

# MINIATURE MICROSWITCHES - PREMIUM

## V3 - 83161

- › High precision flexible leaf snap-action mechanism
- › Operation without balance-point, even at extremely slow actuating speed
- › Broad range of operating forces from 0.15 N to 5 N
- › Ratings from 4 A to 20(8) A 250 V~, 10(4) A 400 V~ and 1/2 hp 125-250 V~
- › Contact gap less or greater than 3 mm (micro-disconnection (μ) or full disconnection)
- › Operating temperature from -60 °C up to +150 °C - High resistance to shock and vibration
- › Mechanical life up to 50 million cycles
- › ENEC and cURus approved
- › Wide choice of actuators on 4 possible fixing positions (pre-assembled or retrofittable)



### Main specifications

Function	Connections	Standard 831613		High current 831612		
		Standard	UL	Standard	UL	UL SP4186
I (changeover)	W2 (solder)	83161301	83161348	●	83161273	●
I (changeover)	W3 (QC 6.3x0.8)	83161338	83161344	83161241	83161244	●
I (changeover)	W6A5 (QC 4.8x0.5)	83161304	83161343	●*	●*	-
I (changeover)	W3R5 (QC 6.3x0.8, Rast 5)	83163023	83163107	●*	●*	●*
I (changeover)	W5 (screw + clamp)	83161303	83161349	●*	●*	-
I (changeover)	W6D8 (QC 4.8x0.8)	83161305	83161341	●*	●*	-
I (changeover)	W7A5 (QC 2.8x0.5)	83161309	83161350	-	-	-
I (changeover)	2W7A8 (QC 2.8x0.8, double)	83161310	●	●*	●*	-
R (normally closed)	W2 (solder)	83161316	83163041	●	83161274	●
R (normally closed)	W3 (QC 6.3x0.8)	83161311	83163066	●	●	●
R (normally closed)	W6A5 (QC 4.8x0.5)	83161359	●	●*	●*	-
R (normally closed)	W3R5 - W5 - W6D8 - W7A5 - 2W7A8	●	●	●*	●*	●*
C (normally open)	W2 (solder)	83161315	●	●	●	●
C (normally open)	W3 (QC 6.3x0.8)	83161312	83161346	●	●	●
C (normally open)	W6A5 (QC 4.8x0.5)	83161325	●	●*	●*	-
C (normally open)	W3R5 - W5 - W6D8 - W7A5 - 2W7A8	●	●	●*	●*	●*
<b>Electrical characteristics</b>						
Rating nominal / 250 V AC (A)		16		20		
Rating thermal / 250 V AC (A)		20		22		
Rating ENEC/NF / 250 V AC (A)		16(4)	16(4)	20(8)	20(8)	20(8)
Rating UL / 125/250 V AC (A)		-	16 - 1/2hp	-	15.1 - 1/2hp	20.1 - 1/2hp
<b>Mechanical characteristics</b>						
Maximum operating force (N)		0.8		1**		
Min. Release force (N)		0.2		0.2		
Maximum total travel force (N)		2		2.5		
Max. Allowable overtravel force (N)		20		20		
Maximum rest position (mm)		16.2		16.1		
Operating position (mm)		14.7±0.3		14.7±0.4		
Maximum differential travel (mm)		0.35		0.35		
Min. overtravel (mm)		1.2		1.1		
Ambient operating temperature (°C)		-60 → +125		-60 → +125		
Mechanical life for 2/3 OT (operations)		2 x 10 <sup>7</sup>		2.5 x 10 <sup>5</sup>		
Contact gap (mm)		0.4		0.4		
Weight (g)		5.6		5.6		

\* Please consult us

\*\* Also available with 3N operating force (831612 SP4165)

### Additional specifications

- Case: PA6 GF (UL 94-V2 / GWFI 960 °C) - Standard versions
- PBT GF (UL 94-V0 / GWFI 960 °C) - UL versions
- PET GF (UL 94-V0 / GWFI 960 °C / GWIT 775 °C) - On request
- Button: PA66
- Moving blade: silver-plated beryllium copper
- Contacts: silver alloy, micro-profile (831612: silver cadmium oxide)
- Terminals: brass (except W2 : copper nickel)
- Levers: stainless steel or polyamide, polyamide roller
- Nuts for 161L: nickel-plated brass

- Degree of protection: IP40 (mechanism)
- Proof tracking index: PTI 250
- Protection against electric shock: button and 161-type actuators have reinforced insulation for Ui 250V / Uimp 2,5kV / pollution 2
- Recommended min actuating speed: 0.001 mm/s

