2 mA

Hardsilver contacts:

Voltage	24 VDC	110 VDC
Current	50 mA	10 mA

Protection class
Indicators and switches, fit for mounting into devices with protection class II

Slow-make switching element

Environmental conditions

Storage temperature
-40 °C … +85 °C

Operating temperature
-40 °C … +55 °C
(other temperatures on request)

Protection degree
IP 00

Shock resistance
(single impacts, semi-sinusoidal)
300 m/s² puls width 11 ms, as per EN IEC 60068-2-27

Vibration resistance
(sinusoidal)
100 m/s² at 10 Hz … 500 Hz, amplitude 0.75 mm, as per EN IEC 60068-2-6

Approvals

Approbations
CB (IEC 60947)
CCC
CSA
Germanischer Lloyd
GOST
NFF 16-102
UL

Declaration of conformity
CE

Snap-action switching element

Switching system

The double-break, snap-action switching element is equipped with one or two independent contact systems, acting as normally open or normally closed contact. The snap-action switching element is fitted with self-cleaning contacts.
Up to three switching elements can be snapped to each actuator. Snap-action switching elements are not permissible for emergency-stop pushbuttons!

Material

Material of contact
Hardsilver, gold-silver, silver-palladium (for aggressive atmospheres)

Switch housing
Polycarbonate (PC)

Mechanical characteristics

Terminals
Screw terminals
Plug-in terminals 6.3 x 0.8 mm
max. wire cross-section 2 x 2.5 mm^2
max. wire cross-section of stranded cable 2 x 1.5 mm^2
For switches with plug-in terminals it is necessary to provide insulation sleeves and to maintain a spacing of 65 mm between rows (mounting cut-outs)

Tightening torque
Screws at the mounting flange max. 25 – 30 Ncm
Screws at switching element max. 50 Ncm

Actuating force
1 Normally closed 1.9 N
1 Normally open 2 N

Actuating travel
5.8 mm ± 0.2 mm

Rebound time
≤ 3 ms

Mechanical lifetime
(with 1 switching element)

Pushbutton maintained action	1.5 million Cycles of operation
Pushbutton momentary action	3 million Cycles of operation
Selector switch maintained action	1.25 million Cycles of operation
Selector switch momentary action	2.5 million Cycles of operation
Keylock switch maintained action	25 000 Cycles of operation
Keylock switch momentary action	50 000 Cycles of operation

Electrical characteristics

Standards
The switches comply with the “Standards for low-voltage switching devices” EN IEC 60947-5-1

Rated Insulation Voltage U_i
500 VAC/600 VDC, as per EN IEC 60947-5-1

Contact resistance
New state ≤ 50 mΩ as per DIN IEC 60512-2-4

Isolation resistance
≥ 10 MΩ between open contacts at 500 VDC, as per DIN IEC 60512-3-1

Electrical life
50 000 cycles of operations

Conventional free air thermal current I_{th}
As per EN IEC 60947-5-1
6 A for plug-in terminals
10 A for screw terminals
the maximum current in continuous operation and at ambient temperature must not exceed the quoted maximum values.

Switch rating
At switch rating AC for gold-silver, silver-palladium and hardsilver contacts, service category AC-15, as per EN IEC 60947-5-1 (cosφ 0.3)

Voltage	230 VAC	400 VAC	500 VAC
Current	6 A	4 A	2.5 A

At switch rating DC for gold-silver and hardsilver contacts, service category DC-13, as per EN IEC 60947-5-1

Voltage	24 VDC	60 VDC	110 VDC
Current	10 A	3 A	1 A

Recommended minimum operational data
Gold-silver contacts:

Voltage	5 VDC	24 VDC	110 VDC
Current	15 mA	5 mA	2 mA

Hardsilver contacts:

Voltage	24 VDC	110 VDC
Current	50 mA	10 mA

Protection class
Indicators and switches, fit for mounting into devices with protection class II

Environmental conditions

Storage temperature
-40 °C … +85 °C

Operating temperature
-40 °C … +55 °C
(other temperatures on request)

Protection degree
IP 00

Shock resistance
(single impacts, semi-sinusoidal)
300 m/s^2 puls width 11 ms, as per EN IEC 60068-2-27

Vibration resistance
(sinusoidal)
100 m/s^2 at 10 Hz … 500 Hz, amplitude 0.75 mm, as per EN IEC 60068-2-6

EAO reserves the right to alter specifications without further notice.

