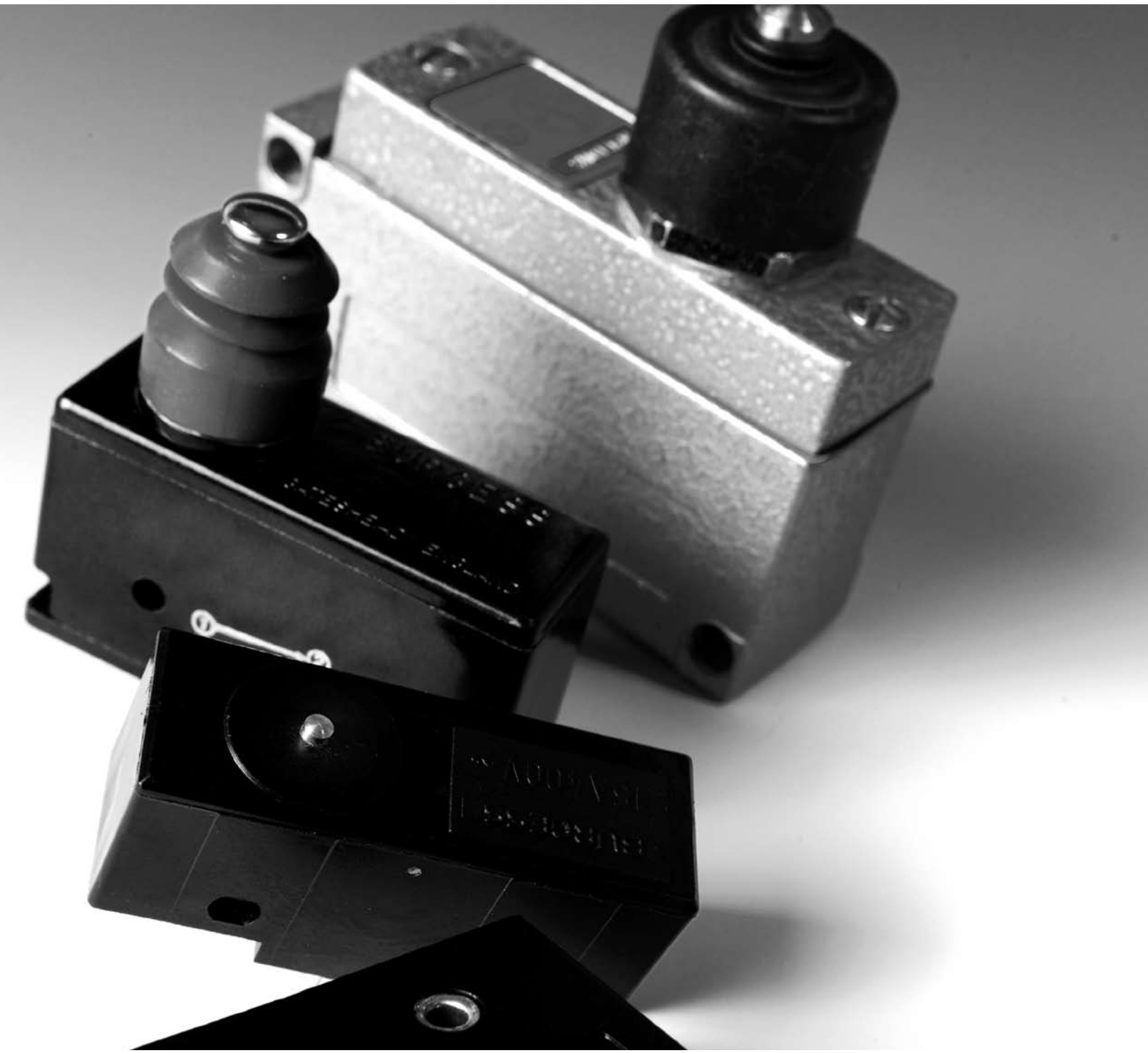
burgess



JOHNSON ELECTRIC

innovating motion

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IPG220/06/E/01

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The Johnson Electric Group is one of the world's largest providers of motion actuators for automotive and industrial applications

Over the years, we have shipped billions of motors to more than thirty countries in over one hundred different motor applications. Johnson Electric has an annual production capacity of one billion motors.

At the heart of Johnson Electric's success is our commitment to make our customers successful. Our customers include many of the world's leading industrial, consumer and automotive companies. We begin by understanding our customers' business needs, and the product application requirements of the end user of our customers' products. Then we design and deliver innovative motion solutions that help our customers to differentiate their products in the marketplace. Our goal is to be instrumental in the successful launch of our customers' products in their respective marketplaces.

Our Brand Promise

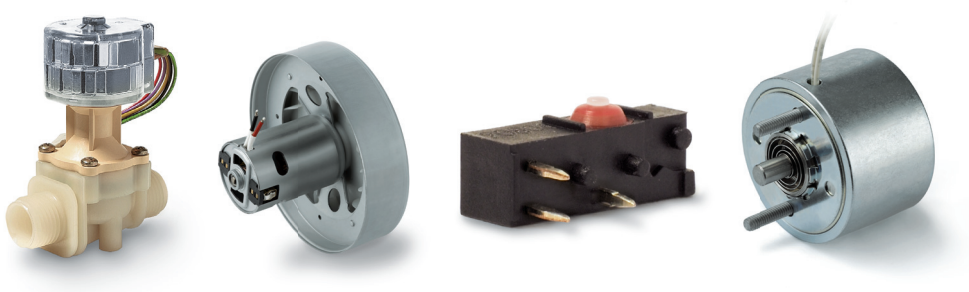
Johnson Electric is the most reliable partner

Johnson Electric is responsive and flexible; and has the financial stability and organizational integrity to meet all of our commitments and to support our customers' success. Product reliability and assurance of supply are our commitment.

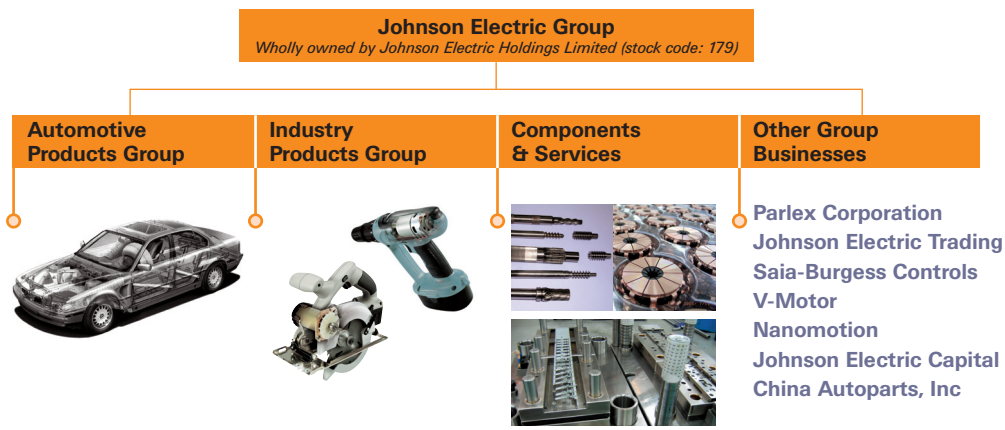
Johnson Electric delivers competitive advantage

Johnson Electric delivers differentiation and innovation through its motion products – subsystems comprising of Stepper Motors, DC Motors, AC Motors, Piezo-electric Motors, Switches, Solenoids, Flexi Circuits, Motion Control, Precision Plastics and Precision Gears.

Our business growth hinges with leading "branded" goods producers to deliver differentiation and innovation through our motion products. The core platform for delivering these solutions is a highly developed production base and focused customer support teams throughout the world. This combines scale advantages in production and procurement with skilled and dedicated motion application experts.



Johnson Electric Holdings Limited is the parent company of the Johnson Electric Group and has been listed on the Stock Exchange of Hong Kong since 1984. The Group structure consists of a number of operating divisions and business units focused on their particular customer application or product segment



The Group's motion systems, motors and switches businesses are managed through two primary operating divisions: Automotive Products Group and Industry Products Group.

The Automotive Products Group, which consists of Johnson Electric's Automotive Motors Group and the Automotive Division of Saia-Burgess Electronics, is focused on providing customized motion solutions for major automotive application segments that include powertrain, body and chassis.

The Industry Products Group is comprised of business units that provide motion products and solutions for various commercial and industrial application sectors, including home appliances, power tools, business equipment, personal care products, medical equipment and healthcare, building automation and security, audio-visual and other industrial products.

Supporting these two operating divisions is the Group's Components & Services function which produces metal and plastic parts, tooling and production equipment for motor and motion related products. Johnson Electric is a highly vertically integrated business that manufactures an exceptionally wide range of components that form the basis for its final assembled end products. We make magnets, bearings, shafts, housings, laminations, commutators and die cast parts. We also build tools, assembly fixtures, plastic molds as well as armature winding and other production machines.

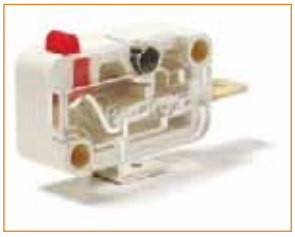
In addition to motion systems and motors, the Group also consists of a number of complementary manufacturing businesses and other subsidiary companies. These include an innovative provider of flexible printed circuits and interconnect solutions; a successful niche player in the programmable controls industry; and a rapidly growing specialty metals and trading services company.

Looking for a specialized switching solution?

Look no further.

In addition to the wide range of standard products shown in this catalog, we will be happy to work with you to meet your switching needs. If your application requires more than a standard product solution, please consider us early in your design process. Our product development team will be happy to discuss your specification, whether you need a special switch design or a complete value-added assembly. We specialize in developing switches for demanding industrial environments.

The images shown give some examples of our capabilities.



Burgess is the leading global brand for industrial switches

Burgess designs have defined industry standards. If you need a specific solution for your switching needs, call us to set your own standard.

A pioneer of snap-action technology, the Burgess brand stands for innovative, robust solutions for industrial switch requirements.

Wide range

Snap-action switches have to fulfill a wide variety of functions. The standard Burgess range ensures there will be a switch for your needs, with one of the broadest product portfolios around. From ultra-miniature to metal-housed basic types, we are sure to have the type appropriate to your application, whether it is signal or power switching, high or low force actuation.

Environmental protection

The sealed switch is a Burgess speciality. In demanding environments – wet, humid or dusty – even the most sensitive signal can be switched reliably with IP67 rated products. Our robust metal-housed switches offer impact resistance outside whilst switching with precision inside.

Uncompromising reliability

With many UL, CSA and ENEC approvals, the performance of Burgess products is globally recognized. For safety-related applications, such as machine maintenance systems, positive-action mechanisms ensure a physical break in the circuit.

Precision actuation

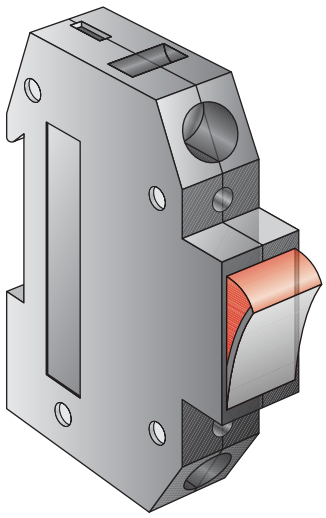
Snap-action switches offer high levels of repeat accuracy and switch virtually independently of actuation speed and force. This is the mechanism of choice for pressure sensing, timing and position indicating applications.

Minimum size

Our F5 range demonstrates our capability to switch relatively high current from a small size envelope – 5A 250 VAC from a switch less than 13 mm long.

Typical Burgess switch applications

- Circuit breakers
- Special purpose vehicles
- Vending machines



Switches in General Industry

Switches can be found in a wide variety of applications:

Burgess switches for special purpose vehicles

Switches used in special purpose vehicle applications must have:
- high levels of environmental protection
- the ability to handle high DC inrush currents
- reliability throughout the life of the product

Burgess switches for circuit breakers

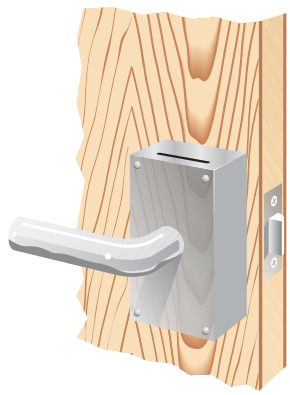
Circuit breaker applications demand:
- dependability and reliability
- a high degree of shock resistance in the mechanism
- the ability to carry high currents and voltages

Burgess switches for vending machines

Switches used in vending machines must:
- work reliably, time after time
- have appropriate environmental protection to resist dust and moisture

Switches for locking mechanisms

Switches are found in numerous applications that require a locking device. Whether it is a medical application, an office automation application or a door lock, switches provide an effective, cost-efficient locking mechanism.



Security Applications

- Hotel room door lock
- Hotel safe lock
- Prison door lock
- Fire safety door opening lock
- Garage door safety lock

Office Automation

- Disk drive door lock
- Personal computer chassis lock
- Docking station lock
- Locks to hold peripherals in place
- Tape library index lock

Medical

- Sterilizer lock
- Centrifuge lock
- Blood analysis machine lock

Industrial

- Overhead door lock
- Fire safety door lock
- Commercial laundry locks

Table of typical applications & Burgess switch types

In addition to the products shown in the Product Catalog pages, the Product Mapping table below shows a wide range of switch types for a selection of applications. Also, a switch may be customized to fulfill your specific requirements, please feel free to contact us.

Application & switch Series	F1	F4	F5	F1N	F6	FK4	V4L	600	V3S	PN4	3BR	K5	V9N	4BR	BVM3	KB5	XP	XT
Circuit Breaker		●	●	●													●	
Commercial Equipment	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
Copier & Printer			●			●			●							●	●	●
Distribution	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Forklifts		●	●				●		●	●	●		●					
Home Appliances		●					●				●		●				●	●
HVAC	●	●	●	●					●			●		●		●		
Industrial automation	●	●	●	●	●	●			●									
Industry general	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Lighting														●				●
Medical	●	●	●	●			●		●	●	●			●	●	●	●	●
Power tools							●		●									
Public transportation									●									
Safety and Security	●	●	●	●		●			●								●	
Specialist vehicles		●					●		●	●	●		●	●				
Telecom		●							●									
Vending/Gaming		●						●			●						●	●
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ADDITIONAL TECHNICAL INFORMATION

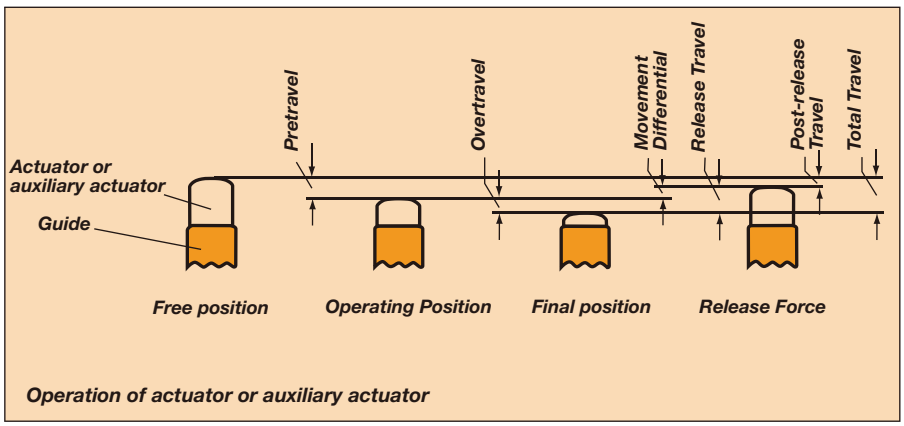
Contact Resistance

The contact resistance is the electrical resistance measured at the terminals of the switch when the contacts are closed. The resistance specifications refer to unwired switches in new condition.

