

# SUBMINIATURE MICROSWITCHES - PREMIUM

## V4 - 83170

- › High precision flexible leaf snap-action mechanism
- › Operation without balance-point, even at extremely slow actuating speed
- › Ratings from 1 mA 4 V<sub>DC</sub> up to 12(6) A 250 V<sub>AC</sub> and 1/4 HP 125-250 V<sub>AC</sub>
- › ENEC and cURus approved up to +150 °C
- › Mechanical life up to 30 million cycles
- › High resistance to shock and vibration
- › Choice of connections with symmetric and asymmetric pinning
- › Wide choice of actuators on 2 possible fixing positions (pre-assembled or retrofittable)



### Main specifications

|                                     |             | Standard<br>831700 | Low force<br>831704 | Dual-current<br>831708 | Dual-current<br>Low force 831709 |
|-------------------------------------|-------------|--------------------|---------------------|------------------------|----------------------------------|
| Function                            | Connections |                    |                     |                        |                                  |
| I (changeover)                      | W2          | 83170002           | 83170402            | 83170802               | 83170902                         |
| I (changeover)                      | W7A5        | 83170005           | 83170405            | 83170805               | 83170905                         |
| I (changeover)                      | X1          | 83170008           | 83170408            | 83170808               | 83170908                         |
| I (changeover)                      | X1S         | 83170009           | 83170409            | 83170809               | 83170909                         |
| I (changeover)                      | X2          | 83170010           | 83170410            | 83170810               | 83170910                         |
| I (changeover)                      | X2S         | 83170011           | 83170411            | 83170811               | 83170911                         |
| I (changeover)                      | X3          | 83170012           | 83170412            | 83170812               | 83170912                         |
| I (changeover)                      | X3S         | 83170013           | 83170413            | 83170813               | 83170913                         |
| R (normally closed)                 | W2          | 83170003           | 83170403            | 83170803               | 83170903                         |
| R (normally closed)                 | W7A5        | 83170006           | 83170406            | 83170806               | 83170906                         |
| C (normally open)                   | W2          | 83170004           | 83170404            | 83170804               | 83170904                         |
| C (normally open)                   | W7A5        | 83170007           | 83170407            | 83170807               | 83170907                         |
| <b>Electrical characteristics</b>   |             |                    |                     |                        |                                  |
| Rating nominal / 250 V AC (A)       |             | 10                 | 5                   | 5**                    | 5**                              |
| Rating thermal / 250 V AC (A)       |             | 12.5               | 6                   | 6                      | 6                                |
| <b>Mechanical characteristics</b>   |             |                    |                     |                        |                                  |
| Maximum operating force (N)         |             | 1.5                | 0.6                 | 1.5                    | 0.6                              |
| Min. Release force (N)              |             | 0.3                | 0.1                 | 0.3                    | 0.1                              |
| Maximum total travel force (N)      |             | 1.8                | 1                   | 1.8                    | 1                                |
| Max. allowable overtravel force (N) |             | 10                 | 10                  | 10                     | 10                               |
| Rest position max. (mm)             |             | 9.2                | 9.2                 | 9.2                    | 9.2                              |
| Operating position (mm)             |             | 8.4±0.3            | 8.4±0.3             | 8.4±0.3                | 8.4±0.3                          |
| Maximum differential travel (mm)    |             | 0.15               | 0.15                | 0.15                   | 0.15                             |
| Min. overtravel (mm)                |             | 0.5                | 0.5                 | 0.5                    | 0.5                              |
| Ambient operating temperature (°C)  |             | -40 +125           | -40 +125            | -40 +125               | -40 +125                         |
| Mechanical life (operations)        |             | 10 <sup>7</sup> *  | 3.10 <sup>7</sup>   | 10 <sup>7</sup> *      | 3.10 <sup>7</sup>                |
| Contact gap (mm)                    |             | 0.4                | 0.4                 | 0.4                    | 0.4                              |
| Weight (g)                          |             | 1.7                | 1.7                 | 1.7                    | 1.7                              |