- Certification marks: Standard versions:   
 UL versions:

Standard product

Product made to order

Contact us



### Main specifications (continued)

High force 831611		Low force 831614		Very low force 831615		Ultra low force 831615 SP4136		Wide contact gap 831616		Func.	Conn.
Standard	UL	Standard	UL	Standard	UL	Standard	UL	Standard	UL		
83161102	83161058	83161402	83161431	83161502	●	83161520	●	83161601	●	I	W2
83161118	83161165	83161401	●	83161501	83161513	83161519	83161573	83161602	83161636	I	W3
83161110	83161182	83161403	83161407	83161503	83161508	●	83161577	●*	●*	I	W6A5
●	●	●	●	83161516	83161518	●	83161575	83161619	●	I	W3R5
83161113	83161055	●	83161408	83161509	83161511	●	●	83161603	●	I	W5
83161123	●	●	83161429	83161507	●	●	●	●	●	I	W6D8
83161189	●	83161405	●	●	●	●	●	●*	●*	I	W7A5
83161059	●	●	●	●	●	●	●	●*	●*	I	2W7A8
83161117	●	●	●	83161595	●	●	●	83161609	●	R	W2
83161109	●	●	●	83161528	●	●	●	83161605	●	R	W3
83161070	●	83161424	●	●	●	●	●	●*	●*	R	W6A5
●	●	●	●	●	●	●	●	●*	●*	R	Others
83161104	83161082	●	83161435	●	●	83161589	●	●	●	C	W2
83161103	83161188	83161404	83161412	●	●	●	●	83161606	●	C	W3
83161125	83161111	●	●	83161504	●	●	●	●*	●*	C	W6A5
●	●	●	●	●	●	●	●	●*	●*	C	Others
<b>Electrical</b>											
16		10		4		4		12		Nom rating (A)	
20		12		5		5		15		Therm rating (A)	
16(4)	16(4)	10(3)	10(3)	4(1)	4(1)	4(1)	4(1)	12(3)	12(3)	ENEC rating (A)	
-	16 - 1/2hp	-	6 - 1/4hp	-	4 - 1/10hp	-	4 - 1/10hp	-	6.1 - 1/3hp	UL rating (A)	
<b>Mechanical</b>											
3		0.5		0.25		0.15		5		OF max (N)	
1		0.1		0.05		0.04		0.5		RF min (N)	
4.5		1.5		0.40		0.2		6		TTF max (N)	
20		20		20		20		20		AOF max (N)	
16.1		16.2		16.3		16.3		16.1		RP max (mm)	
14.7±0.4		14.7±0.4		14.7±0.4		14.7±0.3		14.5±0.4		OP (mm)	
0.35		0.35		0.35		0.35		0.8		DT max (mm)	
1.1		1.1		1.1		1.2		0.9		OT min (mm)	
-60 → +125		-60 → +125		-40 → +125		-40 → +125		-60 → +125		Temp (°C)	
10 <sup>7</sup>		3 x 10 <sup>7</sup>		5 x 10 <sup>7</sup>		5 x 10 <sup>7</sup>		5 x 10 <sup>4</sup>		Mech. life (op)	
0.4		0.4		0.4		0.4		3.2		Gap (mm)	
5.6		5.6		5.6		5.6		5.6		Weight (g)	

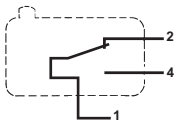
### Product adaptations



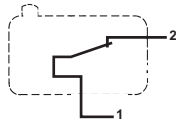
- ▶ Special levers: special shapes and lengths, flexible levers, adjustable, two-pole, pinned, ....
- ▶ Special connections: angled, with 7mm spacing (RAST 7-W3R7), for PCB, long solder (W2L),...
- ▶ High operating temperature: +150 °C
- ▶ Special contacts (for gold plated contacts: see "V3 Dual-current - 83161")
- ▶ Reduced or increased switching hysteresis: max 0.1 mm to max 0.8 mm differential travel
- ▶ Specific operating force easily achievable
- ▶ Telescopic plunger and adjustable fixing by threaded barrel: plastic version (161L accessory) or metal version (SP9603)
- ▶ Housing material complying with IEC 60335-1 for unattended appliances: GWFI 850° C / GWIT 775° C (SP9680)
- ▶ 400 V~ ENEC approved versions

Principles

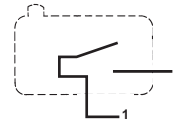
Single break snap-action switch  
Changeover - SPDT (form C)