Snap-action switching element

Approvals

Approbations
CB (IEC 60947)
CCC
CSA
Germanischer Lloyd
GOST
NFF 16-102
UL

Declaration of conformity
CE

Slow-make switching element PIT

Switching system

The double-break, slow-make switching element is equipped with one or two independent contact systems, acting as normally open or normally closed contact. The normally closed contact has forced opening.
Slow-make contacts with forced action are ideal for high switch ratings.
Up to three switching elements can be snapped to each actuator.
For the emergency-stop pushbutton use the slow-make switching element (max. 3).

Material

Material of contact
Hardsilver and gold-silver

Switch housing
Polycarbonate (PC)

Mechanical characteristics

Terminals
PIT push-in terminal
Skinning 8 mm
Wire cross-section:
Wire 0.2 to 1.0 mm²
Stranded wire 0.2 to 1.0 mm² without core and sleeve
Stranded wire 0.2 to 0.75 mm² with core and sleeve

Tightening torque
Screws at the mounting flange max. 25 Ncm

Actuating force
1 Normally closed 2 N
1 Normally open 3.1 N

Actuating travel
5.8 mm ± 0.2 mm

Rebound time
≤ 1 ms

Mechanical lifetime
(with 1 switching element)

Pushbutton maintained action	1.5 million Cycles of operation
Pushbutton momentary action	3 million Cycles of operation
Selector switch maintained action	1.25 million Cycles of operation
Selector switch momentary action	2.5 million Cycles of operation
Emergency-stop switch	50 000 Cycles of operation
Keylock switch maintained action	25 000 Cycles of operation
Keylock switch momentary action	50 000 Cycles of operation

Electrical characteristics

Standards
The switches comply with EN IEC 60947-1/EN IEC 60947-5-1

Rated Insulation Voltage U_i
500 VAC/600 VDC, as per EN IEC 60947-5-1

Contact resistance
New state ≤ 50 mΩ as per DIN IEC 60512-2-4

Isolation resistance
≥ 10 MΩ between open contacts at 500 VDC, as per DIN IEC 60512-3-1

Electrical life
6050 cycles of operations

Conventional free air thermal current I_{th}
6 A, as per EN IEC 60947-5-1
the maximum current in continuous operation and at ambient temperature must not exceed the quoted maximum values.

Switch rating
At switch rating AC for gold-silver and hardsilver contacts, service category AC-15, as per EN IEC 60947-5-1 (cosφ 0.3)

Voltage	250 VAC
Current	6 A

At switch rating DC for gold-silver and hardsilver contacts, service category DC-13, as per EN IEC 60947-5-1

Voltage	24 VDC	110 VDC
Current	6 A	1.0 A

Recommended minimum operational data
Gold-silver contacts:

Voltage	24 VDC
Current	5 mA

Hardsilver contacts:

Voltage	24 VDC
Current	50 mA

Protection class
Indicators and switches, fit for mounting into devices with protection class II

Environmental conditions

Storage temperature
-40 °C … +85 °C

Operating temperature
-40 °C … +55 °C
(other temperatures on request)

Protection degree
IP 20

Shock resistance
(single impacts, semi-sinusoidal)
300 m/s² puls width 11 ms, as per EN IEC 60068-2-27

Slow-make switching element PIT

Approvals

Approbations
CB (IEC 60947)
CSA
Germanischer Lloyd
GOST
NFF 16-102
UL

Declaration of conformity
CE

Snap-action switching element PIT

Switching system

The double-break, snap-action switching element is equipped with one or two independent contact systems, acting as normally open or normally closed contact. The snap-action switching element is fitted with self-cleaning contacts.
Up to three switching elements can be snapped to each actuator. Snap-action switching elements are not permissible for emergency-stop pushbuttons!