Positions – forces – movements

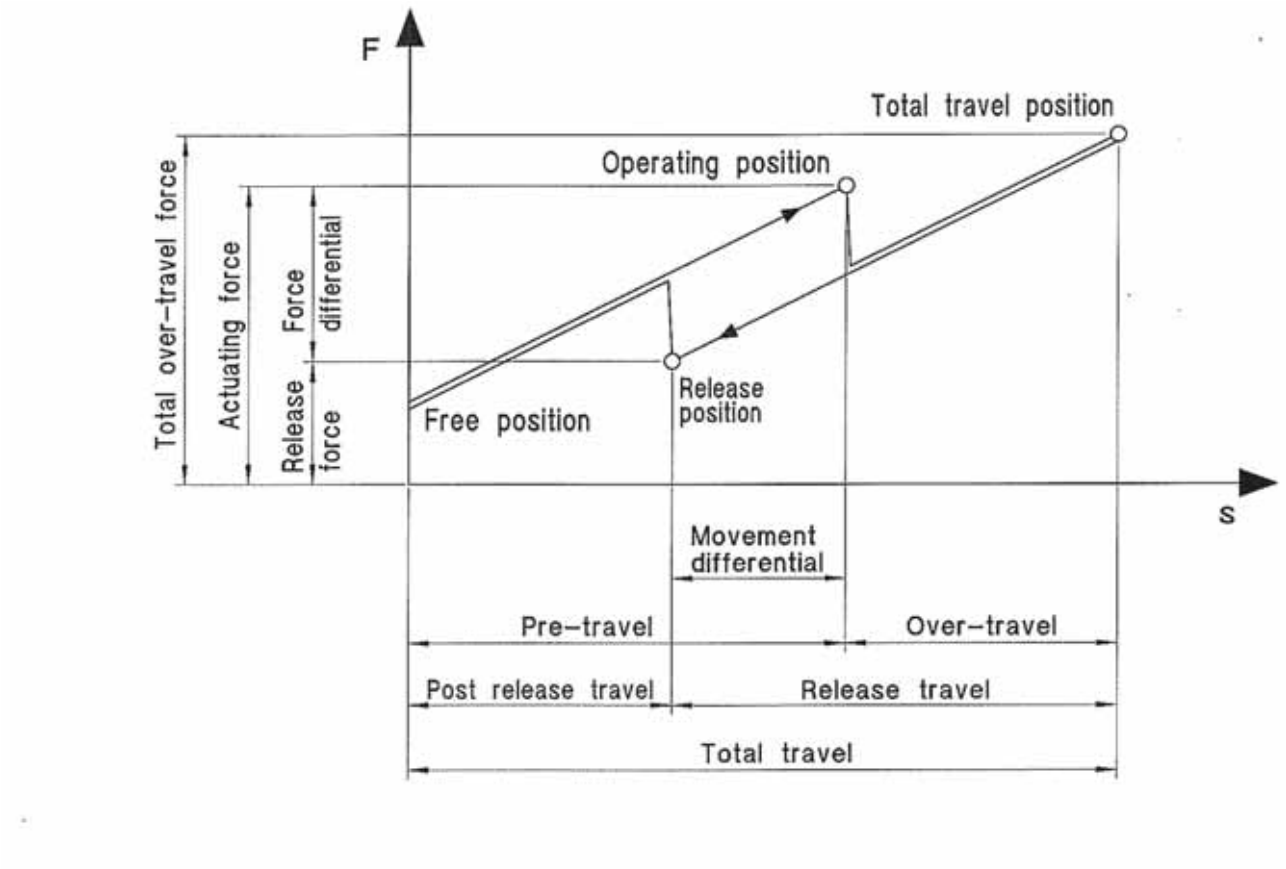
Free position	Position of the actuator, without any influence from an external force.
Operating position	Position of the actuator when contact changeover takes place.
Total travel position	Position of the actuator at the end of the allowed travel.
Release position	Position of the actuator when the switch mechanism resets.
Actuating force	The force required to move the actuator from the free position to the operating position.
Release force	The value to which the applied force must be reduced to allow the mechanism to reset after operation.
Force differential	Difference between actuating force and release force.
Pre-travel	Movement of the switch actuator between free and operating position.
Over-travel	Movement of the switch actuator beyond the operating position.
Total travel	The sum of pre-travel and over-travel.
Movement differential	Distance between operating position and release position.
Release travel	Movement of the switch actuator between release and total travel position.
Post release travel	Movement of the switch actuator between release and free position.

Contact force – movement – diagram

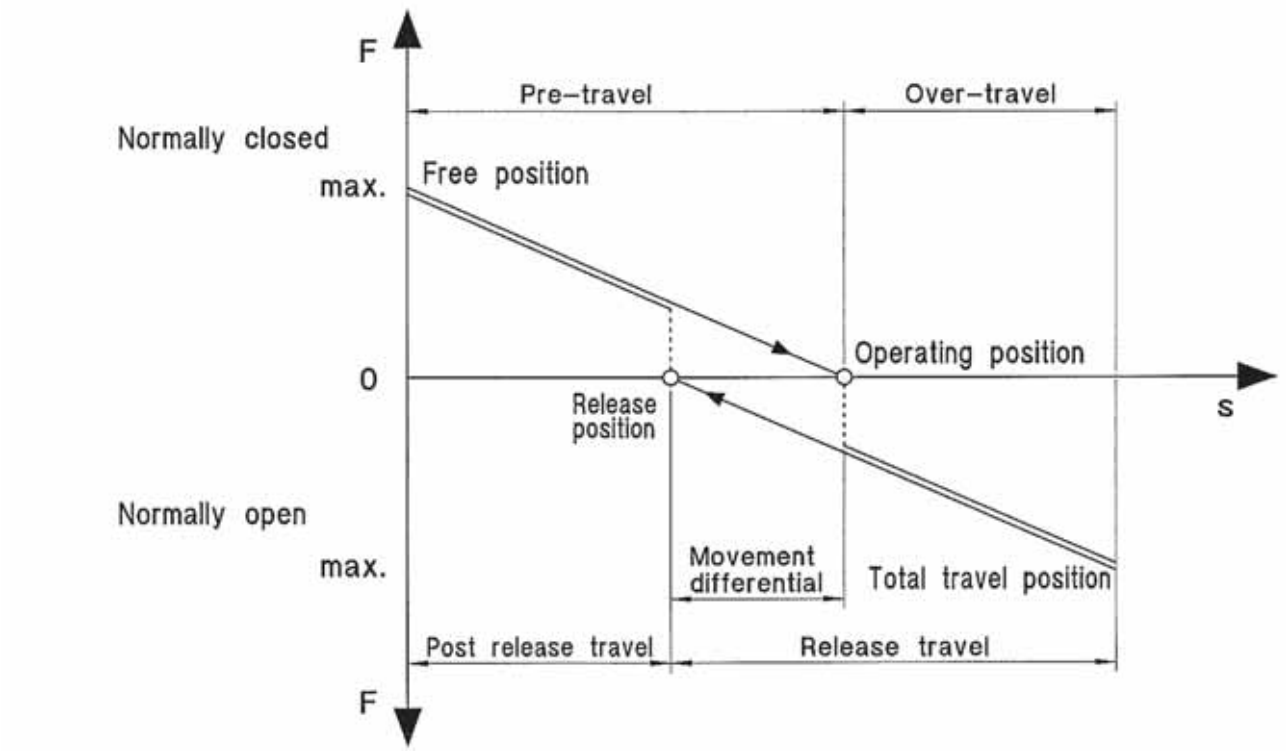


Operation of actuator or auxiliary actuator

Actuating force – movement – diagram



Contact force – movement – diagram



Switch Technology

Clearance Distance – the distance in air between current carrying parts of opposite polarity or between any current carrying part and an earthed-(grounded) metal plate to which the switch is attached.

Creepage Distance – the path along the surface of insulating material between current carrying parts of opposite polarity or between any current carrying part and an earthed (grounded) metal plate to which the switch is attached.

Insulation Resistance – resistance as measured between the normally closed terminals, or between all terminals connected together and a metal plate to which the switch is mounted. In dry conditions the value would be expected to be greater than 5MΩ.

Single Throw – a switch which provided an ON-OFF or OFF-ON function but does not change over from one conductor to another. Such switches are usually referred to as being «normally-closed only» or «normally-open only».

Switching Cycle – one complete switching operating from free position into overtravel and back through release position to free position.

Switch Resistance – a total resistance offered by a switch in a circuit, as measured from terminal through mating contacts, to terminal.

Transit Time – the time taken by the moving contact in a snap-action mechanism to move from one stable position to another.

Electrical Ratings

Electrical ratings given in the catalog are ratings according to UL1054, CSA22.55 or IEC61058-1.

Where these are not available, a general rating is given based upon in-house laboratory testing.

The ratings tables should be considered as safe working maximums for most applications. However, switch performance is influenced by a variety of factors, including:

- Frequency of operation
- Type of load
- Amount of travel used
- Temperature
- Humidity

Please do not hesitate to contact Burgess about your specific application.

Approvals

CSA mark. Switch meets CSA's safety standards

UL Recognized Component Mark for Canada and the United States

ENEC Mark. Switch fulfills European EN standards. The two digit number indicates which certification body has issued the ENEC Certificate

CQC Approval (China) is available for certain switches

Switch Life

a. Electrical Life – the electrical life data contained in this catalog is based on laboratory controlled tests. In practice, frequency and speed of operation, type of load, suppression, actuator travel used, ambient humidity and temperature and other environmental conditions can have a major effect on switch life.
Individual assessments for specific applications are possible and can be undertaken by Burgess on request.
Please ask Burgess if you would like an assessment for your specific application.

b. Mechanical Life – the figures quoted relate to the number of switching cycles made without an electrical load.

Switch Drawings

All drawings in this catalog are third angle projection.
All dimensions in this catalog are nominal, except where specifically shown.

Application Technology

Shock and Vibration

If switches are likely to be subjected to shock or vibration, select models with the highest available actuating force.
Burgess switches feature low mass mechanisms which are inherently resistant to shock and vibration.
If possible, the switches should be mounted so that the line of acceleration is at right angles to the travel of the plunger. The maximum available overtravel should be used.

Direct Current

Direct current (DC) ratings where shown should not be exceeded if destructive arcing and contact welding are to be avoided.
Some form of arc suppression is recommended when switches are used in DC circuits containing inductive devices wired in series with the switch and the supply.

Lamp Loads

Because of the very high inrush currents associated with incandescent lamps, applications should be subject to individual assessment.

Capacitive Loads (including fluorescent lamps)

These can generate very high peak currents which can cause contact welding. Applications should be subject to individual assessment.

Inductive Loads

The general ratings tables included in this catalog provide data for switches used to control inductive circuits at a power factor of 0.5 (EN 0.6; UL 0,7 means HP-Rating 0,5).

Contact Materials

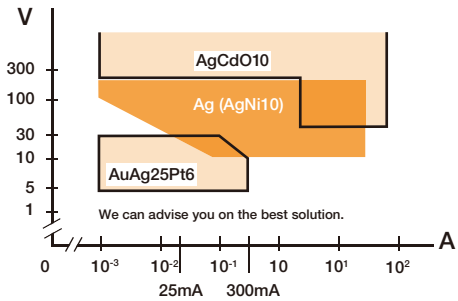
Silver and silver alloys are the primary contact materials used in Burgess switches.
The ratings tables shown refer to switches with silver/silver alloy contacts.
Gold contacts should be specified when switches are to be used in low voltage control or logic circuits, especially when long periods of inactivity are expected or when atmospheres with a high sulphur content may be encountered.
Gold contacts are generally available in two forms; gold plated silver alloy contacts, which can also be used at higher currents or gold alloy cross-point contacts, which are only suitable for switching low currents.

Gold

Gold plated contacts are recommended for switches to be used in low voltage control or logic circuits, especially when long periods of inactivity are envisaged. Gold flash, a thinner deposit, is applied to certain switch terminals to ensure good solderability even after prolonged storage.

How to determine the contact material for SAIA XG/XC-series only

The selection of the appropriate contact material will depend on a number of factors:



- current and voltage
- resistive or inductive load
- inrush current peak
- frequency of switching operations
- atmospheric conditioons
- required switching reliability

Pure silver contacts (standard)

Burgess Snap-Action Switches are normally equipped with pure silver contacts (Ag999). These are suitable for most applications and have satis-factory electrical and thermal properties.

Gold-plated contacts

Gold-plated contacts (4 µm) are used for low currents of a few mA and voltages below about 20 V (for DC and AC) and for sulphurous atmospheres. They are unsuitable for higher breaking capacities.

Silver-cadmium oxide contacts

Silver-cadmium oxide (AgCdO 90/10) contacts should be used where high inrush current peaks (30 A or more) are switched on as they tend to weld less at high current loads. They can resist peaks of 80 A or more for several ms provided that they are used with a Burgess Snap-Action Switch with high operating and contact force (80 cN in the free position and total-travel position).

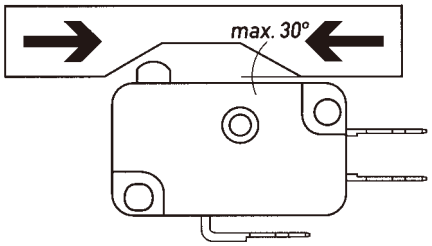
At high breaking capacities, switches fitted with such contacts have about 50 % longer life expectancy than those fitted with pure silver contacts. Normally, silver-cadmium oxide contacts are not suitable for voltages under 50 V.

Please ask Burgess if you would like an assessment for your specitic application.

Switch Actuation

Direct Operation

Actuating plungers should be operated in the direction of their axis. Where this is not possible the use of actuating levers is recommended. For direct actuation the attack angle should not exceed 30°.



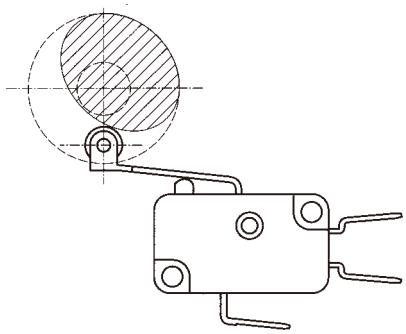
Actuation by sliding cams.

Actuating Levers

Various lever types are available for use with Burgess switches. They are generally stainless steel.
If roller or cam-follower levers are approached in the reverse direction, care must be taken to ensure that the angle of approach is small enough not to jam the lever.

Actuation by Cams

Cam-follower levers are particularly well suited for use with plastic actuating cams.
Abrupt actuation or release of switch actuators shortens the life of the switches.
For this reason cam should preferably provide a continuous movement. Ideally they should be of cyclodal form.



Long roller lever with continuous actuation

Environmental Protection

Protection Classifications

The protection classes of Burgess switches are in accordance with IEC 529 and are covered by just four codes.

IP40

Adequate protection against solids such as probing fingers and small wires>1mm. Liquids however can gain access and, unless externally protected, the switches should be mounted in dry or well-sheltered positions.

IP5K4

Good protection against solid foreign bodies, including dust and water splashing against the enclosure from any direction.
Switches may be used out of doors if sheltered from the worst of the elements or on factory machines subjected to normal washing down procedures.

IP65

Complete protection against solids, including dust, and against low pressure jets of water from all directions.

IP6K7

Complete protection against solids including dust and against immersion in water at a specific pressure for a specified time.
We reserve this code for switches which are factory sealed and tested.Switches should not be immersed in any liquid.

***International IK code indicates protection against mechanical impact regarding to EN 50102.**

Working Temperatures

For details of the working temperatures applicable to individual types, refer to the appropriate specification sheet. Special versions suitable for temperatures outside these ranges may be possible. Please contact us for information.

All quoted temperatures assume stable operation. They do not imply an ability to withstand excessive cycling within the range.

Health & Safety

Burgess has ensured, so far as it is reasonably practicable, that their products are as described in this catalog or in other current company publications, or as specified on Burgess

installation drawings. They have been so designed and constructed as to be safe and without risk to health when installed by suitably qualified personnel in accordance with relevant legislation, codes of practice, regulations (including IEE Wiring Regulations), the installation recommendations offered by the company and the accepted rules of the art. Their usage should be confined within the ratings limitations and parameters of-application indicated in this catalog and elsewhere.
Please contact us should you need additional information or guidance.

Service Recommendations

Maintenance

Burgess switches are not user-maintainable but they should be kept in a reasonably clean, paint-free condition, especially in the actuator area. Regular checks should be made on mounting security and on the actuating medium to switch actuator relationship.
Lubrication or the use of aqueous or chemical cleaning fluids is not recommended.

Installation Recommendations

The following notes are intended merely to stress the most important and general aspects of good switch installation procedure and to provide some helpful additional information. Safety Consideration
Installation should only be carried out by competent personnel.

Switch Positioning and Operation

Pre-loading of the switch actuator must be avoided. The actuating medium must be able to operate the switch through the operating position into overtravel and then to retract far enough to allow the switch to regain its free position.
Burgess recommends that the actuating medium should drive the switch into at least 50% of the available overtravel.
All ratings tables shown in this catalog are based on the use of all the available overtravel.