Normally closed - SPST-NC (form B)

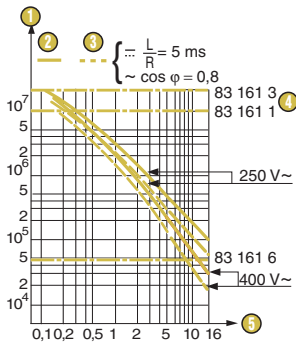


Normally open - SPST-NO (form A)



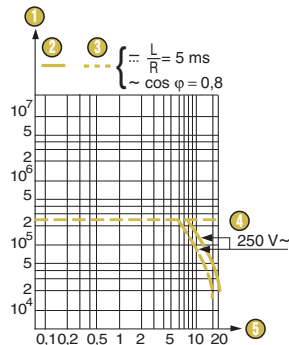
Curves

Operating curve for types 831611\* / 831613\* / 831616



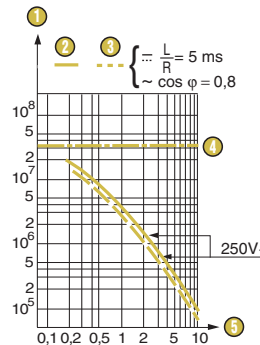
- 1 Number of cycles
- 2 Resistive circuit
- 3 Inductive circuit
- 4 Mechanical life limit
- 5 Current in Amps

Operating curve for type 831612



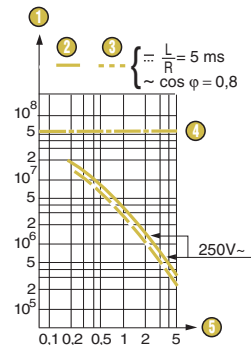
- 1 Number of cycles
- 2 Resistive circuit
- 3 Inductive circuit
- 4 Mechanical life limit
- 5 Current in Amps

Operating curve for type 831614



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

Operating curve for types 831615 / 831615 SP 4136



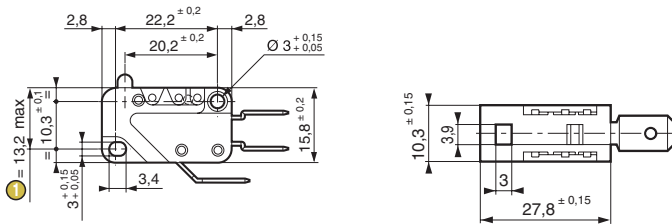
- 1 Number of cycles
- 2 Resistive circuit
- 3 Inductive circuit
- 4 Mechanical life limit
- 5 Current in Amps

\* For 831611 UL and 831613 UL: please consult us

Dimensions

Product

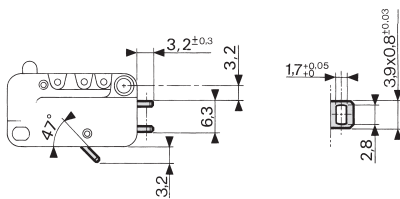
83161



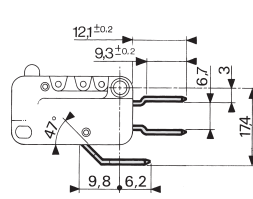
- 1 Total travel position

Connections

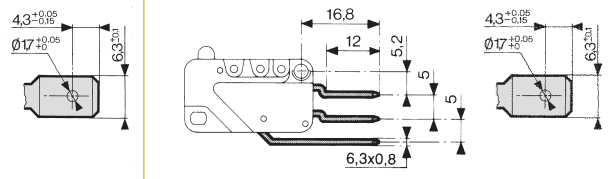
W2 solder



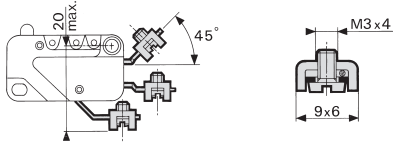
W3 quick-connect 6.3 x 0.8



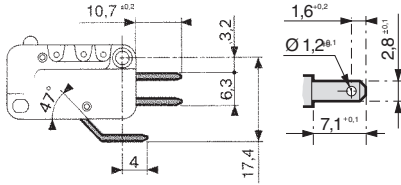
W3R5 quick-connect 6.3 x 0.8 for RAST 5 connector