Material

Material of contact
Hardsilver and gold-silver

Switch housing
Polycarbonate (PC)

Mechanical characteristics

Terminals
PIT push-in terminal
Skinning 8 mm
Wire cross-section:
Wire 0.2 to 1.0 mm²
Stranded wire 0.2 to 1.0 mm² without core and sleeve
Stranded wire 0.2 to 0.75 mm² with core and sleeve

Tightening torque
Screws at the mounting flange max. 25 Ncm

Actuating force
1 Normally closed 1.9 N
1 Normally open 2 N

Actuating travel
5.8 mm ± 0.2 mm

Rebound time
≤ 3 ms

Mechanical lifetime
(with 1 switching element)

Pushbutton maintained action	1.5 million Cycles of operation
Pushbutton momentary action	3 million Cycles of operation
Selector switch maintained action	1.25 million Cycles of operation
Selector switch momentary action	2.5 million Cycles of operation
Emergency-stop switch	50 000 Cycles of operation
Keylock switch maintained action	25 000 Cycles of operation
Keylock switch momentary action	50 000 Cycles of operation

Electrical characteristics

Standards
The switches comply with EN IEC 60947-1/EN IEC 60947-5-1

Rated Insulation Voltage U_i
500 VAC/600 VDC, as per EN IEC 60947-5-1

Contact resistance
New state ≤ 50 mΩ as per DIN IEC 60512-2-4

Isolation resistance
≥ 10 MΩ between open contacts at 500 VDC, as per DIN IEC 60512-3-1

Electrical life
50 000 cycles of operations

Conventional free air thermal current I_{th}
6 A, as per EN IEC 60947-5-1
the maximum current in continuous operation and at ambient temperature must not exceed the quoted maximum values.

Switch rating
At switch rating AC for gold-silver and hardsilver contacts, service category AC-15, as per EN IEC 60947-5-1 (cosφ 0.3)

Voltage	250 VAC
Current	6 A

At switch rating DC for gold-silver and hardsilver contacts, service category DC-13, as per EN IEC 60947-5-1

Voltage	24 VDC	110 VDC
Current	6 A	1.0 A

Recommended minimum operational data
Gold-silver contacts:

Voltage	24 VDC
Current	5 mA

Hardsilver contacts:

Voltage	24 VDC
Current	50 mA

Protection class
Indicators and switches, fit for mounting into devices with protection class II

Environmental conditions

Storage temperature
-40 °C … +85 °C

Operating temperature
-40 °C … +55 °C
(other temperatures on request)

Protection degree
IP 20

Shock resistance
(single impacts, semi-sinusoidal)
300 m/s² puls width 11 ms, as per EN IEC 60068-2-27

Vibration resistance
(sinusoidal)
100 m/s² at 10 Hz … 500 Hz, as per EN IEC 60068-2-6 and EN 61373 Increased broad band noise, class 1B

Snap-action switching element PIT

Approvals

Approbations
CB (IEC 60947)
CSA
Germanischer Lloyd
GOST
NFF 16-102
UL

Declaration of conformity
CE

Lamp block

Material

Housing
Polycarbonate (PC)

Mechanical characteristics

Terminals
Screw terminals
Plug-in terminals 6.3 x 0.8 mm
max. wire cross-section 2 x 2.5 mm²
max. wire cross-section of stranded cable 2 x 1.5 mm²
For switches with plug-in terminals it is necessary to provide insulation sleeves and to maintain a spacing of 65 mm between rows (mounting cut-outs)

Electrical characteristics

Standards
The switches comply with EN IEC 60947-1/EN IEC 60947-5-1

Illumination
Voltage 250 V max.
Power 2.6 W max.
BA9s standard adaptable.

Environmental conditions

Storage temperature
-40 °C … +85 °C

Operating temperature
-40 °C … +55 °C
(other temperatures on request)

Protection degree
IP 00

Shock resistance
(single impacts, semi-sinusoidal)
300 m/s² puls width 11 ms, as per EN IEC 60068-2-27

Vibration resistance
(sinusoidal)
100 m/s² at 10 Hz … 500 Hz, as per EN IEC 60068-2-6 and EN 61373 Increased broad band noise, class 1B

Lamp block PIT

Material

Housing
Polycarbonate (PC)

Mechanical characteristics

Terminals
PIT push-in terminal
Skinning 8 mm
Wire cross-section:
Wire 0.2 to 1.0 mm²
Stranded wire 0.2 to 1.0 mm² without core and sleeve
Stranded wire 0.2 to 0.75 mm² with core and sleeve

Electrical characteristics

Standards
The switches comply with EN IEC 60947-1/EN IEC 60947-5-1

Illumination
Voltage 250 V max.
Power 2.6 W max.
BA9s standard adaptable.