Mounting

Side mounting switches should be mounted on smooth, firm, flat surfaces using the recommended screw size. Avoid over tightening the screws. For added security, they should be locked using epoxy resin. Do not attempt to enlarge switch mounting holes and avoid over stressing the switch. Use insulating material between the switch and metallic plates to increase clearance on switches with open terminals.

Connections

When soldering, overheating of the switch insulation must be avoided. In certain circumstances, it may be advisable to use a heat shunt. For optimum mechanical strength, the conductor should be wrapped round the tip of the terminal taking care to avoid loose strands of wire.
The soldering iron tip should be applied to the end of the terminal while simultaneously applying solder. Remove the iron as soon as the solder has wetted the conductor and terminal end. A-soldering iron tip temperature of 350°C (260°C/5 seconds for PCB Terminals) applied for a maximum of 2-3 seconds should be adequate.

For lead-free solder, is usually needed an iron tip temperature 15% higher.

Installation Recommendations (EN 61058-1)

Mounting Holes and Screw sizes				Mounting Screw Torque	
Normal hole Diameter		Metric	Unified Thread	For guidance when using	
(mm)	(in)	Screw	Screw	mild steel screws:	
2.2/2.3	0.067/0.091	M2	#2	M2 or #2 screws	0.15Nm
3.1/3.2	0.122/0.126	M3	#4	M3 or #4 screws	0.5Nm
3.6/3.7	0.142/0.146	M3.5	#6	M3.5 or #6 screws	0.8Nm
5.1/5.2	0.201/0.205	M5	#10	M5 or #10 screws	3.0Nm

Snap-action Microswitches

Ultraminiature

	F1	F4	F5	F1NS	F6
Type					
Characteristics	▪ small size ▪ high current ▪ long mechanical life ▪ PCB mounting	▪ small size ▪ long mechanical and electrical life ▪ solder ▪ 2 mm faston ▪ PCB terminals	▪ small switch ▪ long mechanical and electrical life ▪ PCB mounting	▪ small size ▪ low current ▪ long mechanical life ▪ PCB mounting ▪ sealed IP54 (option)	▪ small size ▪ sealed (IP6K7) ▪ PCB mounting
Rating	250 VAC, 5 A	250 VAC, 5 A	250 VAC, 5 A	up to 250 VAC, 1 A	12–30 VDC, 5–300 mA
Dimensions (mm)	16 × 6 × 6.5	12.8 × 10 × 5	12.8 × 7 × 5	16 × 6.5 × 6	14.7 × 9 × 5.4
Actuator	▪ plunger ▪ plain lever ▪ simulated roller lever/ cam follower	▪ plunger ▪ plain lever ▪ simulated roller lever/ cam follower	▪ plunger ▪ plain lever ▪ simulated roller lever/ cam follower	▪ plunger ▪ plain lever ▪ simulated roller lever/ cam follower	▪ plunger ▪ plain lever
Approvals	UL, CSA	UL, CSA	UL, CSA	none	none
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Subminiature

Miniature torque

Miniature sealed

	FK4	V4L	600	V3S
Type				
Characteristics	▪ double break switching ▪ long mechanical and electrical life ▪ solder, 2 mm faston and PCB mounting ▪ snap-action	▪ long overtravel of 2.2 mm minimum ▪ sealed to IP6K7 option ▪ pre-wired option ▪ solder terminals	▪ low and medium torque operation ▪ horizontal or vertical actuation ▪ 6.35 × 0.8 faston terminals	▪ sealed (IP67) ▪ flying leads ▪ robust construction
Rating	250 VAC, 5 A	250 VAC, 5 A	250 VAC, 5 A	250 VAC, 5 A
Dimensions (mm)	18 × 8 × 5	20 × 11 × 6.4	39.6 × 22 × 16.4	32 × 24 × 10
Actuator	▪ plunger ▪ plain lever ▪ simulated roller lever/ cam follower	▪ plunger ▪ plain lever ▪ ice break lever	▪ wire levers	▪ plunger ▪ plain levers ▪ roller levers
Approvals	UL, CSA	ENEC, UL, CSA	none	UL, CSA, ENEC
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Snap-action Microswitches

	Standard			Metal housed	
					
Type	**PN4**	**3BR**	**K5**	**V9N**	**4BR**
Characteristics	▪ precision switching ▪ long mechanical life ▪ screw terminals	▪ choice of IP54 or IP67 sealed versions ▪ precise movements and exceptional repeat accuracy ▪ flying lead version available ▪ long overtravel	▪ double break switching ▪ long mechanical life ▪ high electrical rating ▪ faston terminals	▪ sealed (IP67) ▪ metal housed ▪ screw terminals or flying leads	▪ choice of IP54 or IP67 sealed versions ▪ precise movements and exceptional repeat accuracy ▪ robust metal housing ▪ flying lead version available ▪ long overtravel
Rating	250 VAC, 15 A	250 VAC, 10 A max.	250 VAC, 16 A	250 VAC, 10 A max.	250 VAC, 15 A max.
Dimensions (mm)	49 × 22 × 17.5	53.1 × 20.6 × 30.8	41 × 19 × 15.5	42 × 24.5 × 16	53.1 × 20.6 × 29.2
Actuator	▪ plunger ▪ plain lever ▪ roller lever	▪ plunger	▪ plunger ▪ ramp plunger ▪ plain lever ▪ roller lever	▪ plunger ▪ plain levers ▪ reverse action levers ▪ roller levers	▪ plunger
Approvals	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
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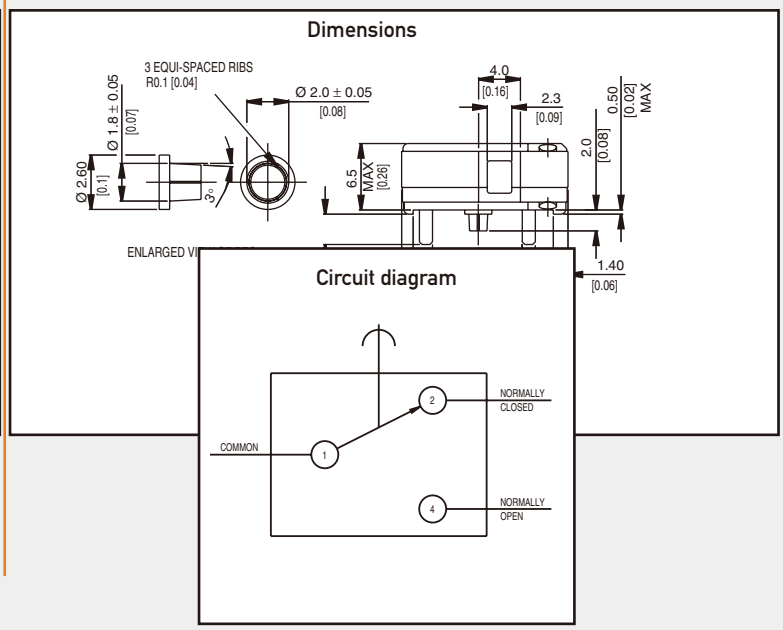
	Miniature	Standard	Forced break	
				
Type	**BVM3**	**KB5**	**XP**	**XT**
Characteristics	▪ positive-action (forced break) contacts ▪ > 3 mm contact gap at full travel ▪ internationally recognized V3 housing ▪ faston terminals	▪ positive-action forced double break switching ▪ > 3 mm contact gap at full travel ▪ high electrical rating ▪ faston terminals	▪ double break switching ▪ positive-action force break option ▪ > 3 mm contact gap at full travel option ▪ faston terminals	▪ 8 mm contact gap, creepage and clearance distances ▪ double break contacts
Rating	250 VAC, 10 A	up to 250 V, 25 A	400 VAC, 16 A	400 VAC, 16.5 A max.
Dimensions (mm)	28 × 16 × 10.5	41 × 19.5 × 15.5	30 × 32 × 12	30 × 32 × 12
Actuator	▪ plunger ▪ plain lever ▪ roller lever	▪ plunger ▪ plain lever ▪ roller levers	▪ plain plunger ▪ mushroom plunger ▪ plunger with external spring (for increased reset security)	▪ shrouded plunger ▪ optional key ▪ plain plunger
Approvals	UL, CSA and ENEC	UL, CSA	ENEC, UL, CSA	UL, cUL, CSA, ENEC
Page	66	69	73	76

Coil spring mechanism Microswitch



F1

Characteristics
- small size
- high current
- long mechanical life
- PCB mounting

Rating 250 VAC, 5 A

Dimensions (mm) 16 × 6 × 6.5

Actuator
- plunger
- plain lever
- simulated roller lever/cam follower

Approvals UL, CSA

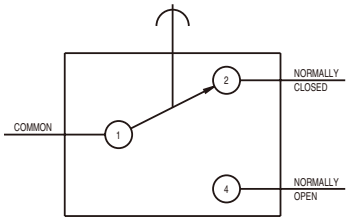
Preferred Range

Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos. (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
F1T8GPUL	1,4	5,00	IP40	6,35	0,25	PCB	CO	Plunger	Gold plate	Up to 250 VAC, 5 A
F1T8Y1GPUL	0,5	1,8	IP40	8,5	0,33	PCB	CO	Lever	Gold plate	Up to 250 VAC, 5 A

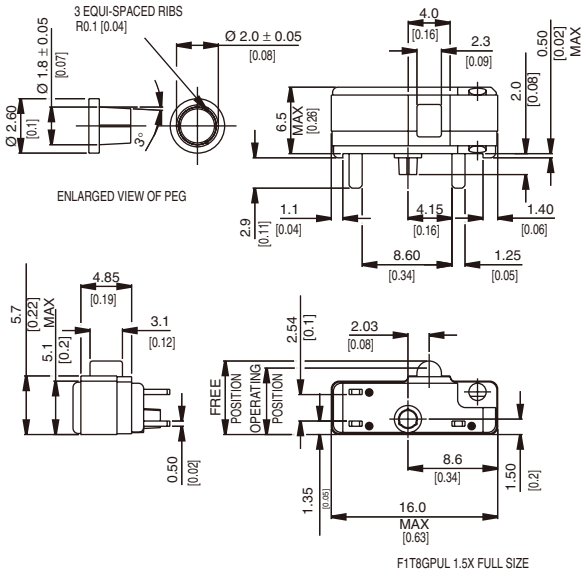
Specifications

Housing	Glass fibre reinforced nylon
Plunger	Nylon
Mechanism	Snap-action, coil spring mechanism with stainless steel spring
Functions	Single pole change-over
Contacts	Gold plate on silver
Terminals	PCB - copper, gold-flashed
Temperature range °C	–40°C to +85°C
Mechanical life	10^6 cycles minimum (impact-free actuation)
Protection	IP40 (enclosure)
Mounting	Side mount PCB with locating pin on housing
Actuators	Plain plunger, straight lever

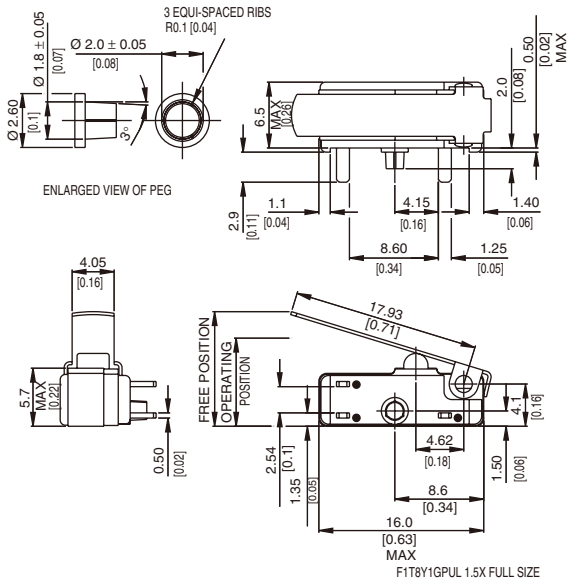
Circuit diagram



Dimensions



F1T8GPUL 1.5X FULL SIZE

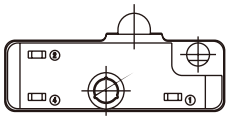
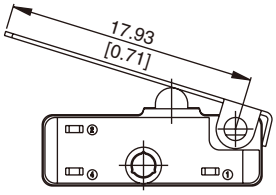


F1T8Y1GPUL 1.5X FULL SIZE

Recommended maximum electrical ratings

Voltage (max)	Resistive load (A)	Inductive load	Approval
250 VAC	5 (0.75 pf)	5	UL 1054/CSA 22.2 No. 55 - 6,000 operations
0 - 15 VDC	5		General rating - 50,000 operations
15 - 30 VDC	10	10	General rating - 50,000 operations

Operating Characteristics

	Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Operating Position (mm)	(in)	Movement Differential Maximum (mm)	(in)	Over Travel (mm)	(in)
Plunger		F1T8GPUL	1,4	5,00	0,28	1,00	7,1	0,28	6,35 ± 0.38	0,25 ± 0.015	0,1	0,004	*	
Straight lever		F1T8Y1GPUL	0,5	1,8	0,06	0,022	11,0	0,43	8,5 ± 1,5	0,33 ± 0.06	0,5	0,02	*	

Width of lever 4.05 mm/0.16 in

* Plunger can be depressed flush with housing. The housing should not be used as an end stop.

Ordering Reference

			Example: F1	T8	Y1	GP	UL
Basic type	F1						
Terminals	T8	PCB	1,25 × 0,5 × 2,9 long				
Actuators		No symbol, without lever					
	Y1	Plain lever 21.0 mm					
	YR1	Roller lever 16.0 mm					
Contacts Material		No symbol, Ag					
	GP	Gold plate on Ag (GP)					
Approvals		No symbol, without approval					
	UL	UL and CSA approval					
Special Features	/☐☐☐☐	Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.					

F4

Characteristics	■ small size ■ long mechanical and electrical life ■ solder ■ 2 mm faston ■ PCB terminals
Rating	250 VAC, 5 A
Dimensions (mm)	12.8 × 10 × 5
Actuator	■ plunger ■ plain lever ■ simulated roller lever/cam follower
Approvals	UL, CSA

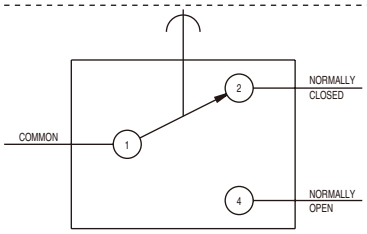
Preferred Range

Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos. (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
F4T7UL	1.4	5.00	IP40	8.1	0.32	Solder	CO	Plunger	Ag	Up to 250 VAC, 5 A
F4T7GPUL	1.4	5.00	IP40	8.1	0.32	Solder	CO	Plunger	Gold plate	Up to 250 VAC, 5 A
F4T7Y1UL	0.6	2.20	IP40	8.2	0.32	Solder	CO	Plain lever	Ag	Up to 250 VAC, 5 A
F4T7Y1GPUL	0.6	2.20	IP40	8.2	0.32	Solder	CO	Plain lever	Gold plate	Up to 250 VAC, 5 A
F4T7YCUL	0.7	2.50	IP40	10.3	0.41	Solder	CO	Simulated roller	Ag	Up to 250 VAC, 5 A
F4T7YCGPUL	0.7	2.50	IP40	10.3	0.41	Solder	CO	Simulated roller	Gold plate	Up to 250 VAC, 5 A

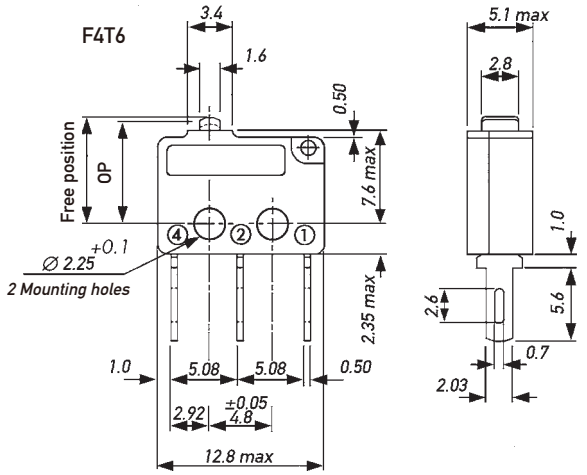
Specifications

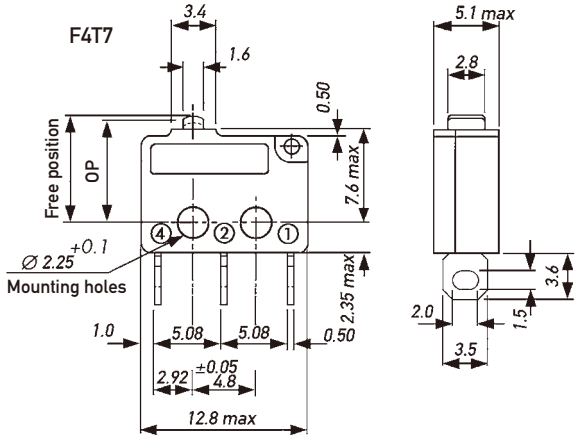
Housing	Glass fibre reinforced nylon
Plunger	Nylon
Mechanism	Snap-action, single pole
Functions	Change-over, Normally open, Normally closed
Contacts	Fixed, Moving – Ag or Gold plate on Ag
Terminals	2.0 mm (0.08 in) faston and solder - brass, gold flashed
Temperature range °C	-40°C to +85°C
Mechanical life	10^7 cycles minimum (impact free actuation)
Protection	IP 40 (enclosure)
Mounting	Side mounting
Actuators	Plain lever; simulated roller (cam follower) lever
Accessories	Lug mounting frame, insulating sheet, spring-leaf actuator