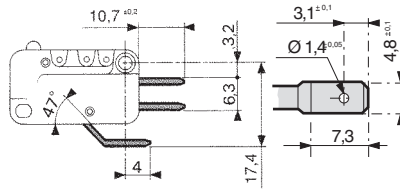
W5 screw with clamp



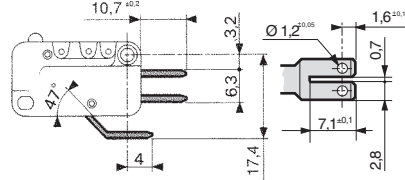
W7A5 quick-connect 2.8 x 0.5



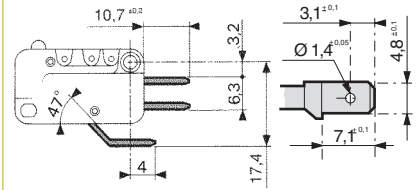
W6A5 quick-connect 4.8 x 0.5



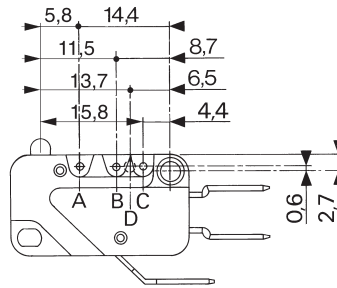
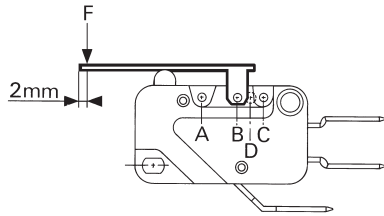
2W7A8 quick-connect 2.8 x 0.8, double



W6D8 quick-connect 4.8 x 0.8



Actuator mounting positions



To calculate force

Divide the switch force by the coefficient given in the table.

To calculate travel

Multiply the switch travel by the same coefficient.

Example :

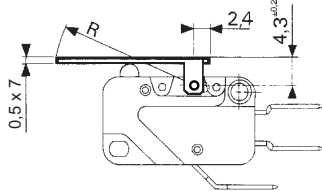
83 161 3 with lever 161 A - R 25.4 position A (coeff. 4)

Operating force:  $0.8 : 4 = 0.2 \text{ N}$

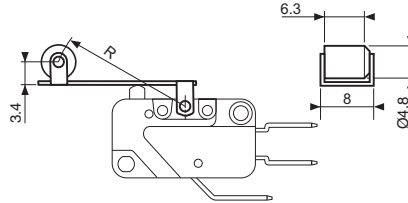
Overtravel:  $1.2 \times 4 = 4.8 \text{ mm}$

Actuators

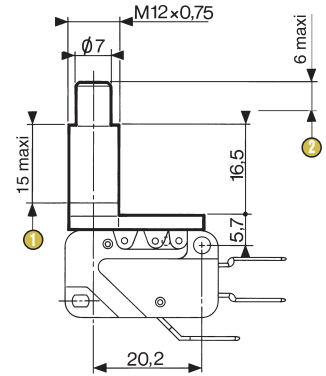
161A flat



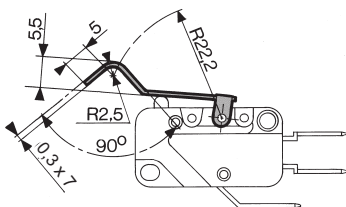
161E roller



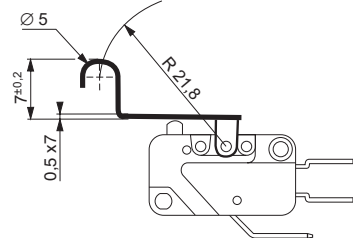
161L telescopic plunger



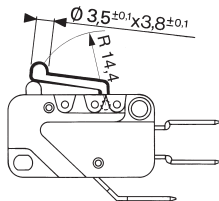
161F dummy roller



161G dummy roller



161V plastic



Other shapes and dimensions: consult us

Also available are pinned actuators mounted on position D (factory mounting), same as for 83160 series. (datasheet: SP9640)

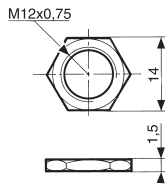
1 Thread length

2 Total travel

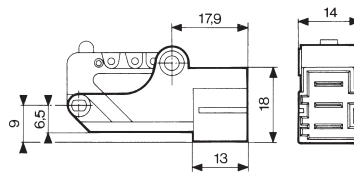
Nut thickness	Max. torque
1,5 mm	0.5 N.m
2 mm	0.7 N.m
2,5 mm	1 N.m