\* For 2/3 of the overtravel

### Additional specifications

- Case: PBT GF (UL 94-V0 / GWFI 960 °C)
- Button: PA66 GF
- Moving blade: beryllium copper
- Contacts: silver alloy, micro-profile  
gold alloy on silver alloy, crossbar (dual-current)
- Terminals: copper nickel (except W7A5: brass)
- Levers: stainless steel or plastic, polyamide roller
- Degree of protection: IP40 (mechanism)
- Proof tracking index: PTI 250
- Protection against electric shock: button and actuators have reinforced insulation for Ui 250 V / Uimp 2,5kV / pollution 2
- Recommended min actuating speed: 0.001 mm/s
- Approvals: NF - ENEC - cURus

### Product adaptations



- › Special actuators: stainless steel or plastic, special shapes and lengths
- › Special connections: angled, screw, double tabs, ...
- › Special fastening pins
- › High operating temperature: +150 °C
- › NF 12(6) A and cURus 12 A approved version (831700 SP9765)
- › AgSnO2 contacts for very high inrush currents (lamp and capacitor loads)
- › Increased or reduced differential travel (SP4982: max 0.08 mm)
- › Specific operating force up to 2.2 N
- › Housing material according to IEC 60335-1 for unattended appliances: GWFI 850° C / GWIT 775° C
- › Telescopic plunger with 3 mm overtravel and adjustable fixing by threaded barrel
- › NC contacts with forced break action to prevent contact welding in case of accidental overcurrents

Standard product

Product made to order



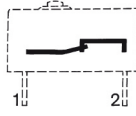
Contact us

## Principles

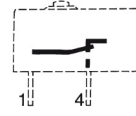
### Single break snap-action switch Changeover - SPDT (form C)



### Normally closed - SPST-NC (form B)

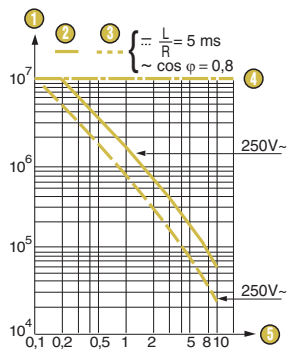


### Normally open - SPST-NO (form A)



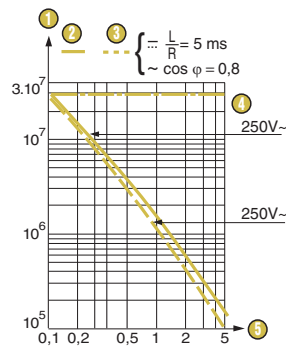
## Curves

### Operating curve for type 831700



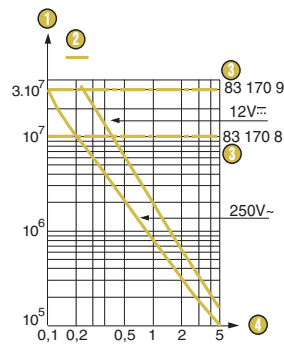
- 1 Number of cycles
- 2 Resistive circuit
- 3 Inductive circuit
- 4 Mechanical life limit
- 5 Current in Amps

### Operating curve for type 831704



- 1 Number of cycles
- 2 Resistive circuit
- 3 Inductive circuit
- 4 Mechanical life limit
- 5 Current in Amps

### Operating curve for types 831708/831709



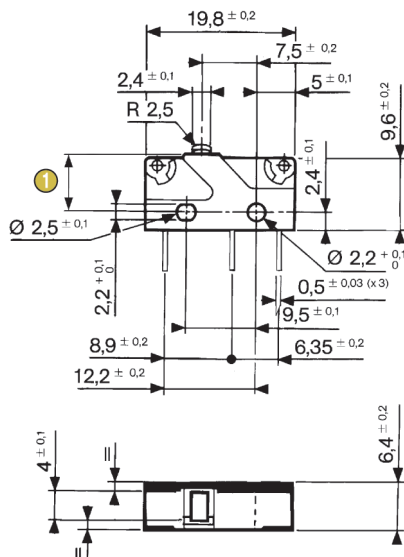
- 1 Number of cycles
- 2 Resistive circuit
- 3 Inductive circuit
- 4 Mechanical life limit
- 5 Current in Amps

\*\* Models 831708 and 831709 are designed to operate equally well on low-current (1 mA 4 V minimum recommended) or medium-current (5 A maximum) circuits. However, a given product should only be used to switch one type of circuit during its working life.