Circuit diagram



Dimensions

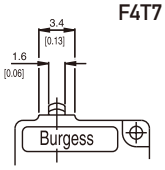
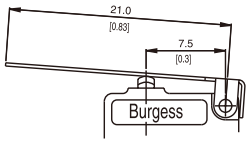
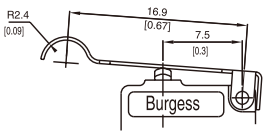




Recommended maximum electrical ratings

Voltage (max)	Load (A)	Approval
250 VAC	5 (0.75 pf)	UL 1054/CSA 22.2 No. 55 - 6,000 operations
125 VAC	5 (0.75 pf)	UL 1054/CSA 22.2 No. 55 - 6,000 operations
0 - 15 VDC	5	General rating - 50,000 operations
15 - 30 VDC	3	General rating - 50,000 operations

Operating Characteristics

	Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Operating Position (mm)	(in)	Movement Differential Maximum (mm)	(in)	Over travel
Plunger		F4T6 F4T7	1,4	5,00	0,25	0,90	8,8	0,35	8,1 +0.3 −0.2	0,32 +0.01 −0.008	0,13	0,005	*
Y1-Lever	 Width of lever 3.0 mm/0.12 in	F4T6Y1 F4T7Y1	0,6	2,20	0,07	0,25	10,0	0,39	8,2 +1.0 −0.7	0,32 +0.04 −0.03	0,70	0,030	*
YC-Lever	 Width of lever 3.0 mm/0.12 in	F4T6YC F4T7YC	0,7	2,50	0,09	0,32	11,7	0,46	10,3 +0.8 −0.55	0,41 +0.03 −0.02	0,45	0,020	*

Operating characteristics are specified from the mounting holes.

* Plunger can be depressed flush with housing. The housing should not be used as an end stop.

Ordering Reference

Example: F4 | T6 | C2 | Y1 | GP | UL

Basic type	F4		
Terminals	T6	Faston	2.03 × 0.5 × 6.6 long
	T7	Solder	3.50 × 0.5 × 3.6 long
	T8	PCB	0.8 × 0.5 × 4.0 long
Circuit		No symbol, change-over	
	C2	Normally closed	
	C4	Normally open	
Actuators		No symbol, without lever	
	Y1	Plain lever 21.0 mm	
	YC	Cam follower lever 16.9 mm	
Contacts Material		No symbol, Ag	
	GP	Gold plate on Ag (GP)	
Approvals		No symbol, without approval	
	UL	UL and CSA approval	
Special Features	/☐☐☐☐	Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.	

F5

F5

Characteristics	▪ small switch ▪ long mechanical and electrical life ▪ PCB mounting
Rating	250 VAC, 5 A
Dimensions (mm)	12.8 × 7 × 5
Actuator	▪ plunger ▪ plain lever ▪ simulated roller lever/cam follower
Approvals	UL, CSA

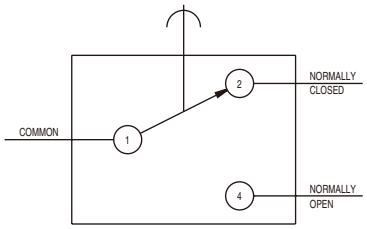
Preferred Range

Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos. (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
F5T8UL	1.4	5.00	IP40	8.75	0.34	PCB	CO	Plunger	Ag	Up to 250 VAC, 5 A
F5T8GPUL	1.4	5.00	IP40	8.75	0.34	PCB	CO	Plunger	Gold plate	Up to 250 VAC, 5 A
F5T8Y1UL	0.6	2.20	IP40	8.80	0.35	PCB	CO	Plain lever	Ag	Up to 250 VAC, 5 A
F5T8Y1GPUL	0.6	2.20	IP40	8.80	0.35	PCB	CO	Plain lever	Gold plate	Up to 250 VAC, 5 A
F5T8YCUL	0.7	2.50	IP40	10.90	0.43	PCB	CO	Simulated roller	Ag	Up to 250 VAC, 5 A
F5T8YCGPUL	0.7	2.50	IP40	10.90	0.43	PCB	CO	Simulated roller	Gold plate	Up to 250 VAC, 5 A

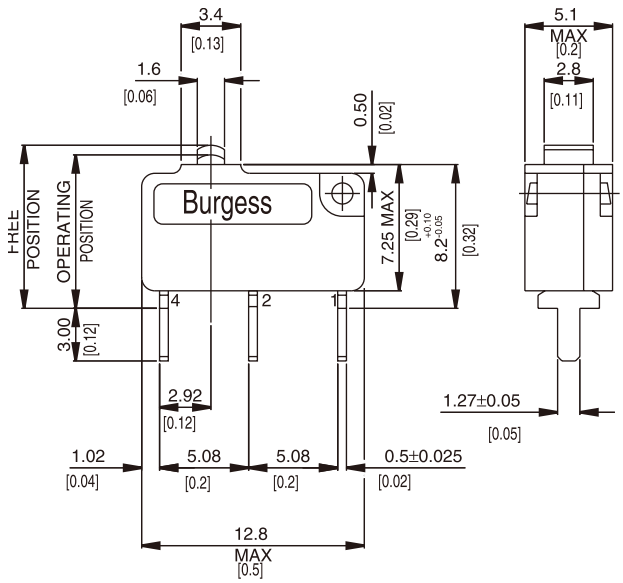
Specifications

Housing	Glass fibre reinforced nylon
Plunger	Nylon
Mechanism	Snap-action, single pole
Functions	Change-over, Normally open, Normally closed
Contacts	Fixed, Moving - Silver or Gold plate on silver
Terminals	PCB - Brass, gold flashed
Temperature range °C	-40°C to +85°C
Mechanical life	10^7 cycles minimum (impact free actuation)
Protection	IP 40 (enclosure)
Mounting	PCB
Actuators	Plain lever; simulated roller (cam follower) lever

Circuit diagram



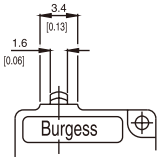
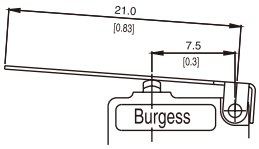
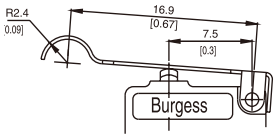
Dimensions



Recommended maximum electrical ratings

Voltage (max)	Load (A)	Approval
250 VAC	5 (0.75 pf)	UL 1054/CSA 22.2 No. 55 - 6,000 operations
125 VAC	5 (0.75 pf)	UL 1054/CSA 22.2 No. 55 - 6,000 operations
0 - 15 VDC	5	General rating - 50,000 operations
15 - 30 VDC	1	General rating - 50,000 operations

Operating Characteristics

	Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Operating Position (mm)	(in)	Movement Differential Maximum (mm)	(in)	Over travel
Plunger		F5T8	1,4	5,00	0,25	0,90	9.5	0,37	8,75 ± 0,3	0,34 ± 0,012	0,13	0,005	*
													
Y1-Lever		F5T8Y1	0,6	2,20	0,07	0,25	10,7	0,42	8,8 ± 1,1	0,35 ± 0,04	0,70	0,030	*
													
	Width of lever 3.0 mm/0.12 in												
YC-Lever		F5T8YC	0,7	2,50	0,09	0,32	12.4	0,49	10,9 ± 0.85	0,43 ± 0,03	0,45	0,020	*
													
	Width of lever 3.0 mm/0.12 in												

Operating characteristics are specified from the terminal shoulder.

* Plunger can be depressed flush with housing. The housing should not be used as an end stop.

Ordering Reference

Example: F5 | T8 | C2 | Y1 | GP | UL

Basic type	F5	
Terminals	T8	PCB 1.27 × 0.5 × 3.0 long
Circuit		No symbol, change-over
	C2	Normally closed
	C4	Normally open
Actuators		No symbol, without lever
	Y1	Plain lever 21.0 mm
	YC	Cam follower lever 16.9 mm
Contact Material		No symbol, Ag
	GP	Gold plate on Ag (GP)
Approvals		No symbol, without approval
	UL	UL and CSA approval
Special Features	/☐☐☐☐	Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.

F1NS

Characteristics	■ small size ■ low current ■ long mechanical life ■ PCB mounting ■ sealed IP54 (option)
Rating	Up to 250 VAC, 1 A
Dimensions (mm)	16 × 6.5 × 6
Actuator	■ plunger ■ plain lever ■ simulated roller lever/cam follower
Approvals	none

Preferred Range

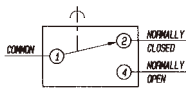
Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos. (mm)	Terminal	Circuit	Actuator	Contacts	Electrical rating
F1NST8	2,0	7,2	IP5K4	5,9	PCB	CO	Plunger	Ag	250 VAC, 1 A
F1NST8A1	0,6	2,2	IP5K4	7,6	PCB	CO	Plain lever	Ag	250 VAC, 1 A
F1NST8AC	0,6	2,2	IP5K4	10,1	PCB	CO	Cam follower	Ag	250 VAC, 1 A

F1NS

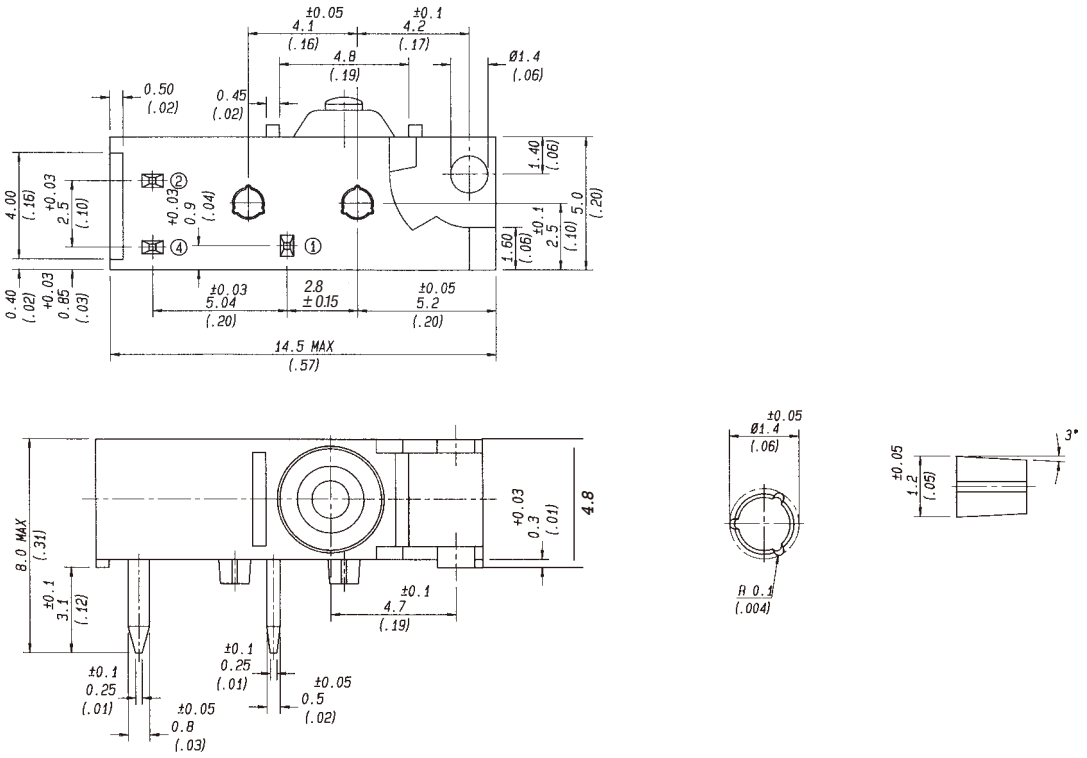
Specifications

Housing	Base: PA66 GF30; Cowl: Silicon; Lid: PA 66
Plunger	POM
Mechanism	Snap-action, coil spring mechanism with stainless steel spring. Single-pole change-over contact
Contacts	Fine silver, Gold plate on silver
Terminals	PCB silver plated
Temperature range °C	–40°C bis +85°C
Mechanical life	10^7 cycles minimum (impact-free actuation)
Protection	Enclosure IP40 (F1N), IP54 (F1NS)
Mounting	PCB. Locating pins on housing

Circuit diagram



Dimensions

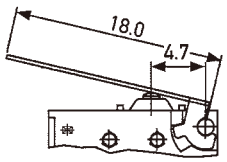


Recommended maximum electrical ratings

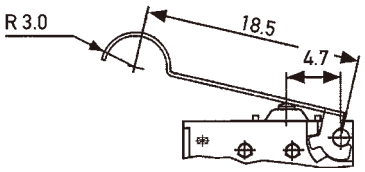
Voltage (VAC)	Resistive load (A)	Inductive load (A)	Voltage (VAC)	Resistive load (A)	Inductive load (A)
125	1	1	up to		
250	1	1	30	2	2
			50	0,5	0,5
			75	0,25	0,25
			125	0,2	0,03

Operating Characteristics

	Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Operating Position (mm)	(in)	Movement Differential Maximum (mm)	(in)	Total travelled position Maximum (mm)	(in)
Plunger		F1NST8	2	7,20	0,2	0,72	6,5	0,26	5,9 ± 0,2	0,23 ± 0,008	0,2	0,008	*	
A1-Lever		F1NST8A1	0,6	2,20	0,09	0,32	10,5	0,41	7,6 ± 1,2	0,3 ± 0,05	0,7	0,03	*	
AC-Lever		F1NST8AC	0,6	2,20	0,09	0,32	13,3	0,52	10,1 ± 1,2	0,4 ± 0,05	0,7	0,03	*	



Width of lever 3 mm/0,12 in



Width of lever 3 mm/0,12 in

Datum for Free Position and Operating Position: base of switch opposite plunger.

* Flush with case. The case should not be used as an end stop.

Ordering Reference

Example: F1N | S | T8 | C2 | A | AU

Basic type	F1N	
Type of sealing		No symbol, unsealed
	S	Sealed IP5K4
Terminals	T8	PCB 0.8 × 0.5 × 3.45 long
Circuit		No symbol, change-over
	C2	Normally closed
	C4	Normally open
Actuators		No symbol, without lever
	A	Special lever A type (see specification)
	A1	Plain lever 18.0 mm
	AC	Cam follower lever 18.5 mm
Contact Material		No symbol, Ag
	AU	Gold on nickel
	GP	Gold plate on Ag (GP)
Special Features	/☐☐☐☐	Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.