## Mounting accessories

### Nut for 161L



### Housing 161J for connections W3 R5



## Actuators and mounting accessories

### Part numbers for standard actuators

	79215740	70507524	79215742	70507529	70507528
Actuators	Flat <b>161A</b> R14.2	Flat <b>161A</b> R25.4	Roller <b>161E</b> R13.6	Roller <b>161E</b> R24.1	Dummy roller <b>161F</b> R22.2
Fixing positions	A B	A B C	A B	A B C	A B
Coefficient	2 1	4 2 1.5	2 1	4 2 1.5	3.6 1.8
Operating position, except 831616 (mm)	15.2 ±1 15.2 ±0.45	15.2 ±2.5 15.2 ±1 15.2 ±0.8	20.5 ±1.5 20.5 ±0.8	20.5 ±2.9 20.5 ±1.5 20.5 ±1.2	20.4 ±2 20.4 ±0.7
Operating position 831616 (mm)	14.8 ±1 15 ±0.45	15.2 ±2.5 14.8 ±1 14.9 ±0.8	20.1 ±1.5 20.3 ±0.8	19.7 ±2.9 20.1 ±1.5 20.2 ±1.2	20.2 ±2 20.2 ±0.7

### Part numbers for standard actuators

	79218651	**Telescopic plunger 161L	Manual actuation	Plastic <b>161V</b>	Housing <b>161J</b>	Nut for <b>161L</b>
Actuators	Dummy roller <b>161G</b> R21.8					
Fixing positions	A B C	D		D		
Coefficient	3.6 1.8 1.2	1		1		
Operating position, except 831616 (mm)	21.7 ±2 21.7 ±0.7 21.7 ±0.5	21.5 ±1		18.55 ±0.45		
Operating position 831616 (mm)	21.5 ±2 21.5 ±0.7 21.5 ±0.5	21.5 ±1		18.35 ±0.45		

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

\*\* For 831611, 831612, 831613, 831616. Mounted in factory (supplied without nut)

### V3-83161 microswitches with referenced actuators

Actuators	161A R14.2		161A R25.4			161E R13.6		161E R24.1			161L		
	79215740		70507524			79215742		70507529					
	Pos A	Pos B	Pos A	Pos B	Pos C	Pos A	Pos B	Pos A	Pos B	Pos C		Pos D	
831611	I W2	STD	83161020	83161021	83161022	83161023	83161024	83161025	83161026	83161027	83161028	83161029	●
		UL	●	●	●	●	●	●	●	●	●	●	●
		I W3	STD	83161032	83161033	83161034	83161035	83161036	83161037	83161038	83161039	83161040	83161041
I W6A5	STD	83161044	83161045	83161046	83161177	83161047	83161048	83161049	83161050	83161051	83161052	●	
	UL	●	●	●	●	●	●	●	●	●	●	●	
	831613	I W2	STD	83163067	83163068	83163069	83163015	83163071	83163072	83163073	83163074	83163016	83163075
UL	●		●	●	●	●	●	●	●	●	●	●	
I W3	STD		83163078	83163079	83163080	83163081	83163082	83163083	83161374	83163084	83163007	83163085	83161318 83163102
I W6A5	STD	83163088	83163089	83163090	83163091	83163092	83163093	83163094	83163095	83163096	83163097	●	
	UL	●	●	●	83161327	●	●	83163222	●	83163220	●	83161352	
	831615	I W2	STD	83161529	83161530	83161531	83161532	83161533	83161534	83161535	83161536	83161537	83161538
UL	●		●	●	●	●	●	●	●	●	●	●	-
I W3	STD		83161541	83161542	83161543	83161544	83161545	83161546	83161547	83161548	83161514	83161549	-
I W6A5	STD	83161552	83161553	83161554	83161526	83161555	83161556	83161557	83161558	83161559	83161560	●	
	UL	●	●	●	●	●	●	●	●	●	●	●	
	831616	I W3	STD	●	●	●	●	●	●	●	●	●	83161615
UL	●		●	●	●	●	●	●	●	●	●		

Standard product

Product made to order

● Contact us

## 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 - UL approval\* - Actuator\* - Fixing position\* - Adaptation\* + Mounting accessories\*  
\* if needed

Example: 831613 C W3R5 UL 161E R13.6 B SP9680 + 79250338

## Examples of special adaptations



Telescopic plunger and adjustable fixing . 4mm overtravel. Metal version for heavy duty (SP9603)



Door switch for industrial vehicle



Angled W3 terminals



RAST 7mm - W3R7 connections



Long solder terminals (W2L)