## Dimensions

### Product

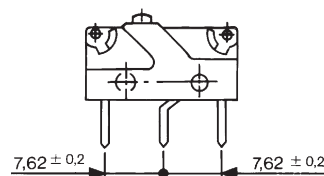
#### 83170 Asymmetrical version



- 1 Total travel position = max 7.6

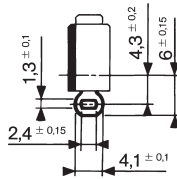
Fixing with M2 screws  
Recommended tightening torque: 0.2 N.m

#### 83170 Symmetrical version (X.S connections)

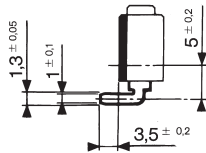


## Connections

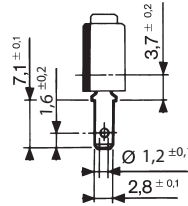
### W2 solder



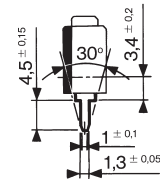
### X2 - X2S for PCB, rear output



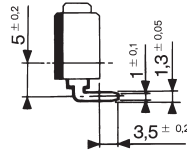
### W7A5 quick-connect 2.8 x 0.5



### X1 - X1S for PCB, straight output

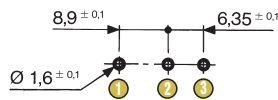


### X3 - X3S for PCB, front output



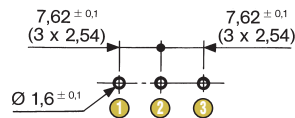
## Drilling

### Printed circuit board mounting Asymmetrical X1 - X2 - X3



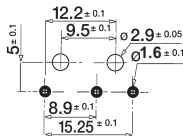
- 1 1.C
- 2 4.NO
- 3 2.NC

### Printed circuit board mounting Symmetrical X1S - X2S - X3S

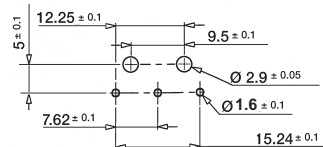


- 1 1.C
- 2 4.NO
- 3 2.NC

### Mounting on a printed circuit board with holding pins Asymmetrical

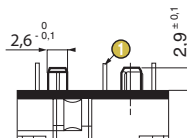


### Mounting on a printed circuit board with holding pins Symmetrical



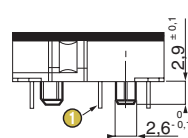
## Mounting accessories

### Locating pins 79219682



- 1 X2 - X2S connections

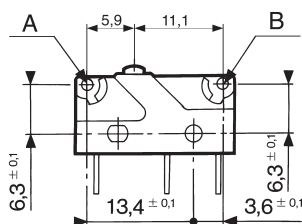
### Locating pins 79219682



- 1 X3 - X3S connections

Other shapes and dimensions:  
consult us

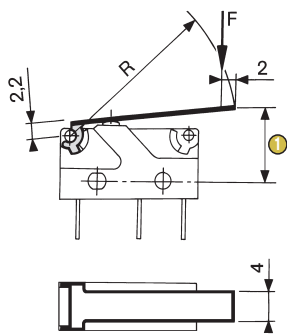
## Actuator mounting positions



To calculate force : divide the switch force by the coefficient in the table.  
To calculate travel : multiply the switch travel by the same coefficient.