F6

F6

Characteristics	■ small size ■ sealed (IP6K7) ■ PCB mounting
Rating	12–30 VDC, 5–300 mA
Dimensions (mm)	14.7 × 9 × 5.4
Actuator	■ plunger ■ plain lever
Approvals	none

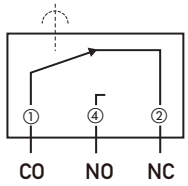
Preferred Range

Ordering Reference	Actuating Force (N)	Sealing	Operating pos. (mm)	Terminal	Circuit	Actuator	Contacts	Electrical rating
F6T85	1,6	IP6K7	10,8	PCB	CO	Plunger	Gold plated	30 VDC, 300 mA

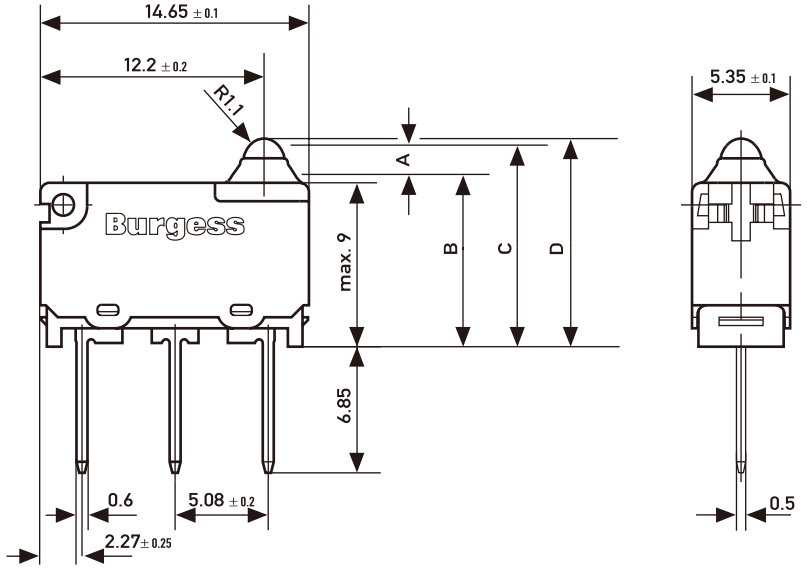
Specifications

Base	PBT
Lid	PP GF30
Plunger	POM
Mechanism	Leaf spring
Contacts	Gold plated on silver
Terminals	CuZn silver plated
Temperature range °C	-40°C up to +90°C
Mechanical life	Up to 1 mio. cycles
Protection	IP67
Actuators	Plain plunger, lever, cam follower
Cowl	TPE

Circuit diagram



Dimensions



A = Overtravel
B = End Position
C = Operating Position
D = Free Position

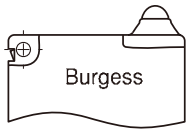
Recommended maximum electrical ratings

	Voltage (VDC)	Resistive load (A)	Cycles
F6	12 to 30	0,005 – 0,3	500.000

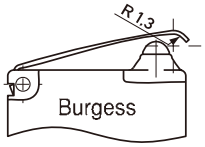
F6

Operating Characteristics

Actuator	Reference	Actuating Force Maximum (N)	Release Force Minimum (N)	Free Position Maximum (mm)	Operating Position (mm)	Movement Differential Maximum (mm)	Total travelled positions Maximum (mm)
Plunger	F6T85	1,6	0,2	11.35	10.8 ± 0.2	0,3	9.5



H-Lever	F6T85H	For positions and forces of this actuator please contact Saia Burgess					
		2,5	0,5	12,9	11,3 + 0,35	0,45	



Width of lever 3.0 mm/0.12 in

Datum for free position and operating position is button edge of base (stand-off's).
The case should not be used as an end stop.

Ordering Reference

Example: F6 T8 C2 H

Basic type	F6		
Terminals		No symbol, pre-wired 500 mm with cable box K	
	T8	PCB	0.6 × 0.5 × 4.0 long
	T81	Formed PCB	side B
	T82	Formed PCB	side A
	T84	Short PCB	0.6 × 0.5 × 2.0 long
	T85	Long PCB	0.6 × 0.5 × 6.85 long
	T87	Long PCB	side A, for flexible PCB
	T88	Long PCB	side B, for flexible PCB
Circuit		No symbol, change-over	
	C2	Normally closed	
	C4	Normally open	
Actuators		No symbol, without lever	
	H	Formed. lever 0.3 mm thickness	
	Y	Special lever Y-clip-on	
	Y1	Plain lever mm	
	YC	Cam follower lever	
	HC	Cam follower	
Contact Material		No symbol, Ag, gold plated	
Special Features	/☐☐☐☐	Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.	

FK4

Characteristics	■ double break switching ■ long mechanical and electrical life ■ solder, 2 mm faston and PCB mounting ■ snap-action
Rating	250 VAC, 5 A
Dimensions (mm)	18 × 8 × 5
Actuator	■ plunger ■ plain lever ■ simulated roller lever/cam follower
Approvals	UL and CSA

Preferred Range

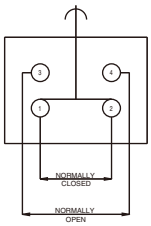
Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos. (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
FK4T7UL	1,8	6,5	IP40	8,25	0,32	Solder	SPDT	Plunger	Ag	Up to 250 VAC, 5 A
FK4T7Y1UL	0,8	2,9	IP40	8,25	0,32	Solder	SPDT	Plain lever	Ag	Up to 250 VAC, 5 A
FK4T7YCUL	1,0	3,6	IP40	10,40	0,41	Solder	SPDT	Simulated roller	Ag	Up to 250 VAC, 5 A

FK4

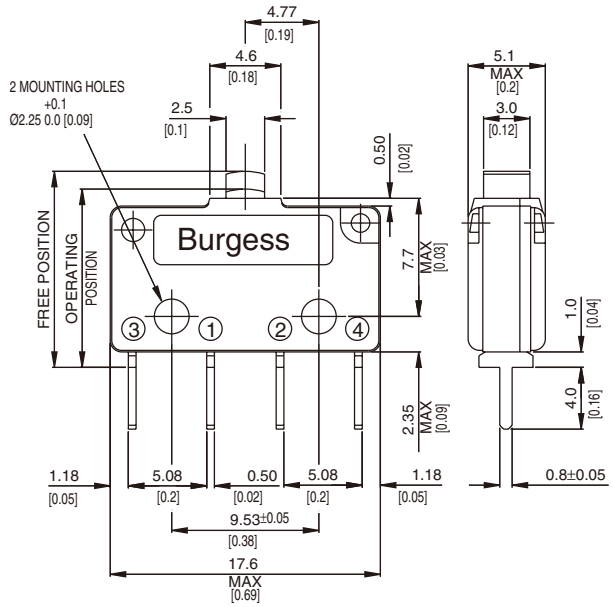
Specifications

Housing	Glass fibre reinforced nylon
Plunger	Nylon
Mechanism	Double pole, single throw snap-action coil spring mechanism with stainless steel springs
Functions	Change-over, NO, NC
Contacts	Silver
Terminals	Solder, PCB - brass, gold flashed
Temperature range °C	–40°C to +85°C
Mechanical life	10^7 cycles minimum (impact free actuation)
Protection	IP40 (enclosure)
Mounting	Side mounting or PCB mounting (T8 only)
Actuators	Plain lever, simulated roller lever/cam follower
Accessory	Insulating sheet

Circuit diagram



Dimensions

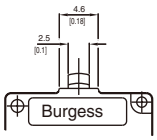
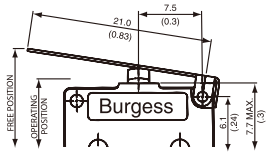
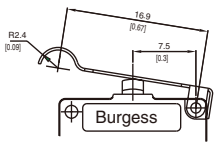


Recommended maximum electrical ratings

Voltage (max)	Load (A)	Approval
250 VAC	5 (0.75 pf)	UL 1054/CSA 22.2 No. 55 - 6,000 operations
125 VAC	5 (0.75 pf)	UL 1054/CSA 22.2 No. 55 - 6,000 operations
0 - 15 VDC	5	General rating - 50,000 operations
15 - 30 VDC	3	General rating - 50,000 operations

Values shown are recommended maximum ratings for single circuit switching

Operating Characteristics

	Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Operating Position (mm)	(in)	Movement Differential Maximum (mm)	(in)
Plunger		FK4T7*	1,8	6,50	0,25	0,9	9,4	0,37	8,25 ± 0.25	0,32 ± 0.01	0,50	0,02
		FK4T8[1)]	1,8	6,50	0,25	0,9	12,75	0,50	11,60 ± 0.45	0,45 ± 0.02	0,50	0,02
Y1 Lever		FK4T7Y1	0,8	2,90	0,09	0,3	12,1	0,48	8,25 ± 0.9	0,32 ± 0.04	1,85	0,07
		FK4T8Y1	0,8	2,90	0,09	0,3	15,6	0,61	11,55 ± 1,1	0,45 ± 0.04		
	Width of lever 3.0 mm/0.12 in											
YC Lever		FK4T7YC	1,0	3,60	0,1	0,4	13,5	0,53	10,40 ± 0.6	0,41 ± 0.02	1,30	0,05
		FK4T8YC	1,0	3,60	0,1	0,4	17,0	0,67	13,70 ± 0.8	0,54 ± 0.03		
	Width of lever 3.0 mm/0.12 in											

Overtravel: Plunger can be depressed flush with housing. The housing should not be used as an end stop.

Datum for free position and operating position

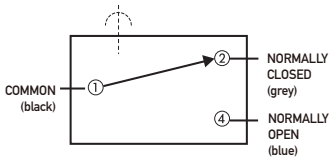
* FK4T7 – Center of fixing hole
[1)] FK4T8 – Terminal shoulder

Ordering Reference

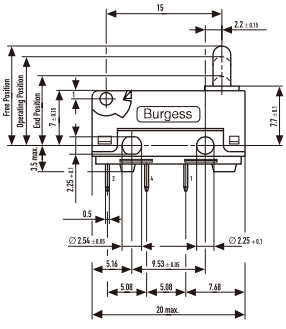
				Example: FK4	T7	Y1	UL
Basic type	FK4						
Terminals	T7	Solder	0,5 × 3,5				
	T8	PCB	0,5 × 0,8				
Actuators		No symbol, plunger					
	Y1	Plain lever					
	YC	Simulated roller lever/cam follower					
Approvals	UL	UL and CSA					

Long overtravel Microswitches

Circuit diagram



Dimensions



JOHNSON ELECTRIC
innovating motion

V4L

Characteristics	■ long overtravel of 2.2 mm minimum ■ sealed to (IP6K7) option ■ pre-wired option ■ solder terminals
Rating	250 VAC, 5 A
Dimensions (mm)	20 × 11 × 6.4
Actuator	■ plunger ■ plain lever ■ ice break lever
Approvals	ENEC, UL, CSA

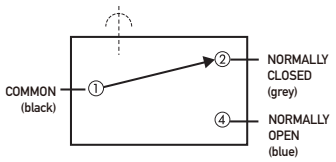
Preferred Range

Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos. (mm)	Terminal	Circuit	Actuator	Contacts	Electrical rating
V4LS	2,5	9,0	IP6K7	11,7 ± 0,4	Cable 500 mm	CO	Plunger	Ag	250 VAC, 5 A
V4LSA1	2,5	9,0	IP6K7	14,5 ± 0,8	Cable 500 mm	CO	Plain lever	Ag	250 VAC, 5 A
V4LSA2	2,0		IP6K7	16,5 ± 1,0	Cable 500 mm	CO	Plain lever	Ag	250 VAC, 5 A
V4LST7	2,5	9,0	IP6K7	11,7 ± 0,4	Solder	CO	Plunger	Ag	250 VAC, 5 A
V4LST7A1	2,5		IP6K7	14,5 ± 0,8	Solder	CO	Plain lever	Ag	250 VAC, 5 A
V4LST7A2	2,0		IP6K7	14,6 ± 1,0	Solder	CO	Plain lever	Ag	250 VAC, 5 A
V4LT7	2,4	8,6	no symbol	11,7 ± 0,4	Solder	CO	Plunger	Ag	250 VAC, 5 A

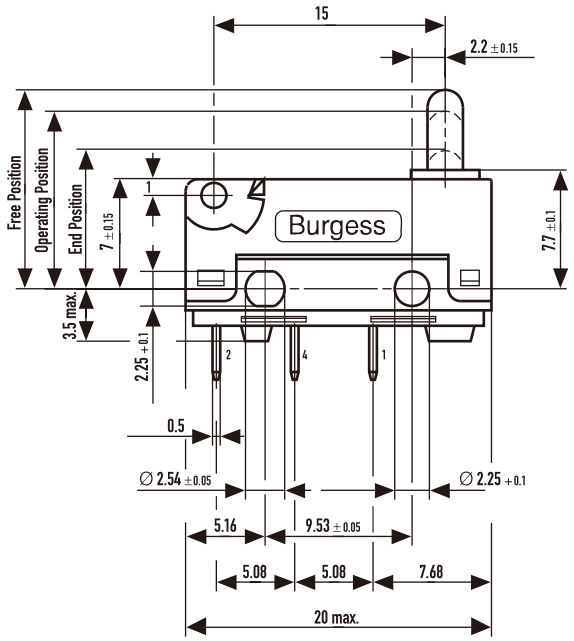
Specifications

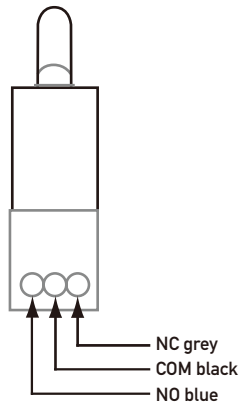
Housing	Glass fibre reinforced polyamide (PA 6.6)
Plunger	Polyacetal (POM)
Mechanism	Snap-action coil spring mechanism with stainless steel spring. Change-over, normally closed or normally open
Contact carrier	Brass. Moving contact beryllium-copper
Contacts	Fine silver or gold crosspoint
Terminals	V4L – solder tags V4LS – PVC covered leads 0.5 m long
Temperature range °C	–40°C to +85°C
Mechanical life	V4L 2 × 10^6 cycles/min., V4LS 2 × 10^5 cycles/min. (impact free actuation)
Protection	V4L series IP40, V4LS series IP6K7, with encapsulated terminals
Mounting	Side mounting to a flat surface
Actuators	Plain lever, Ice break lever
Cowl	Silicon elastomer

Circuit diagram



Dimensions

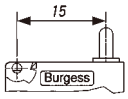
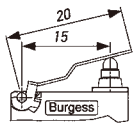
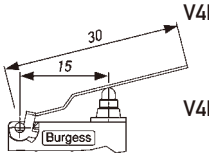
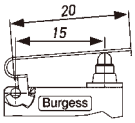




Recommended maximum electrical ratings

Voltage (VAC)	Resistive load (A) (Ag Contact)	Incandescent lamp load (A) (Ni1 Contact)	Inductive load (A) (Ag Contact)	Voltage (VDC) up to	Resistive load (A) (Ag Contact)	Incandescent lamp load (A) (Ni1 Contact)	Inductive load (A) (Ag Contact)
125	5	2	2	30	5	2	3
250	5	2	2	50	1	0,4	1
				75	0,75	0,3	0,75
				125	0,5	0,2	0,03
				250	0,25	0,1	0,03

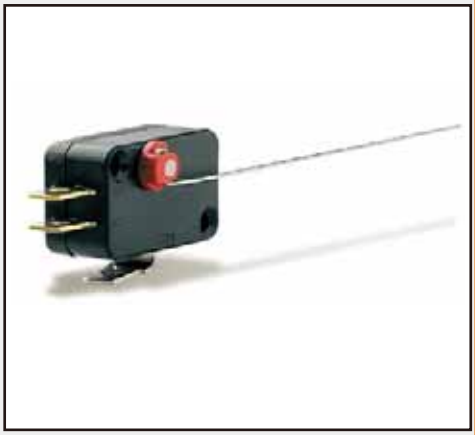
Ordering Reference

	Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Operating Position (mm)	(in)	Movement Differential Maximum (mm)	(in)	Total overtravel Position Minimum (mm)	(in)	Overtravel Minimum (mm)	(in)
Plunger		V4LT7	2,4	8,60	0,4	1,44	12,9	0,507	11,7 ± 0.4	0,46 ± 0.012	0,9	0,023	9,2	0,36	2,2	0,09
		V4LST7	2,5	9,00	0,5	1,78	12,9	0,507	11,7 ± 0.4	0,46 ± 0.012	0,9	0,023	9,2	0,36	2,2	0,09
A1 Lever		V4L…	2,4	8,60	0,4	1,44	14,5	0,57	12,6 ± 0,8	0,59 ± 0.03	1,0	0,04	9,6	0,38	2,2	0,09
		V4LS…	2,5	9,00	0,5	1,78	14,5	0,57	12,6 ± 0,8	0,59 ± 0.03	1,0	0,04	9,6	0,38	2,2	0,09
	Width of lever 4.0 mm/0.16 in															
A2 Lever		V4L…	1,5	5,70	0,3	1,08	16,5	0,65	13,5 ± 1.0	0,53 ± 0.04	1,3	0,05	9,6	0,38	2,9	1,1
		V4LS…	2	7,20	0,3	1,08	16,5	0,65	13,5 ± 1.0	0,53 ± 0.04	1,3	0,05	9,6	0,38	2,9	1,1
	Width of lever 4.0 mm/0.16 in															
F Lever		V4L…	For positions and forces of this actuator please contact Burgess													
		V4LS…														
	Width of lever 4.0 mm/0.16 in															

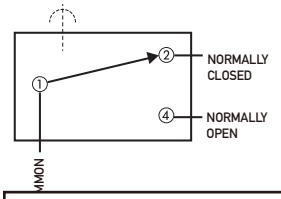
Ordering Reference

				Example: V4L	S	T7	C2	A1	G	UL
Basic type	V4L									
Type of sealing		No symbol, unsealed								
	S	Sealed IP6K7								
Terminals		No symbol, pre-wired 500 mm with cable FLRY 0.5 mm^2 and cable box (V4LS only)								
	T7	Solder	2.95 × 0.5 × 3.55 long							
	T8	PCB	0.8 × 0.5 × 4,0 long							
Circuit		No symbol, change over								
	C2	Normally closed								
	C4	Normally open								
Actuators		No symbol, without lever								
	A1	Plain lever	20.0 mm, fitted at the end opposite to plunger							
	A2	Plain lever	30.0 mm, fitted at the end opposite to plunger							
	F	Special lever F type	20.0 mm, fitted at the end opposite to plunger							
Contact Material		No symbol, Ag								
	G	Gold plate on silver (GP)								
	X	Gold alloy on silver palladium crosspoint (AUX)								
	Other contact materials on special request									
Approvals		No symbol, without approval								
	UL	UL and CSA approval								
	EN	ENEC approval only								
	UN	UL, CSA and ENEC approval								
Special Features	/☐☐☐☐	Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.								