Environmental conditions

Storage temperature
-40 °C … +85 °C

Operating temperature
-40 °C … +55 °C
(other temperatures on request)

Protection degree
IP 20

Shock resistance
(single impacts, semi-sinusoidal)
300 m/s² puls width 11 ms, as per EN IEC 60068-2-27

Vibration resistance
(sinusoidal)
100 m/s² at 10 Hz … 500 Hz, as per EN IEC 60068-2-6 and EN 61373 Increased broad band noise, class 1B

Buzzer

Buzzer system

System
Piezo disc

Material

Buzzer case
Polyamide

Front cap
Plastic Polyamide
Metal Nickel-plated brass (sea-water proof)

Mechanical characteristics

Terminals
Plug-in terminal 2.8 x 0.5 mm

Tightening torque
for fixing nut max. 25 Ncm

Electrical characteristics

Frequency (tone)
approx. 2.8 kHz continuous tone only

Sound pressure
95 db (A) ±8 dB at a distance of 0.1 m
Operation Voltage/Current
Operation Voltage 24 VDC ±10 %
Operation Current ≤ 25 mA

Environmental conditions

Storage temperature
-40 °C … +85 °C

Operating temperature
-40 °C … +55 °C
(other temperatures on request)

Protection degree
as per EN IEC 60529, frontside
IP 40, devices flush design
IP 65, devices raised design

Approvals

Declaration of conformity
CE

Actuator

Material

Front ring
Polyamide, Aluminium or Stainless steel

Mounting flange
Polyethylene terephtalate

Actuator housing
Polycarbonate, Polyamide

Mechanical characteristics

Actuating force
Mounting style square flush 6.2 N
other mounting styles 8 N

Actuating travel
5.8 mm ± 0.2 mm

Mechanical lifetime
(with 1 switching element)

Pushbutton	≤ 3 million Cycles of operation
Selector switch	≤2.5 million Cycles of operation
Stop switch	≤ 50 000 Cycles of operation
Fool proofed E-stop	≥ 50 000 Cycles of operation
Keylock switch	≤ 50 000 Cycles of operation
Key insert switches	≤ 250 000 Cycles of operation

Keylock switch
The standard lock number is 251, the last digit of the device Part No. = 0 (example: 704.335.0).
Additional lock numbers are available:
252 last digit = 1; 253 last digit = 2; 254 last digit = 3
255 last digit = 4, 256 last digit = 5; 257 last digit = 6
258 last digit = 7; 259 last digit = 8; 260 last digit = 9

Electrical characteristics

Standards
The switches comply with the “Rules for low-voltage switching devices” EN IEC 60947-5-1

Environmental conditions

Storage temperature
-40 °C … +85 °C

Operating temperature
-40 °C … +55 °C
(other temperatures on request)

Protection degree
As per EN IEC 60529
frontside IP 65 (IP 67 Key insert switch)

Rotary selector switching element

Mechanical characteristics

Terminals
Screw terminals
Terminal lead material copper wires only
max. permissible wire gage:
Single-core or stranded wire 2 x 1.5 mm² (2 x AWG 14)
flexible wire 2 x 1.5 mm² (2 x AWG 16)

Tightening torque
for fixing nut max. 25 Ncm

Number of stages
1 to 8 positions max.

Number of contacts
1 to 16 max. normally open contacts
(contact positioning according circuit drawing)

Switching angle
Basic position of switching position “A” is 9 o’clock

Maintained action	Switching angle
12 max.	30°
8 max.	45°
6 max.	60°
4 max.	90°

Momentary action with release 24°
(provide at the beginning or at the end)

Standard type of Kraus & Naimer
CG4 Hard Silver contacts with 1 µm Gold layer
CG4-1 Hard Silver contacts with 35 µm Gold layer

Electrical characteristics

Minimum Voltage
20 V

Rated Impulse Withstand Voltage U_{imp}
4 kV

Short Circuit Protection
Max. fuse size (gL-characteristic) 10 A
Rated short-time withstand current (1s-current) 90 A

Electrical characteristics for AC

Standards
The devices comply with: EN IEC 60947-3, VDE 0660 part 107

Rated Operational Voltage U_e
440 V

Rated Insulation Voltage U_i
440 V

Rated Thermal Current I_u / I_{th}
10 A

Rated Operational Current I_e
AC-15 Switching of control devices, contactors, valves etc.