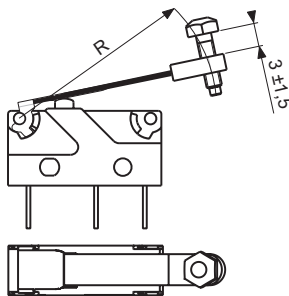
## Actuators

170A flat

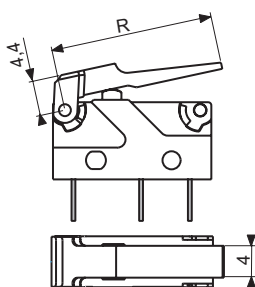


① Operating position

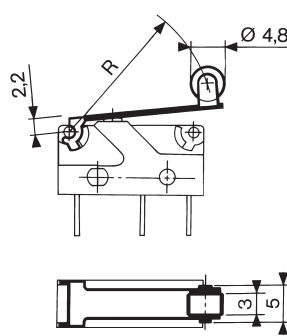
170D adjustable



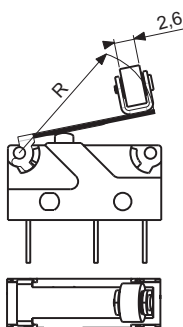
79257876 plastic



170E roller

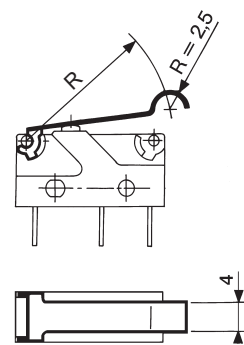


170EL transverse roller

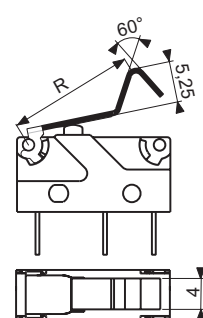


Other shapes and dimensions:  
consult us

170F dummy roller



79250004 folded



## Actuators and mounting accessories

| Part numbers for standard actuators | 79253327                 | 79253326                       | 79253328            | 79218454                     | 79253329                   |
|-------------------------------------|--------------------------|--------------------------------|---------------------|------------------------------|----------------------------|
| Actuators                           | Flat 170A<br>R18.3       | Flat 170A<br>R24               | Flat 170A<br>R41    | Roller 170E<br>R20           | Dummy roller 170F<br>R19.5 |
|                                     |                          |                                |                     |                              |                            |
| Fixing positions                    | A B                      | A B                            | A B                 | A B                          | A B                        |
| Coefficient                         | 3 1.5                    | 4 2                            | 7 3.5               | 3 1.5                        | 3 1.5                      |
| Operating position                  | 10 ±1 9.4 ±0.6           | 10.8 ±1.4 9.8 ±0.8             | 12.1 ±2.6 10.5 ±1.5 | 14.7 ±1.3 14.2 ±0.8          | 12.6 ±1.2 11.9 ±0.7        |
| Part numbers for standard actuators | 79218491                 | 79218493                       | 79250004            | 79257876                     |                            |
| Actuators                           | Adjustable 170D<br>R26.5 | Transverse roller 170EL<br>R18 | Folded<br>R16.5     | Plastic (PARA GF50)<br>R20.5 |                            |
|                                     |                          |                                |                     |                              |                            |
| Fixing positions                    | A B                      | A B                            | A B                 | A B                          |                            |
| Coefficient                         | 4 2                      | 3 1.5                          | 2.5 1.2             | 3 -                          |                            |
| Operating position                  | 16.6 ±1.8 * 15.5 ±1.1 *  | 16.3 ±1.2 15.6 ±0.8            | 15 ±1 13.9 ±0.6     | 10.6 ±1.1 -                  |                            |

\* Factory setting. Adjustment range +/- 1.5 mm

Except where otherwise indicated, levers are supplied unmounted. For factory mounting, specify fixing position A or B.