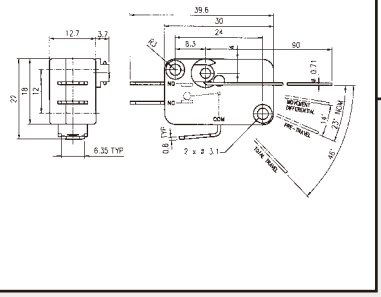
Coin operated Switches



Circuit diagram



Dimensions



600

Characteristics	■ low and medium torque operation ■ hoizontal or vertical actuation ■ 6,35 × 0,8 faston terminals
Rating	250 VAC, 5 A
Dimensions (mm)	39,6 × 22 × 16,4
Actuator	■ wire levers
Approvals	none

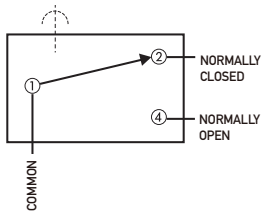
Popular Product

Ordering Reference	Actuating Force (Ncm)	Pretravel.	Terminal	Circuit	Actuator	Contacts	Electrical rating
BB1/R-S1	6	23°	6,3 × 0,8	C0	Torque Wire	Ag Au	5 A/250 VAC

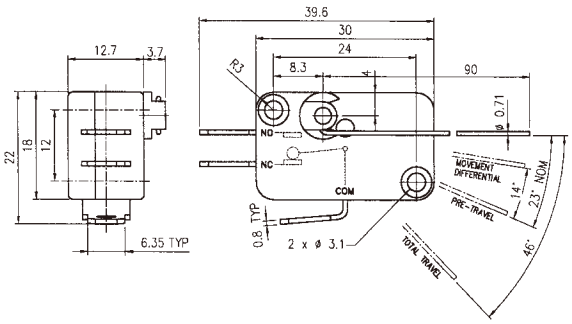
Specifications

Housing	Glass fibre reinforced nylon
Plunger	Acetal
Mechanism	Snap-action, single pole
Functions	Change-over
Contacts	Silver
Terminals	Faston
Temperature range °C	–40 °C +85 °C
Mechanical life	5 x 10^6, Cycles maximum (Impact free Actuators)
Protection	IP40 (enclosure)
Mounting	Side mounting
Actuators	Stainless steel

Circuit diagram



Dimensions



Recommended electrical ratings

Approvals held	None
Electrical rating	5 A, 250 V, AC
Terminals	6,35 × 0,8 fast-on
Mechanical life	>5 million operations
Temperature rating	T85 °C

Ordering Reference

Basic type	BB1	Low Torque Wire Operated Microswitch		Example: 600	R	S1
Operating force	R	Light	6 g/cm			
	B	Medium	24 g/cm			
Actuator	S1	– Horizontal				
	S10	– Vertical				

V3S

Characteristics	■ sealed (IP67) ■ flying leads ■ robust construction
Rating	250 VAC, 5 A
Dimensions (mm)	32 × 24 × 10
Actuator	■ plunger ■ plain levers ■ roller levers
Approvals	UL, CSA, ENEC

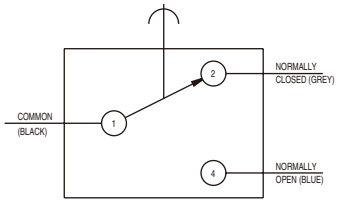
Preferred Range

Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos. (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
V3SUL	3,9	14,00	IP67	14,5	0,57	Pre-wired	CO	Plunger	Ag	Up to 250 VAC, 5 A
V3SYRUL	3,9	14,00	IP67	20,4	0,80	Pre-wired	CO	Roller lever - short	Ag	Up to 250 VAC, 5 A
V3SYR1UL	2,3	8,26	IP67	22,0	0,86	Pre-wired	CO	Roller lever - long	Ag	Up to 250 VAC, 5 A
V3SY1UL	1,7	7,50	IP67	14,9	0,55	Pre-wired	CO	Plain lever	Ag	Up to 250 VAC, 5 A

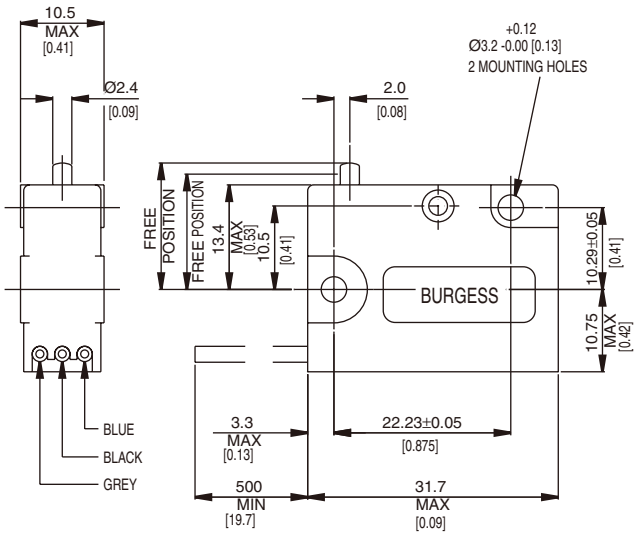
Specifications

Housing	Glass fibre reinforced nylon
Plunger	Acetal (lever types), stainless steel (plunger types)
Mechanism	Snap-action, single pole
Functions	Change-over
Cowl	Silicone rubber
Contacts	Silver
Terminals °C	Pre-wired
Temperature range	–40°C to +85°C
Mechanical life	10^6 cycles minimum, impact-free actuation
Protection	IP67 (enclosure)
Mounting	Side mounting
Actuators	Plain lever - stainless steel, Roller levers - stainless steel, nylon roller

Circuit diagram



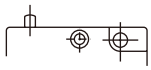
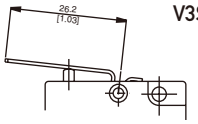
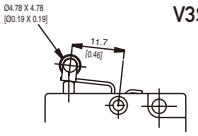
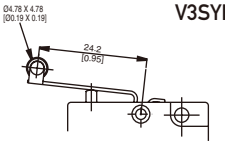
Dimensions



Recommended maximum electrical ratings

Voltage (max)	Load (A)	Approval
125 VAC	5 (0.75 pf)	UL 1054/CSA 22.2 No. 55 - 6,000 operations (85° C)
250 VAC	5 (0.75 pf)	UL 1054/CSA 22.2 No. 55 - 6,000 operations (85° C)
250 VAC	5	EN61058-1, T85, 10,000 operations
0 - 15 VDC	6	General rating - 50,000 operations (85° C)
15 - 30 VDC	3	General rating - 50,000 operations (85° C)

Operating Characteristics

Actuator	Reference	Actuating Force Maximum (N)	Release Force (ozf)	Free Position Minimum (N)	Operating Position (ozf)	Differential Maximum (mm)	Movement (in)	(mm)	Maximum (in)	(mm)	(in)
Plunger 	V3SUL	3,90	14,0	1,10	4,00	15,9	0,63	14,5 ± 0.5	0,57 ± 0.02	0,4	0,016
Plain lever 	V3SY1UL	1,65	6,0	0,42	1,50	13,4	0,71	14,9 ± 1,0	0,59 ± 0.4	1,0	0,040
Roller lever - short 	V3SYRUL	3,90	14,0	1,10	4,00	22,1	0,87	20,45 ± 0.64	0,8 ± 0.025	0,40	0,016
Roller lever - long 	V3SYR1UL	1,65	7,5	0,42	1,50	18,1	0,71	14,9 ± 01.0	0,55 ± 0.039	1,00	0,040

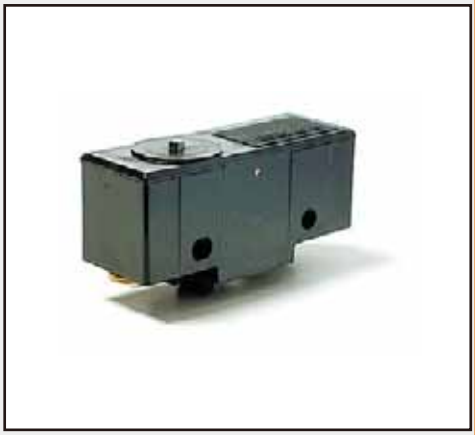
Over travel: Plunger can be depressed flush with housing. The housing should not be used as an end stop.

Ordering Reference

Example: V3S | C2 | Y1 | GP | UL

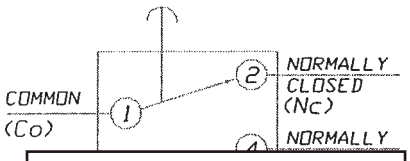
Basic type	V3S	
Circuit		No symbol, change-over
	C2	Normally closed
	C4	Normally open
Actuators		No symbol, without lever or actuator
	Y1	Plain lever 26.2 mm
	YR	Roller lever 11.7 mm
	YR1	Roller lever 24.2 mm
Contact Material		No symbol, Ag
	GP	Gold plate on silver (GP)
Terminals		No symbol, fitted with standard 500 mm cables
Approvals		No symbol, without approval
	UL	UL and CSA approval
Special Features	/☐☐☐☐	Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.

Precision Switches

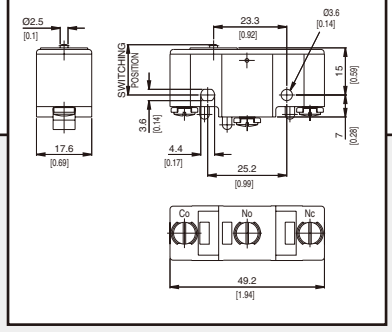


Circuit diagram

DIAGRAM OF CONNECTIONS



Dimensions



PN4

Characteristics	■ precision switching ■ long mechanical life ■ screw terminals
Rating	250 VAC, 15 A
Dimensions (mm)	49 × 22 × 17.5
Actuator	■ plunger ■ plain lever ■ roller lever
Approvals	UL, CSA

Preferred Range

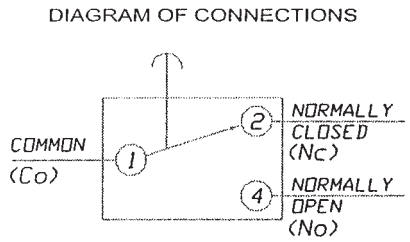
Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos. (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
PN401	3,8	13,7	IP40	16,0	0,63	Screw/washer	CO	Plunger	Ag	Up to 250 VAC, 15 A
PN4D2	3,8	13,7	IP40	22,2	0,87	Screw/washer	CO	Spring plunger	Ag	Up to 250 VAC, 15 A
PN4K152	0,3	1,08	IP40	25,0	1,00	Screw/washer	CO	Plain lever (length 152 mm, 6.0 in)	Ag	Up to 250 VAC, 15 A
PN4K63	0,9	3,2	IP40	19,0	0,75	Screw/washer	CO	Plain lever (length 63.5 mm, 2.5 in)	Ag	Up to 250 VAC, 15 A
PN4KZ56	1,5	5,4	IP40	8,5	0,33	Screw/washer	CO	Reverse action plain lever	Ag	Up to 250 VAC, 15 A
PN4GK48	1,1	4,0	IP40	30,2	1,19	Screw/washer	CO	Roller lever (length 48.2 mm, 1.90 in)	Ag	Up to 250 VAC, 15 A
PN4GK26	1,7	6,1	IP40	30,2	1,19	Screw/washer	CO	Roller lever (length 26.7 mm, 1.05 in)	Ag	Up to 250 VAC, 15 A
PN41	3,8	13,7	IP40	21,8	0,86	Screw/washer	CO	Long overtravel plunger	Ag	Up to 250 VAC, 15 A
PN4G	3,8	13,7	IP40	33,3	1,31	Screw/washer	CO	Spring plunger, in-line roller	Ag	Up to 250 VAC, 15 A
PN4GH	3,8	13,7	IP40	33,3	1,31	Screw/washer	CO	Spring plunger, across-line roller	Ag	Up to 250 VAC, 15 A

PN4

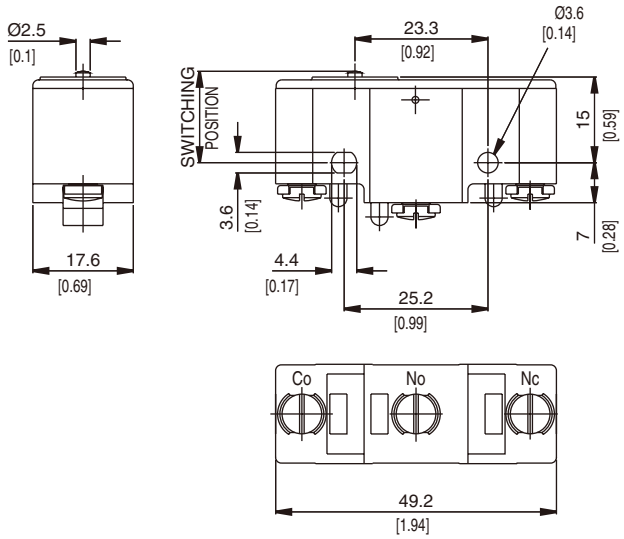
Specifications

Housing	PBT thermoplastic polyester resin
Plunger	PBT thermoplastic polyester resin
Mechanism	Snap-action, single pole
Functions	Change-over
Contacts	Silver
Terminals	Screw terminals with cup washers
Temperature range °C	–10°C to +85°C
Mechanical life	10^6 cycles minimum (impact free actuation)
Protection	IP 40 (enclosure)
Mounting	Side or panel mounting
Actuators	Plain levers - zinc-plated mild steel, Roller levers - zinc-plated mild steel, stainless steel roller

Circuit diagram



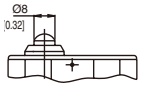
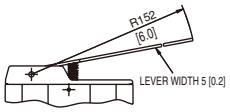
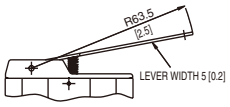
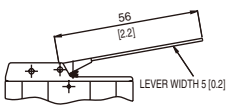
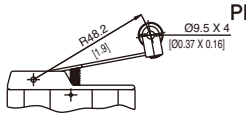
Dimensions



Recommended maximum electrical ratings

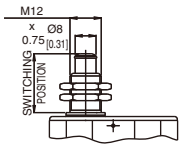
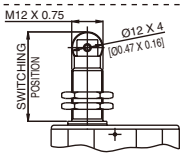
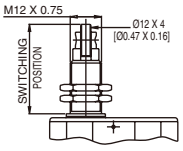
Voltage (max)	Load (A)	Horsepower	Approval
250 VAC	15 (0.75 pf)	-	ULS 1054/CSA 22.2 No. 55 - 6,000 operations
125 VAC	15 (0.75 pf)	-	ULS 1054/CSA 22.2 No. 55 - 6,000 operations
250 VAC	-	¼ HP	ULS 1054 - Horsepower - 6,000 operations
125 VAC	-	⅛ HP	ULS 1054 - Horsepower - 6,000 operations
0 - 15 VDC	15	-	General rating - 50,000 operations
15 - 30 VDC	10	-	General rating - 50,000 operations