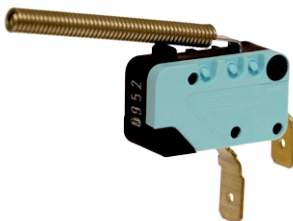
One-way roller lever (active on right, idle-return on left)



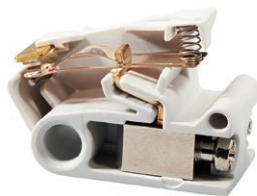
Lever fitted with POM ramp for transverse actuation



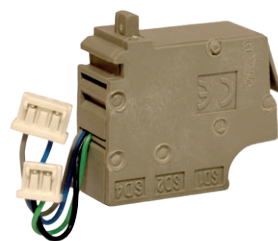
Two-pole lever



Spring lever for extra-long overtravel



Fully specific integrable switching module with terminal block for time switch



Auxiliary contact for power switches and circuit breakers. Integrates the V3-83161 mechanism

### Warning:

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**Product adaptations**

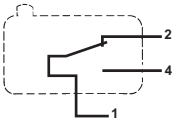


- › Special levers: special shapes and lengths, flexible levers, adjustable, two-pole, pinned, ....
- › Special connections: angled, with 7mm spacing (RAST 7-W3R7), for PCB, long solder (W2L), ...
- › High operating temperature: +150 °C
- › Reduced or increased switching hysteresis: max 0.1 mm to max 0.8 mm differential travel
- › Specific operating force easily achievable
- › Telescopic plunger and adjustable fixing by threaded barrel: plastic version (161L accessory) or metal version (SP9603)
- › Housing material complying with IEC 60335-1 for unattended appliances: GWFI 850° C / GWIT 775° C (SP9680)

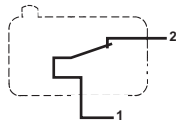
**Principles**

Single break snap-action switch

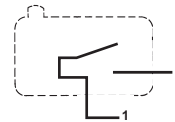
Changeover - SPDT (form C)



Normally closed - SPST-NC (form B)

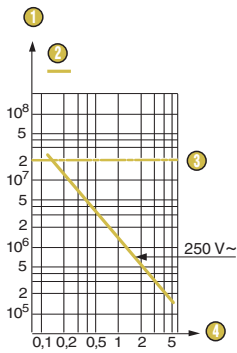


Normally open - SPST-NO (form A)



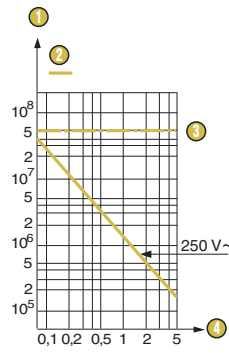
**Curves**

Operating curve for type 831618 and 831618 SP 4174



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

Operating curve for types 831619 and 831619 SP 4136



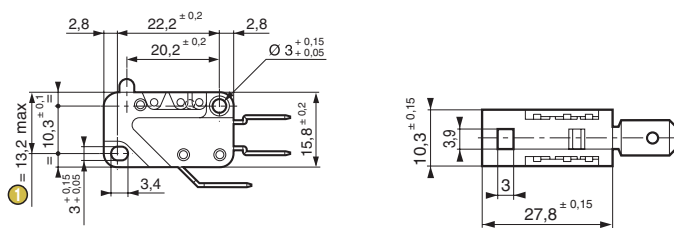
- 1 Number of cycles
- 2 Resistive circuit
- 3 Mechanical life limit
- 4 Current in Amps