## V4 - 83170 microswitches with referenced actuators

| Actuator | 170A R18.3 |          | 170A R24 |          | 170E R20 |          | 170F R19.5 |          | Folded R16,5 |          | Plastic  |
|----------|------------|----------|----------|----------|----------|----------|------------|----------|--------------|----------|----------|
|          | 79253327   |          | 79253326 |          | 79218454 |          | 79253329   |          | 79250004     |          | 79257876 |
|          | Pos A      | Pos B    | Pos A    | Pos B    | Pos A    | Pos B    | Pos A      | Pos B    | Pos A        | Pos B    | Pos A    |
| 831700   | I W2       | 83170162 | 83170185 | 83170182 | •        | •        | •          | 83170028 | 83170032     | •        | 83170176 |
|          | I W7A5     | 83170197 | •        | •        | •        | •        | •          | 83170046 | 83170183     | •        | •        |
|          | I X1       | •        | •        | •        | •        | 83170121 | 83170049   | •        | 83170184     | •        | •        |
|          | I X1S      | •        | •        | •        | •        | •        | •          | •        | •            | •        | •        |
|          | I X2       | •        | 83170160 | •        | •        | •        | 83170038   | •        | 83170035     | •        | •        |
|          | I X3       | •        | 83170161 | •        | •        | •        | 83170039   | •        | 83170036     | •        | •        |
| 831704   | I W2       | 83170437 | 83170439 | 83170440 | 83170441 | 83170434 | 83170442   | 83170443 | 83170444     | •        | •        |
|          | I W7A5     | 83170445 | 83170446 | 83170447 | 83170448 | 83170449 | 83170450   | 83170451 | 83170433     | •        | •        |
|          | I X1       | 83170464 | 83170465 | 83170466 | 83170467 | 83170468 | 83170469   | 83170470 | 83170471     | •        | •        |
|          | I X1S      | •        | •        | •        | •        | 83170435 | •          | •        | •            | •        | •        |
|          | I X2       | •        | •        | •        | •        | •        | •          | •        | •            | 83170427 | •        |
|          | I X3       | •        | •        | •        | •        | •        | •          | •        | •            | 83170428 | •        |
| 831708   | I W2       | 83170848 | •        | 83170832 | •        | •        | •          | •        | •            | 83170833 | 83170864 |
|          | I W7A5     | •        | 83170849 | •        | •        | •        | •          | •        | •            | •        | •        |
|          | I X1       | •        | •        | •        | •        | •        | •          | 83170850 | 83170851     | •        | •        |
|          | I X1S      | •        | •        | •        | •        | •        | •          | •        | •            | •        | •        |
|          | I X2       | •        | •        | •        | •        | •        | •          | •        | •            | •        | •        |
|          | I X3       | •        | •        | •        | •        | •        | •          | •        | •            | •        | •        |
| 831709   | I W2       | 83170930 | 83170931 | 83170932 | 83170933 | 83170934 | 83170935   | 83170936 | 83170937     | •        | •        |
|          | I W7A5     | 83170938 | 83170939 | 83170929 | 83170940 | 83170941 | 83170942   | 83170943 | 83170944     | •        | •        |
|          | I X1       | 83170928 | 83170945 | 83170946 | 83170947 | 83170948 | 83170949   | 83170950 | 83170951     | •        | •        |
|          | I X1S      | 83170926 | 83170927 | •        | •        | •        | •          | •        | •            | •        | •        |
|          | I X2       | •        | •        | •        | •        | •        | •          | •        | •            | •        | •        |
|          | I X3       | •        | •        | •        | •        | •        | •          | •        | •            | •        | •        |

## Installation recommendations

See "Basic technical concepts"

## How to order

Use the 8 digit part numbers when they are defined

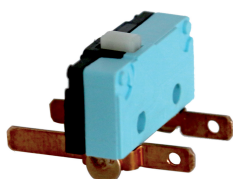
Other cases, precise: Type of microswitch - Function - Connection - Actuator\* - Fixing position\* - Mounting accessories\* - Adaptation\*  
\* if needed

Example: 831708 I X2 170A R24 B 79219682

## Examples of special adaptations



Angled W7A5 terminals



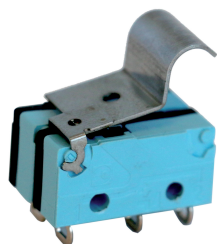
Double lateral 2.8 x 0.5 quick-connect terminals



Top mounted bracket and screw terminals



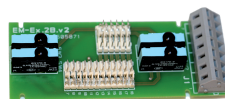
Telescopic plunger with 3 mm overtravel and with M6 x 0.75 threaded barrel



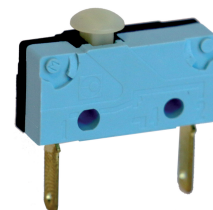
Two-pole assembly with single actuator



Fastening pins for 2.8 max thickness and Ø 4mm holes (79253576)



PCB assembly with terminal block



Special buttons:  
see "V4 Mushroom-head button - 83170 BC"