110 V – 120 V	2.5 A
220 V – 240 V	2.5 A
380 V – 440 V	1.5 A

No load operation
10 A

AC-21A Switching of resistive loads, including moderate overloads
For switchin of power > 1 kW
10 A

AC-22A Switching of combined resistive or low inductive loads including moderate overloads

220 V – 240 V	10 A

Rated Utilization Category
AC-2 Slip ring motor starting, reversing and plugging, star-delta starting 3 phase, 3 pole

220 V – 240 V	2.5 kW
380 V – 440 V	4.5 kW

AC-3 Direct-on-line starting, star-delta starting

3 phase, 3 pole	220 V – 240 V	2.50 kW
	380 V – 440 V	2.20 kW
1 phase, 2 pole	110 V – 120 V	0.30 kW
	220 V – 240 V	0.55 kW
	380 V – 440 V	0.75 kW

AC-Direct-on-line starting, reversing, plugging and inching

3 phase, 3 pole	220 V – 240 V	0.37 kW
	380 V – 440 V	0.55 kW
1 phase, 2 pole	110 V – 120 V	0.15 kW
	220 V – 240 V	0.25 kW
	380 V – 440 V	0.50 kW

AC-23A Frequent switching of motors or other high inductive loads

3 phase, 3 pole	220 V – 240 V	1.80 kW
	380 V – 440 V	3.00 kW
1 phase, 2 pole	110 V – 120 V	0.37 kW
	220 V – 240 V	0.75 kW
	380 V – 440 V	1.10 kW

Overvoltage category
III, valid for lines with grounded common neutral termination

Degree of pollution
3, valid for lines with grounded common neutral termination

Rotary selector switching element

Electrical characteristics for AC (UL/Canada)

Rated operational voltage
300 V

Rated Insulation Voltage U_i
300 V

Rated Thermal Current
10 A

Ampere Rating
Resisitve or low inductive loads, for switching of power > 1 kW, 10 A

Ratings
Standard motor load, DOL Rating (similar AC-3)

3 phase, 3 pole	110 V – 120 V	0.75 HP
	220 V – 240 V	1.00 HP
1 phase, 2 pole	110 V – 120 V	0.33 HP
	220 V – 240 V	0.75 HP
	277 V – 277 V	0.75 HP

Pilot Duty, Heavy
300 VAC

Electrical characteristics for DC

Switch Rating DC
Resistive loads T ≤ 1 ms

Number of series contact(s)							Switch
1	2	3	4	5	6	8	Capacity
24 V	48 V	70 V	95 V	120 V	145 V	190 V	10.0 A
48 V	95 V	140 V	190 V	240 V	290 V	350 V	6.0 A
60 V	120 V	180 V	240 V	300 V	360 V	450 V	2.5 A
110 V	220 V	330 V	440 V	550 V	660 V		0.7 A
220 V	440 V	660 V					0.3 A
440 V	660 V						0.2 A

Inductive loads T = 50 ms

Number of series contact(s)							Switch
1	2	3	4	5	6	8	Capacity
24 V	48 V	70 V	95 V	120 V	145 V	190 V	6.0 A
30 V	60 V	90 V	120 V	150 V	180 V	240 V	3.0 A
48 V	95 V	140 V	190 V	240 V	290 V	350 V	1.0 A
60 V	120 V	180 V	240 V	300 V	360 V	450 V	0.7 A
110 V	220 V	330 V	440 V	550 V	660 V		0.3 A

Environment conditions

Operating temperature
Ambient Temperatures of Stages

open at 100 % I_u / I_{th}	55 °C during 24 h with peaks up to 60 °C
enclosed at 100 % I_{the}	35 °C during 24 h with peaks up to 40 °C