\* These models 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**

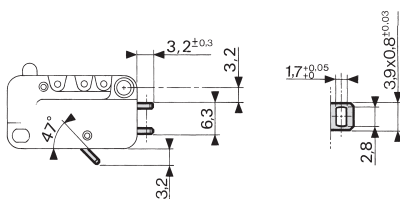
83161



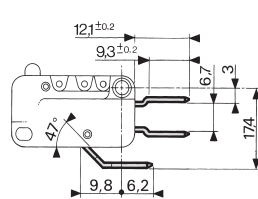
1 Total travel position

**Connections**

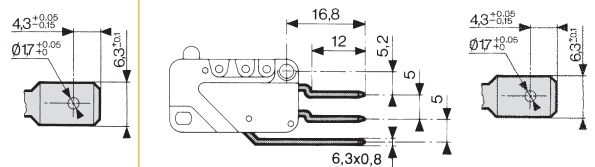
W2 solder



W3 quick-connect 6.3 x 0.8

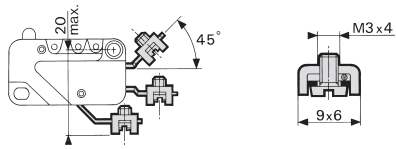


W3R5 quick-connect 6.3x0.8 for RAST 5 connector

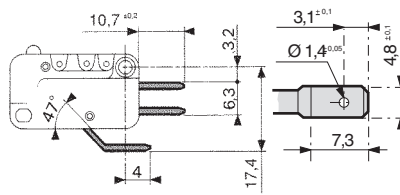




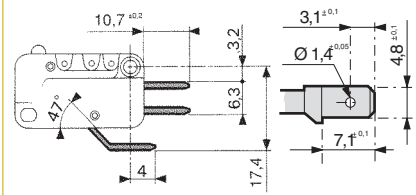
W5 screw



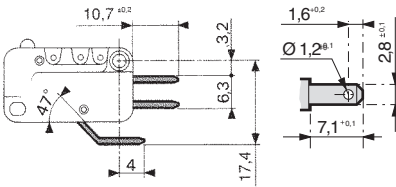
W6A5 quick-connect 4.8 x 0.5



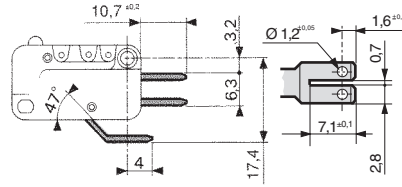
W6D8 quick-connect 4.8 x 0.8



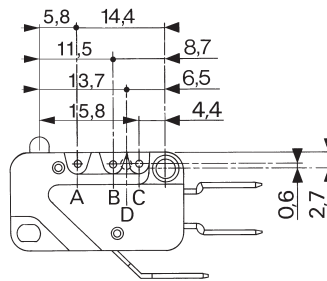
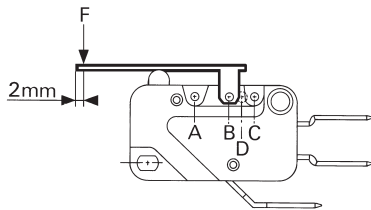
W7A5 quick-connect 2.8 x 0.5



2W7A8 quick-connect 2.8 x 0.8, double



Actuator mounting positions



To calculate force

Divide the switch force by the coefficient given in the table.

To calculate travel

Multiply the switch travel by the same coefficient.

Example :

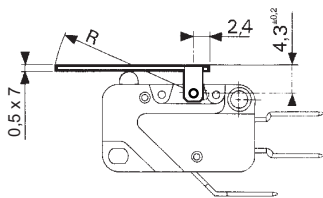
83 161 8 with lever 161 A - R 25.4 position A (coeff. 4)

Operating force:  $0.8 : 4 = 0.2 \text{ N}$

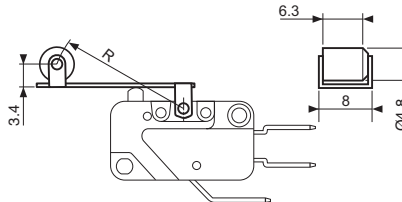
Overtravel:  $1.2 \times 4 = 4.8 \text{ mm}$

Actuators

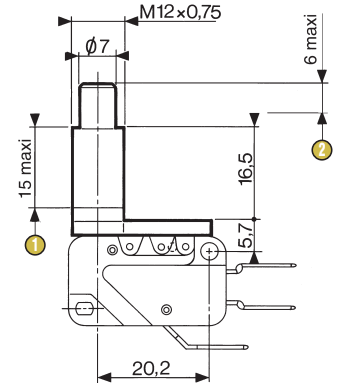
161A flat



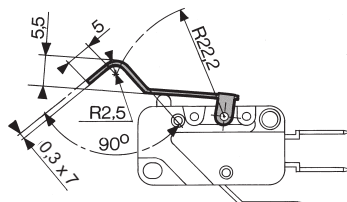
161E roller



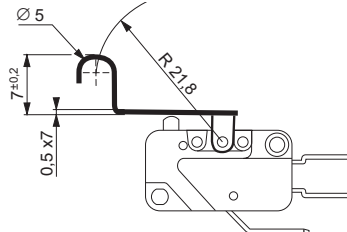
161L telescopic plunger



161F dummy roller



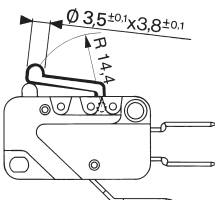
161G dummy roller



- 1 Thread length
- 2 Total travel

Nut thickness	Max. torque
1.5 mm	0.5 N.m
2 mm	0.7 N.m
2.5 mm	1 N.m

161V plastic

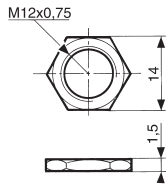


Other shapes and dimensions: consult us

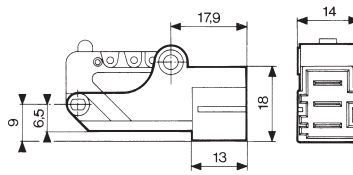
Also available are pinned actuators mounted on position D (factory mounting), same as for 83160 series. (datasheet: SP9640)