Standard product

Product made to order

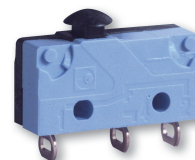


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# SUBMINIATURE MICROSWITCHES - PREMIUM

## V4 Mushroom-head button - 83170 BC

- › High precision flexible leaf snap-action mechanism
- › Suitable for lateral approach from any direction with angle up to 45°
- › Operation without balance-point, even at extremely slow actuating speed
- › Ratings from 1 mA 4 V $\sim$  up to 12(6) A 250 V $\sim$  and 1/4 HP 125-250 V $\sim$
- › ENEC and cURus approved up to +150 °C
- › Mechanical life 1 million cycles
- › High resistance to shock and vibration
- › Choice of connections with symmetric and asymmetric pinning



### Main specifications

|                                     |             | Standard<br>831700 BC | Low force<br>831704 BC | Dual-current<br>831708 BC | Dual-current<br>Low force<br>831709 BC |
|-------------------------------------|-------------|-----------------------|------------------------|---------------------------|----------------------------------------|
| Function                            | Connections |                       |                        |                           |                                        |
| I (changeover)                      | W2          | 83170107              | 83170473               | ●                         | 83170965                               |
| I (changeover)                      | W7A5        | ●                     | 83170474               | ●                         | 83170964                               |
| I (changeover)                      | X1          | ●                     | ●                      | 83170840                  | 83170971                               |
| I (changeover)                      | X1S         | ●                     | 83170481               | ●                         | ●                                      |
| I (changeover)                      | X2          | ●                     | ●                      | 83170386                  | 83170919                               |
| I (changeover)                      | X2S         | ●                     | 83170438               | ●                         | ●                                      |
| I (changeover)                      | X3          | ●                     | ●                      | ●                         | ●                                      |
| I (changeover)                      | X3S         | ●                     | 83170486               | ●                         | ●                                      |
| R (normally closed)                 | W2          | ●                     | 83170495               | ●                         | ●                                      |
| R (normally closed)                 | W7A5        | ●                     | ●                      | ●                         | ●                                      |
| C (normally open)                   | W2          | ●                     | ●                      | ●                         | ●                                      |
| C (normally open)                   | W7A5        | 83170114              | 83170475               | ●                         | ●                                      |
| Electrical characteristics          |             |                       |                        |                           |                                        |
| Rating nominal / 250 V AC (A)       |             | 10                    | 5                      | 5**                       | 5**                                    |
| Rating thermal / 250 V AC (A)       |             | 12.5                  | 6                      | 6                         | 6                                      |
| Mechanical characteristics          |             |                       |                        |                           |                                        |
| Maximum operating force (N)         |             | 1.5                   | 0.6                    | 1.5                       | 0.6                                    |
| Min. Release force (N)              |             | 0.3                   | 0.1                    | 0.3                       | 0.1                                    |
| Maximum total travel force (N)      |             | 1.8                   | 1                      | 1.8                       | 1                                      |
| Max. allowable overtravel force (N) |             | 10                    | 10                     | 10                        | 10                                     |
| Rest position max. (mm)             |             | 10.8                  | 10.8                   | 10.8                      | 10.8                                   |
| Operating position (mm)             |             | 9.9±0.3               | 9.9±0.3                | 9.9±0.3                   | 9.9±0.3                                |
| Maximum differential travel (mm)    |             | 0.15                  | 0.15                   | 0.15                      | 0.15                                   |
| Min. overtravel (mm)                |             | 0.5                   | 0.5                    | 0.5                       | 0.5                                    |
| Ambient operating temperature (°C)  |             | -40 +125              | -40 +125               | -40 +125                  | -40 +125                               |
| Mechanical life at 45° (operations) |             | 10 <sup>6</sup> *     | 10 <sup>6</sup>        | 10 <sup>6</sup> *         | 10 <sup>6</sup>                        |
| Contact gap (mm)                    |             | 0.4                   | 0.4                    | 0.4                       | 0.4                                    |
| Weight (g)                          |             | 1.7                   | 1.7                    | 1.7                       | 1.7                                    |