Operating Characteristics

Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Operating Position (mm)	(in)	Movement Differential Minimum (mm)	(in)	Over travel (mm)	(in)
Plunger 	PN401	3,8	13,70	1,3	4,7	16,0 ± 0.4	0,63 ± 0.016)	0,02	0,0008	0.2	0.008
Spring plunger 	PN4D2	3,8	13,70	1,3	4,7	22,2 ± 0.4	0,87 ± 0.016	0,04	0,0016	2.3	0.09
Plain lever 	PN4K152	0,3	1,08	0,1	0,36	25,5 ± 1.5	1,00 ± 0.060	3,0	0,12	10.0	0.39
Lever width: 5 mm, 0.2 in											
Plain lever 	PN4K63	0,9	3,20	0,1	0,36	19 ±0.8	0,75 ± 0.032	1,2	0,047	5.6	0.22
Lever width: 5 mm, 0.2 in											
Reverse action plain lever 	PN4KZ56	1,5	5,40	0,5	1,80	8,5 ± 0.8	0,33 ± 0.032	1,0	0,004	6.0	0.24
Lever width: 5 mm, 0.2 in											
Roller lever 	PN4GK48	1,1	4,00	0,2	0,72	30,2 ± 0.8	1,19 ± 0.032	0,9	0,035	4.2	0.165
Roller lever 	PN4GK26	1,7	6,11	0,2	0,72	30,2 ± 0.8	1,19 ± 0.032	0,5	0,02	2.0	0.079

PN4

Operating Characteristics

	Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Operating Position (mm)	(in)	Movement Differential Minimum (mm)	(in)	Over travel (mm)	(in)
Long overtravel plunger		PN41	3,8	13,70	1,3	4,7	21,8 ± 0.7	0,86 ± 0.028	0,04	0,0016	5.5	0.21
Spring plunger - in-line roller		PN4G	3,8	13,70	1,3	4,7	33,3 ± 1.2	1,31 ± 0.047)	0,04	0,0016	3.5	0.14
Spring plunger - across-line roller		PN4GH	3,8	13,70	1,3	4,7	33,3 ± 1.2	1,31 ± 0.047	0,04	0,0016	3.5	0.14

Ordering Reference

Basic type: PN4 — Example: PN4 01

Actuators

01	Plain plunger
1	Panel mount plunger
D2	Spring plunger
G	Plunger with in-line roller
GH	Plunger with across-line roller
GK26	Roller lever 26.0 mm
GK35	Roller lever 35 mm
GK48	Roller lever 48.2 mm
GK63	Roller lever 63 mm
K48	Plain lever 48 mm
K63	Plain lever 63.5 mm
K63X	Plain lever 63 mm without spring
K152	Plain lever 152.0 mm
KZ56	Reverse action roller lever 56.0 mm

Special Features: /☐☐☐☐ Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.

PN4 Terminal cover / Part No: 3.204.0222

Standard

3BR

Characteristics
- choice of IP54 or IP67 sealed versions
- precise movements and exceptional repeat accuracy
- flying lead version available
- long overtravel

Rating 250 VAC, 10 A max.

Dimensions (mm) 53.1 × 20.6 × 30.8

Actuator
- plunger

Approvals UL, CSA

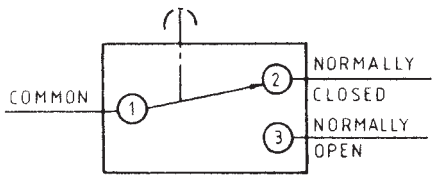
Preferred Range

Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos. (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
3BR103	7,2	26,00	IP54	39,3	1,55	Screw	CO	Plunger	Ag	Up to 125 VAC, 10 A
3BR510	7,2	26,00	IP67	39,3	1,55	Screw	CO	Plunger	Ag	Up to 125 VAC, 10 A

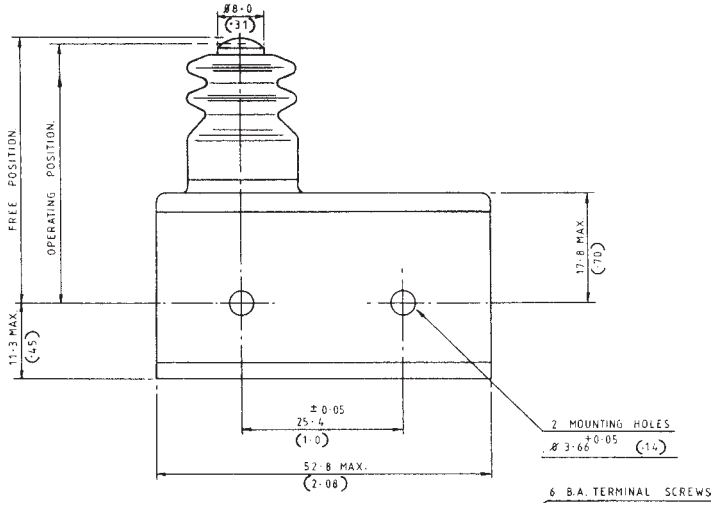
Specifications

Housing	Phenolic
Plunger	Stainless steel
Cowl	Silicone rubber
Mechanism	Single pole change-over
Contacts	Silver
Terminals	Screw terminals with captive washers
Temperature	–10°C to +85°C
Mechanical life	10^6 cycles minimum (impact free actuation)
Protection	3BR / 510 IP67 / 3BR103 IP54 (enclosure)
Mounting	Side mounting

Circuit diagram



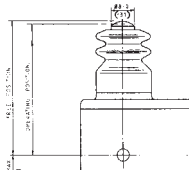
Dimensions



Recommended maximum electrical ratings

Voltage (max)	Load (A)	Horsepower	Approval
250 VAC	5 (0.75 pf)	-	CSA 22.2 No. 55 - 6,000 operations
125 VAC	10 (0.75 pf)	-	CSA 22.2 No. 55 - 6,000 operations
250 VAC	-	¼ HP (0.45 pf)	CSA 22.2 No. 55 - 6,000 operations
125 VAC	-	⅛ HP (0.45 pf)	CSA 22.2 No. 55 - 6,000 operations
0 - 15 VDC	10	-	General rating - 50,000 operations
15 - 30 VDC	5	-	General rating - 50,000 operations

Operating Characteristics

Actuator		Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Operating Position (mm)	(in)	Movement Differential Maximum (mm)	(in)	Overtravel (mm)	(in)
Plunger		3BR103 3BR/510	7,2	26,00	1,7	6	40,8	1,6	39,3 ± 0.4	1,55 ± 0.016	0,08	0,003	4,6	0,18

Ordering Reference

Example: 3BR | SH

Basic type: 3BR

Environmental sealing:
- SH — Sealed terminals with horizontal exiting 500 mm cables
- 103 — Sealed to IP54
- 510 — Sealed to IP67

Special Features: /☐☐☐☐ — Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.

Standard

K5

Characteristics	■ double break switching ■ long mechanical life ■ high electrical rating ■ faston terminals
Rating	250 VAC, 16 A
Dimensions (mm)	41 × 19 × 15.5
Actuator	■ plunger ■ ramp plunger ■ plain lever ■ roller lever
Approvals	UL, CSA

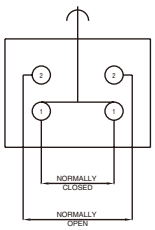
Preferred Range

Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos. (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
K5UL	2,8	10,00	IP40	17,4	0,68	Faston	SPDT	Plunger	Ag	Up to 250 VAC, 16 A
K5CUL	2,8	10,00	IP40	16,7	0,66	Faston	SPDT	Ramp plunger	Ag	Up to 250 VAC, 16 A
K5KUL	1,4	5,00	IP40	20,3	0,80	Faston	SPDT	Plain lever	Ag	Up to 250 VAC, 16 A
K5KRUL	1,5	5,40	IP40	32,0	1,26	Faston	SPDT	Roller lever	Ag	Up to 250 VAC, 16 A
K5QUL	2,8	10,00	IP40	17,9	0,71	Faston	SPDT	Spring plunger	Ag	Up to 250 VAC, 16 A

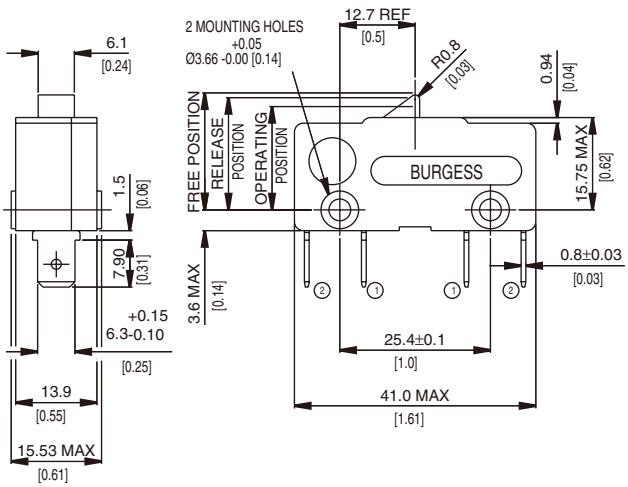
Specifications

Housing	Glass fibre reinforced nylon
Plunger	Nylon
Mechanism	Two circuit double break change-over
Contacts	Silver
Terminals	6.3 mm (0.25 in) faston
Temperature range	–10°C to +85°C
Mechanical life	10^6 cycles minimum (impact free actuation)
Type of protection	IP40 (enclosure)
Mounting	Side mounting
Actuators	Plain lever – stainless steel, roller lever - stainless steel, nylon roller

Circuit diagram



Dimensions

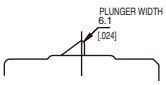
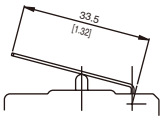
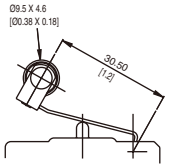
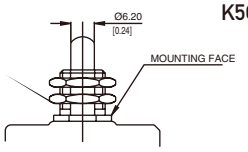


Recommended maximum electrical ratings

Voltage (max)	Load (A)	Horsepower	Approval
250 VAC	16 (0.75 pf)		UL 1054/CSA 22.2 No. 55 - 6,000 operations
125 VAC	16 (0.75 pf)		UL 1054/CSA 22.2 No. 55 - 6,000 operations
250 VAC		¾ HP	UL 1054 6,000 operations
125 VAC		¾ HP	UL 1054 6,000 operations
0 - 15 VDC	15		General rating - 50,000 operations
15 - 30 VDC	10		General rating - 50,000 operations

Values shown are recommended maximum ratings for single circuit switching

Operating Characteristics

Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Operating Position (mm)	(in)	Movement Differential Maximum (mm)	(in)	Overtravel (mm)	(in)
Plunger 	K5UL	2,8	10,00	1,1	4	19,7	0,78	17,4 ± 0.7	0,68 ± 0.028	1,27	0,05	*	
Ramp plunger 	K5CUL	2,8	10,00	1,10	4,00	19,7	0,78	16,7 ± 0.7	0,66 ± 0.028	2,2	0,09	*	
Plain lever 	K5KUL	1,4	5,00	0,35	1,25	28,0	1,10	20,3 ± 1.5	0,80 ± 0.06	3,2	0,13	*	
Roller lever 	K5KRUL	1,5	5,40	0,38	1,28	38,6	1,52	32,0 ± 1.5	1,26 ± 0.06	3,2	0,13	*	
Spring plunger 	K5QUL	2,8	10,00	1,10	4,00	20,6	0,81	17,9 ± 0.7	0,71 ± 0.028	1,27	0,05	4,6	0,18

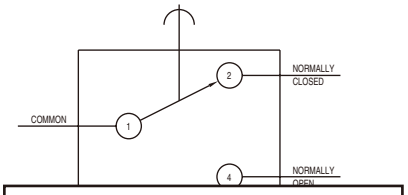
* Plunger can be depressed flush with housing. The housing should not be used as an end stop.

Ordering Reference

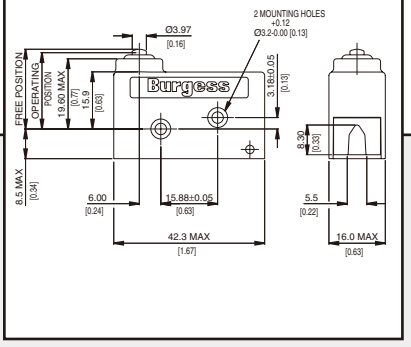
Basic type	K5	Example: K5 C UL
Actuators		No symbol, plain plunger
	C	Ramp plunger
	K	Plain lever 33.5 mm
	KR	Roller lever 30.5 mm
	Q	Spring plunger
Approvals	UL	UL and CSA approval
Special Features	/□□□□	Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.

Metal housed Switches

Circuit diagram



Dimensions



V9N

Characteristics	■ sealed (IP67) ■ metal housed ■ screw terminals or flying leads
Rating	250 VAC, 10 A max.
Dimensions (mm)	42 × 24.5 × 16
Actuator	■ plunger ■ plain levers ■ reverse action levers ■ roller levers
Approvals	UL and CSA

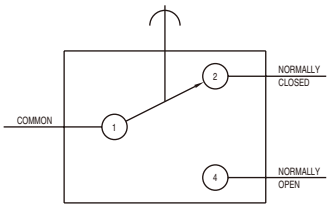
Preferred Range

Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos. (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
V9N	5,5	19,80	IP67	21,3	0,840	M3 screw	CO	Plunger	Ag	Up to 250 VAC, 10 A
V9NLR	6,0	21,60	IP67	27,5	1,080	M3 screw	CO	Roller lever - short	Ag	Up to 250 VAC, 10 A
V9NLR1	4,5	16,20	IP67	34,5	1,360	M3 screw	CO	Roller lever - long	Ag	Up to 250 VAC, 10 A
V9NL	3,0	10,80	IP67	24,7	0,970	M3 screw	CO	Plain lever	Ag	Up to 250 VAC, 10 A

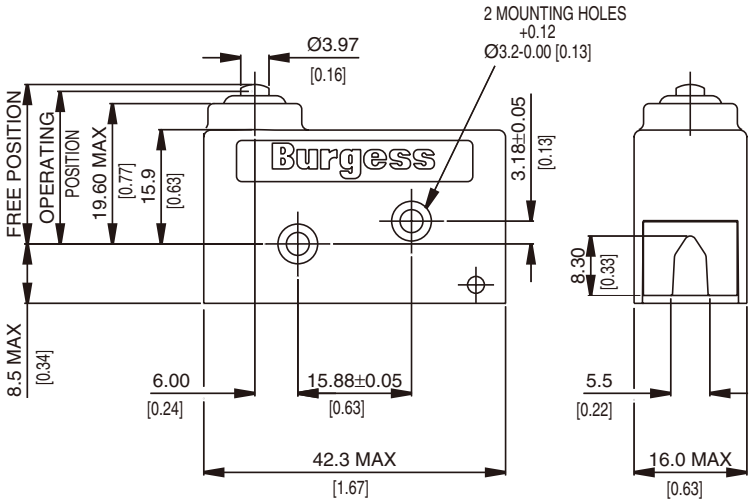
Specifications

Housing	Zinc diecasting
Plunger	Acetal
Mechanism	Snap-action, single pole
Functions	Change-over
Cowl	Silicon rubber
Contacts	Silver
Terminals	M3 screws with captive washers or pre-wired
Temperature range	–40°C to +125°C, switch only -10°C to +85°C pre-wired
Mechanical life	10^6 cycles minimum, impact-free actuation
Protection	IP67 (enclosure)
Mounting	Side mounting
Actuators	Plain levers - stainless steel, roller levers - stainless steel, nylon roller

Circuit diagram



Dimensions



Recommended maximum electrical ratings

Voltage (max)	Load (A)	Approval
250 VAC	10 (0.75 pf)	UL 1054/CSA 22.2 No. 55 - 6,000 operations (85° C)
0 - 15 VDC	10	General rating - 50,000 operations (85° C)
15 - 30 VDC	10	General rating - 50,000 operations (85° C)

Operating Characteristics

Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Operating Position (mm)	(in)	Movement Differential (mm)	(in)	Over travel Maximum (mm)	(in)
Plunger	V9N	5,5	19,8	1,0	3,6	22,6	0,89	21,3 ± 0.3	0,84 ± 0.012	0,35	0,014	*	
Roller lever - short	V9NLR	6,0	21,6	1,3	4,7	31,0	1,22	27,5 ± 0.5	1,08 ± 0.02	0,35	0,014	*	
Roller lever - long	V9NLR1	4,5	16,2	0,8	2,9	39,0	1,54	34,5 ± 0.7	1,36 ± 0.028	0,60	0,024	*	
Plain lever	V9NL	3,0	10,8	0,6	2,1	31,0	1,22	24,7 ± 01.0	0,97 ± 0.039	0,70	0,028	*	
Reverse action lever - short	V9NM	7,5	27,0	1,5	5,4	26,0	1,02	22,4 ± 0.5	0,88 ± 0.02	0,50	0,020	3,50	0,137
Reverse action lever - long	V9NML	4,5	16,2	1,0	3,6	29,0	1,14	23,6 ± 01.0	0,93 ± 0.039	1,20	0,047	6,00	0,236
Reverse action roller lever - short	V9NMR	9,5	34,2	1,5	5,4	36,0	1,42	32,9 ± 0.5	1,295 ± 0.02	0,45	0,018	2,00	0,079
Reverse action roller lever - long	V9NMLR	5,0	18,0	1,0	3,6	39,5	1,56	34,0 ± 01.0	1,34 ± 0.039	1,00	0,039	5,50	0,216

Operating characteristics are specified from lower mounting hole

* Plunger can be depressed flush with housing. The housing should not be used as an end stop.