## Mounting accessories

### Nut for 161L



### Housing 161J for connections W3 R5



## Actuators and mounting accessories

### Part numbers for standard actuators

	79215740	70507524	79215742	70507529	70507528
Actuators	Flat <b>161A</b> R14.2	Flat <b>161A</b> R25.4	Roller <b>161E</b> R13.6	Roller <b>161E</b> R24.1	Dummy roller <b>161F</b> R22.2
Fixing positions	A B	A B C	A B	A B C	A B
Coefficient	2 1	4 2 1.5	2 1	4 2 1.5	3.6 1.8
Operating position (mm)	15.2 ±1 15.2 ±0.45	15.2 ±2.5 15.2 ±1 15.2 ±0.8	20.5 ±1.5 20.5 ±0.8	20.5 ±2.9 20.5 ±1.5 20.5 ±1.2	20.4 ±2 20.4 ±0.7

### Part numbers for standard actuators

	79218651	**Telescopic plunger 161L	Manual actuation	Plastic161V	79250338	70602118
Actuators	Dummy roller <b>161G</b> R21,8				Housing <b>161J</b>	Nut for <b>161L</b>
Fixing positions	A B C	D		D		
Coefficient	3 1.8 1.2	1		1		
Operating position (mm)	21.7 ±2 21.7 ±0.7 21.7 ±0.5	21.5 ±1		18.55 ±0.45		

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

\*\* For 831618, 831618 SP4174. Mounted in factory (supplied without nut)

### V3 Dual-current - 83161 microswitches with referenced actuators

Actuators	161A R14.2 79215740		161A R25.4 70507524			161E R13.6 79215742		161E R24.1 70507529			161L
	Pos A	Pos B	Pos A	Pos B	Pos C	Pos A	Pos B	Pos A	Pos B	Pos C	Pos D
	<b>831618</b> I W2 STD UL	83161838 •	83161839 •	83161840 •	83161841 •	83161842 •	83161843 •	83161844 •	83161845 •	83161846 •	83161847 •
I W3 STD UL	83161850 •	83161851 •	83161852 •	83161853 •	83161854 •	83161855 •	83161856 •	83161857 •	83161858 •	83161859 •	83161820 •
I W6A5 STD UL	83161862 •	83161863 •	83161864 •	83161865 •	83161866 •	83161867 •	83161824 •	83161868 •	83161869 •	83161870 •	•

## 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 - UL approval\* - Actuator\* - Fixing position\* - Adaptation\* + Mounting accessories\*  
\* if needed

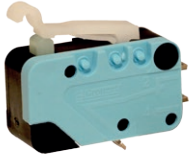
Example: 831618 C W6A5 UL 161L SP9680 + 70602118

Standard product

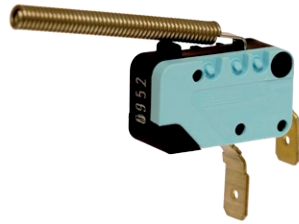
Product made to order

● Contact us

## Examples of special adaptations



Plastic lever with no play in rest position



Spring lever for extra-long overtravel



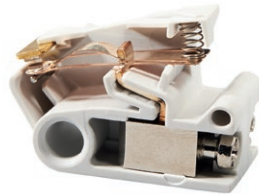
One-way roller lever (active on right, idle-return on left)



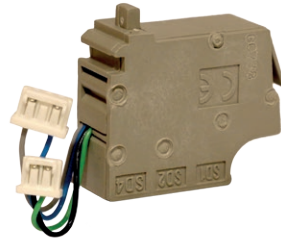
Angled W3 terminals



Telescopic plunger and adjustable fixing. 4mm overtravel.  
Metal version for heavy duty.  
Long barrel.



Fully specific integrable switching module with terminal block for time switch



Auxiliary contact for power switches and circuit breakers. Integrates the V3 - 83161 mechanism



Door switch for industrial vehicle

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