\* for 2/3 of the overtravel

### Additional specifications

- Case: PBT GF (UL 94-V0 / GWFI 960 °C)
- Button: PA66 GF
- Moving blade: beryllium copper
- Contacts: silver alloy, micro-profile  
gold alloy on silver alloy, crossbar (dual-current)
- Terminals: copper nickel (except W7A5: brass)
- Degree of protection: IP40 (mechanism)
- Proof tracking index: PTI 250
- Protection against electric shock: button has reinforced insulation for Ui 250V / Uimp 2,5kV / pollution 2
- Recommended min actuating speed: 0.001 mm/s
- Approvals: NF - ENEC - cURus

### Product adaptations



- › Special buttons: cylindrical radius, specific width and height
- › Special connections: angled, screw, double tabs ...
- › Special fastening pins
- › High operating temperature: +150 °C
- › 12 A 250 V $\sim$  version
- › AgSnO2 contacts for very high inrush currents (lamp and capacitor loads)
- › Increased or reduced differential travel (eg: max. 0.08 mm)
- › Specific operating force up to 2.2 N
- › Housing material according to IEC 60335-1 for unattended appliances: GWFI 850 °C / GWIT 775 °C

Standard product

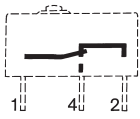
Product made to order



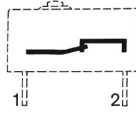
Contact us

## Principles

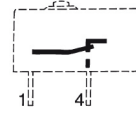
### Single break snap-action switch Changeover - SPDT (form C)



### Normally closed - SPST-NC (form B)

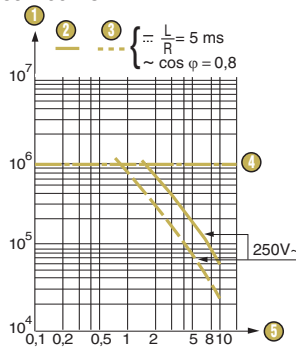


### Normally open - SPST-NO (form A)



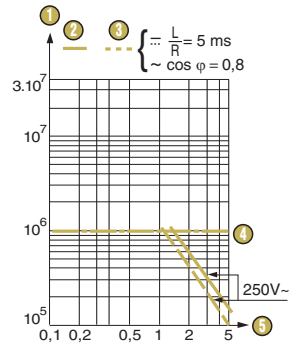
## Curves

### Operating curve for type 831700 BC



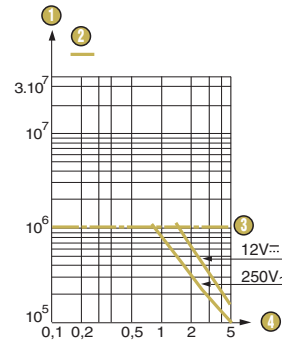
- ① Number of cycles
- ② Resistive circuit
- ③ Inductive circuit
- ④ Mechanical life limit
- ⑤ Current in Amps

### Operating curve for type 831704 BC



- ① Number of cycles
- ② Resistive circuit
- ③ Inductive circuit
- ④ Mechanical life limit
- ⑤ Current in Amps

### Operating curve for types 831708 BC/831709 BC



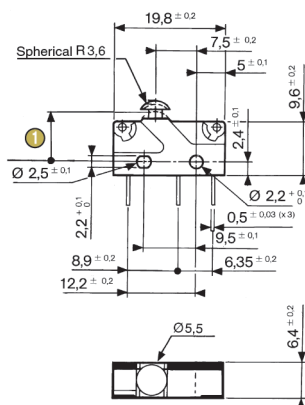
- ① Number of cycles
- ② Resistive circuit
- ③ Mechanical life limit
- ④ Current in Amps

\*\*Models 831708 and 831709 are designed to operate equally well on low-current (1 mA 4 V minimum recommended) or medium-current (5 A maximum) circuits. However, a given product should only be used to switch one type of circuit during its working life.