SCATTERGOOD & JOHNSON LTD
ELECTRICAL ENGINEERING & FLUID CONTROL DISTRIBUTORS
Est.1899

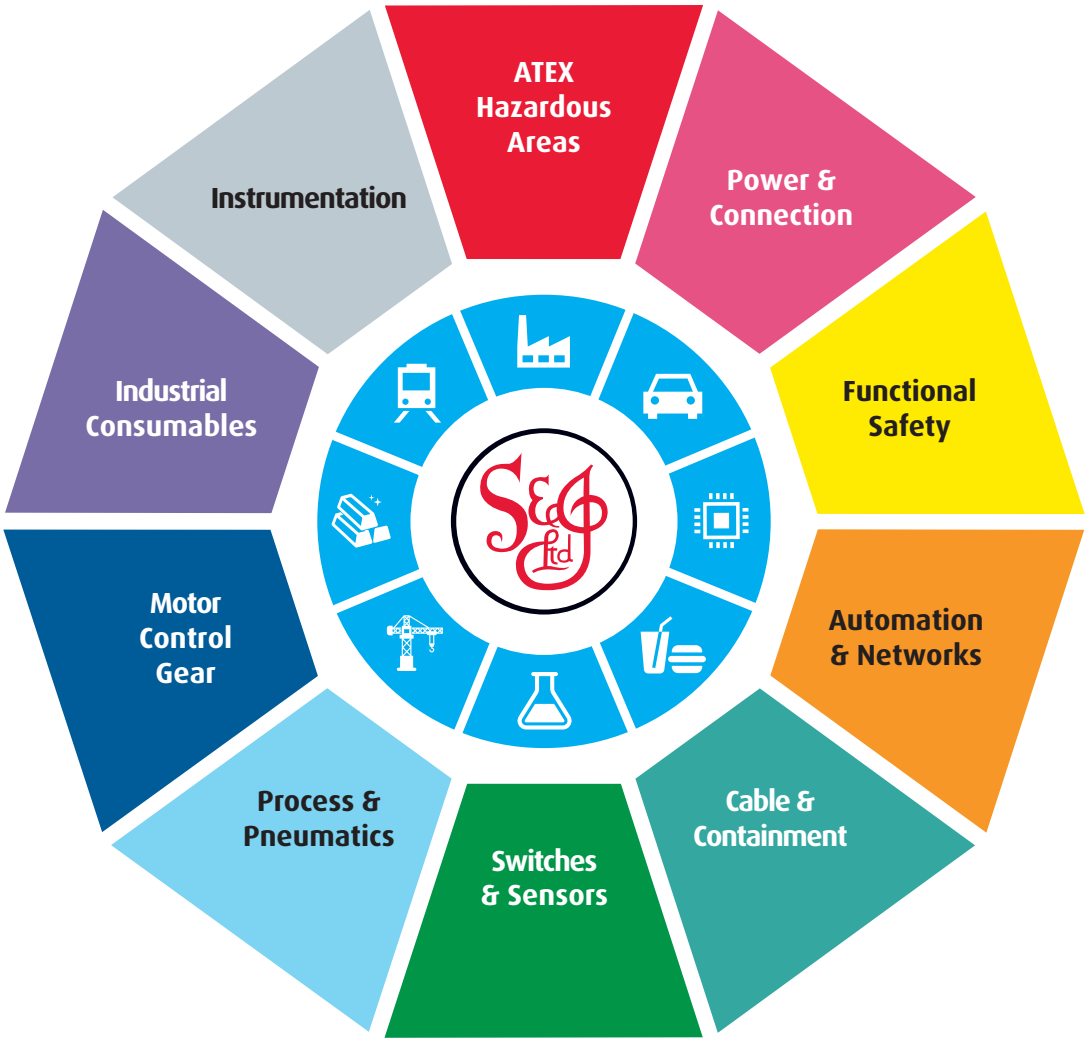
At Scattergood & Johnson Ltd, we pride ourselves on being a technical distributor to specialist industries.

Working with a range of quality product suppliers across a number of specialist markets, we are not your average 'box shifter' - we are your technical and supply chain partner.

We fully support every product we sell - for free! Our internal team and external sales engineers can answer any product or application question, no matter the complexity.

Backing up this technical ability is a range of 50,000+ products available from stock for nationwide next day delivery (same day if required!), or you can collect what you need from any of our trade counters around the UK.

Select your specialist interest below to learn more about how we can help.



Online, In Branch and On the Road - Scattergood & Johnson Ltd, there when you need us.

www.scatts.co.uk