## Dimensions

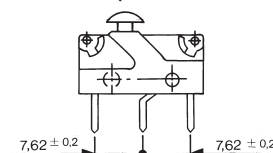
### Product

#### 83170 BC Asymmetrical version

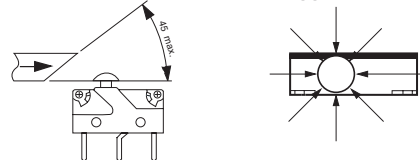


- ① Total travel position: max 9.1

#### 83170 BC Symmetrical version (X.S connections)



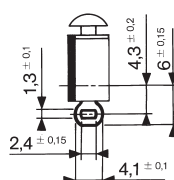
#### Recommendations for lateral approach



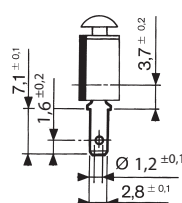
In order to reduce friction and wear, the actuating ramp shall preferably be of POM, PA, PBT or steel, and also be as smooth as possible.  
As a general rule, the use of any lubricant substance is not needed nor recommended.  
For particular cases, please consult us.

## Connections

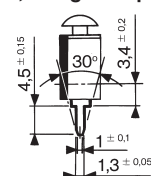
#### W2 solder



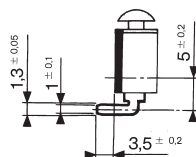
#### W7A5 quick-connect 2.8 x 0.5



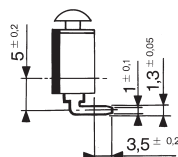
#### X1 - X1S for PCB, straight output



## X2 - X2S for PCB, rear output

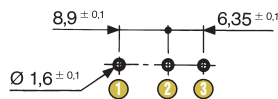


## X3 - X3S for PCB, front output



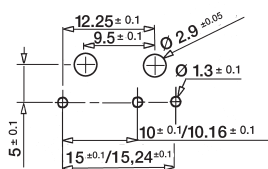
## Drilling

### Printed circuit board mounting Asymmetrical X1 - X2 - X3

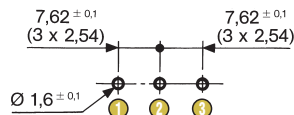


- 1 1.C
- 2 4.NO
- 3 2.NC

### Mounting on a printed circuit board with holding pins Asymmetrical

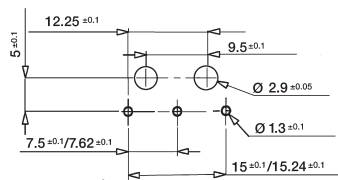


### Printed circuit board mounting Symmetrical X1S - X2S - X3S



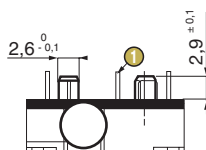
- 1 1.C
- 2 4.NO
- 3 2.NC

### Mounting on a printed circuit board with holding pins Symmetrical



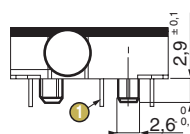
## Mounting accessories

### Locating pins 79219682



- 1 X2 - X2S connections

### Locating pins 79219682



- 1 X3 - X3S connections

## Installation recommendations

See "Basic technical concepts"

## How to order

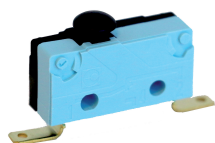
Use the 8 digit part numbers when they are defined

Other cases, precise: Type of microswitch - Function - Connection - Mounting accessories\* - Adaptation\*

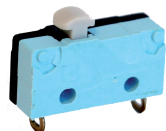
\* if needed

Example: 831700 BC I X3 79219682

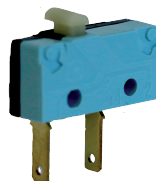
## Examples of special adaptations



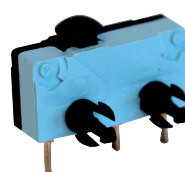
Angled W7A5 terminals



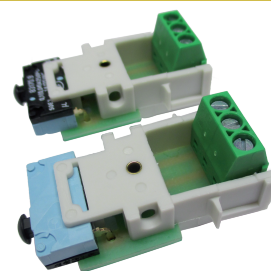
Button head with  
cylindrical radius -  
4 mm width



Button head with  
cylindrical radius -  
5.5 mm width



Fastening pins for 2.8 max  
thickness and Ø 4mm holes  
(79253576)



PCB assembly with terminal block