Ordering Reference

			Example: V9N	L	H
Basic typ	V9N				
Actuators		No symbol, without lever			
	L	Plain lever 44.5 mm			
	LE	Reverse-action lever with uni-directional roller 32.3 mm			
	LR	Roller lever 22.2 mm			
	LR1	Roller lever 32.3 mm			
	M	Reverse action lever 187.2 mm			
	ML	Reverse action lever 28.7 mm			
	MR	Reverse action roller lever 14.0 mm			
	MLR	Reverse action roller lever 25.5 mm			
Terminals		No symbol, unwired			
	H	Horizontal pre-wired cable			
	V	Vertical pre-wired cable			
Pre-wired with Terminals H + V		No symbol, 1 m cable			
Special Features	/☐☐☐☐	Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.			

4BR

Characteristics	■ choice of IP54 or IP67 sealed versions ■ precise movements and exceptional repeat accuracy ■ robust metal housing ■ flying lead version available ■ long overtravel
Rating	250 VAC, 15 A max.
Dimensions (mm)	53,1 × 20,6 × 29,2
Actuator	■ plunger
Approvals	UL, CSA

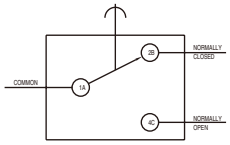
Preferred Range

Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos. (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
4BR	7,2	26,00	IP54	39,3	1,550	Screw	CO	Plunger	Ag	Up to 250 VAC, 15 A
4BR510	7,2	26,00	IP67	39,3	1,550	Screw	CO	Plunger	Ag	Up to 250 VAC, 15 A
4BRSH	7.2	26,00	IP67	39,3	1,550	Pre-wired	CO	Plunger	Ag	Up to 250 VAC, 15 A

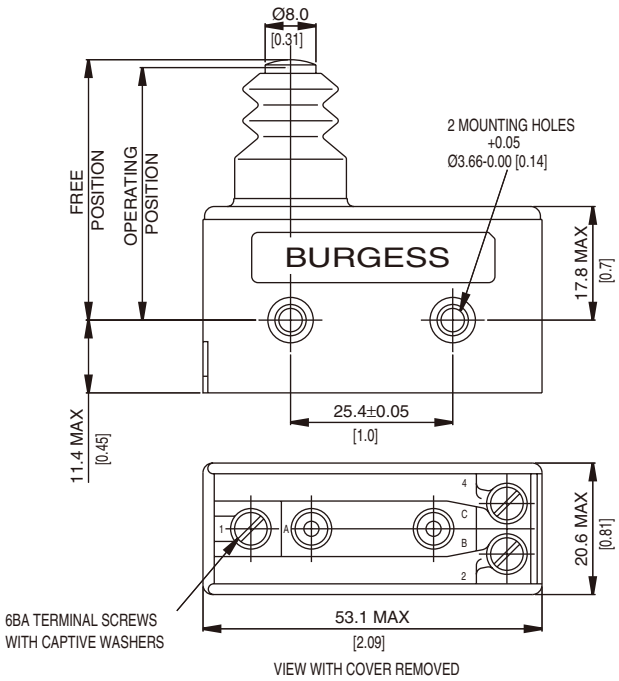
Specifications

Housing	Zinc based alloy
Base Plate	Phenolic
Plunger	Stainless steel
Cowl	Silicon rubber
Mechanism	Single pole change-over
Contacts	Silver
Terminals	Removable screw terminals, insulated cover plate
Temperature	–10°C to +85°C
Mechanical life	10^6 cycles minimum (impact free actuation)
Protection	4BR/510 IP67 / 4BR IP54 (enclosure)
Mounting	Side mounting

Circuit diagram



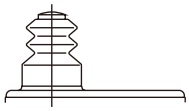
Dimensions



Recommended maximum electrical ratings

Voltage (max)	Resistive load (A)	Inductive load	Horsepower	Approval
250 VAC	5 (0.75 pf)	5	-	CSA 22.2 No. 55 - 6,000 operations
125 VAC	10 (0.75 pf)	-	-	CSA 22.2 No. 55 - 6,000 operations
250 VAC	-	-	¼ HP (0.45 pf)	CSA 22.2 No. 55 - 6,000 operations
125 VAC	-	-	⅛ HP (0.45 pf)	CSA 22.2 No. 55 - 6,000 operations
0 - 15 VDC	10	-	-	General rating - 50,000 operations
15 - 30 VDC	5	-	-	General rating - 50,000 operations

Operating Characteristics

Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Operating Position (mm)	(in)	Movement Differential Maximum (mm)	(in)	Over travel (mm)	(in)
Plunger 	4BR	7,2	26,00	1,7	6	40,8	1,6	39,3 ± 0.4	1,55 ± 0.016	0,08	0,003	4,6	0,18
	4BR/510	7,2	26,00	1,7	6	40,8	1,6	39,3 ± 0.4	1,55 ± 0.016	0,08	0,003	4,6	0,18
	4BR/SH	7,2	26,00	1,7	6	40,8	1,6	39,3 ± 0,4	1,55 ± 0,016	0,08	0,003	4,6	0,18

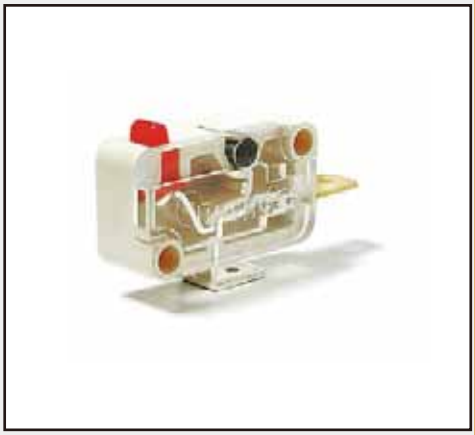
Ordering Reference

Basic type: 4BR

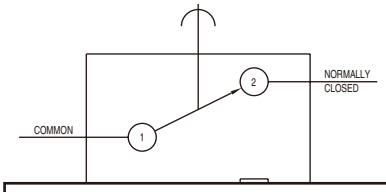
Example: 4BR SH

Environmental sealing	SH	Sealed terminals with horizontal exiting 500 mm cables
	103	Sealed to IP54
	510	Sealed to IP67
Special Features	/□□□□	Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.

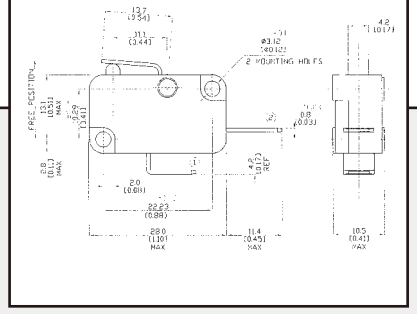
Positive-action Switches



Locknut mounting



Dimensions



BVM3

BVM3F

Characteristics	■ positive-action (forced break) contacts ■ > 3 mm contact gap at full travel ■ internationally recognized V3 housing ■ faston terminals
Rating	250 VAC, 10 A
Dimensions (mm)	28 × 16 × 10.5
Actuator	■ plunger ■ plain lever ■ roller lever
Approvals	UL, CSA and ENEC

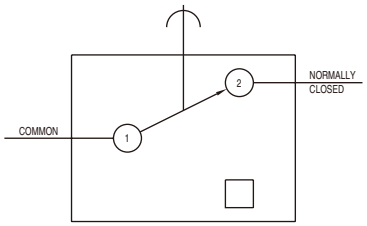
Preferred Range

Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Terminal	Circuit	Actuator	Contacts	Electrical rating
BVM3FULS	4.5	16.2	IP40	Faston	NC	Plunger	Ag/Ag nickel	Up to 250 VAC, 10 A
BVM3FYULS	4.5	16.2	IP40	Faston	NC	Plain lever	Ag/Ag nickel	Up to 250 VAC, 10 A
BVM3FYRULS	5.0	18.0	IP40	Faston	NC	Roller lever	Ag/Ag nickel	Up to 250 VAC, 10 A

Specifications

Housing	Glass reinforced nylon
Plunger	Nylon
Mechanism	> 3 mm gap, positive-action, single pole
Functions	Normally closed
Contacts	Fixed silver nickel, Moving silver
Terminals	6.3 mm (0.25 in) faston NC (2) - brass, Common (1) - brass, Ag-plated
Temperature range °C	–40°C to +85°C
Mechanical life	10^6 cycles minimum, impact-free actuation
Protection	IP40 (enclosure)
Mounting	Side mounting
Actuators	Plain lever - stainless steel, roller lever - stainless steel, nylon roller
Lid	Polycarbonate

Circuit diagram



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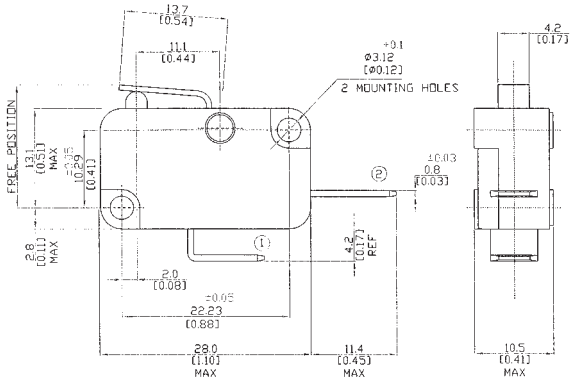
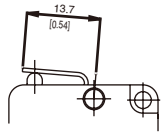
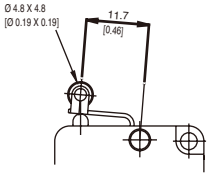


Recommended maximum electrical ratings

Voltage (max)	Load (A)	Horsepower	Approval
250 VAC	10 (0.75 pf)	-	ULS 1054/CSA 22.2 No. 55 - 100,000 operations
250 VAC	-	½ HP	ULS 1054 - Horsepower - 6,000 operations
250 VAC	10 (3)	-	EN 61058-I T85 50,000 operations
125 VAC	-	½ HP	ULS 1054 - Horsepower - 6,000 operations
0 - 15 VDC	10	-	General rating - 50,000 operations
15 - 30 VDC	7	-	General rating - 50,000 operations

Operating Characteristics

Actuator		Reference	Actuating Force at contact break Maximum (N)	(ozf)	Actuating Force at total travel Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Contact gap at total travel Minimum (mm)	(in)
Plunger		BVM3FULS	4,5	16,2	4,8	17,3	15,8	0,62	3,0	0,12
Y Lever		BVM3FYULS	4,5	16,2	4,8	17,3	16,8	0,66	3,0	0,12
YR Lever		BVM3FYRULS	5,0	18,0	5,5	19,8	22,35	0,88	3,0	0,12

Operating characteristics are specified from the mounting holes.

Total travel: Plunger can be depressed flush with housing. The housing should not be used as an end stop.

Ordering Reference

			Example: BVM3	F	Y	ULS
Basic type	BVM3					
Terminals	F	Faston 6.3 × 0.8 mm				
Actuators		No symbol, without lever				
	Y	Straight lever 13.7 mm				
	YR	Roller lever 11.7 mm				
Approvals	ULS	UL 100 k operations and CSA approval				
Special Features	/□□□□	Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.				

KB5

KB5

Characteristics	■ positive-action forced double break switching ■ > 3 mm contact gap at full travel ■ high electrical rating ■ faston terminals
Rating	Up to 250 VAC, 20 A
Dimensions (mm)	41 × 19,5 × 15.5
Actuator	■ plunger ■ plain lever ■ roller levers
Approvals	UL, CSA

Preferred Range

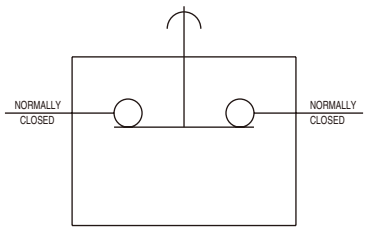
Ordering Reference	Actuating Force (N)	(ozf)	Sealing	Operating pos (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
KB5FULS	3.00	10.0	IP40	16.8	0.66	Faston	NC	Plunger	Ag	Up to 250 VAC, 20 A
KB5FKULS	2.25	8.0	IP40	19.2	0.76	Faston	NC	Plain lever	Ag	Up to 250 VAC, 20 A
KB5FKRULS	2.25	8.0	IP40	31.0	1.22	Faston	NC	Roller lever	Ag	Up to 250 VAC, 20 A

KB5

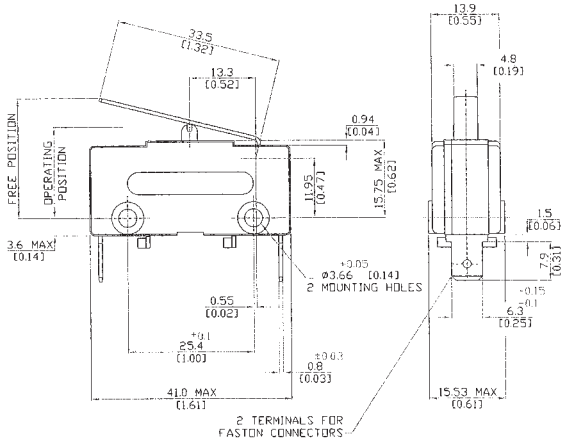
Specifications

Housing	Polycarbonate
Plunger	Nylon
Mechanism	Single pole, double break, positive action
Functions	Normally closed
Contacts	Fixed – silver, Moving – silver cadmium oxide
Terminals	6.3 mm (0.25 in) faston, brass
Temperature range	–40°C to +85°C
Mechanical life	10^7 cycles minimum, impact-free actuation
Protection	IP40 (enclosure)
Mounting	Side mounting
Actuators	Plain lever - stainless steel, roller lever - stainless steel, nylon roller
Approvals	UL and CSA

Circuit diagram



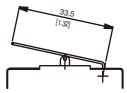
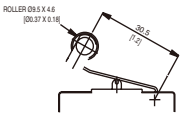
Dimensions



Recommended maximum electrical ratings

Voltage (max)	Resistive load (A)	Inductive load	Horsepower	Approval
250 VAC	20 (0.75 pf)	-	-	ULS 1054/CSA 22.2 No. 55 - 100,000 operations
250 VAC	-	-	2 HP	ULS 1054 - Horsepower - 6,000 operations
125 VAC	-	-	1 HP	ULS 1054 - Horsepower - 6,000 operations
0 - 15 VDC	15	-	-	General rating - 50,000 operations
15 - 30 VDC	10	-	-	General rating - 50,000 operations

Operating Characteristics

	Actuator	Reference	Actuating Force (N)	(ozf)	Operation Position (mm)	(in)	Free Position Maximum (mm)	(in)	Contact gap at total travel Minimum (mm)	(in)
Plunger		KB5FULS	3,00	10,8	16,8	0,66	19,3	0,76	2 × 3.0	2 × 0.12
K Lever		KB5FKULS	2,25	8,0	19,2	0,76	26,0	1,02	2 × 3.0	2 × 0.12
KR Lever		KB5FKRULS	2,25	8,0	31,0	1,22	36,5	1,40	2 × 3.0	2 × 0.12

[1] At contact separation of 2 × 1,5 mm

Recommended minimum contact separation 2 × 1.5 mm (2 × .06) indicated when groove in plunger lines up with case.
Operating characteristics are specified from mounting holes.

Total travel: Plunger can be depressed flush with housing. The housing should not be used as an end stop.

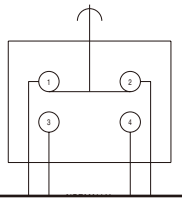
Ordering Reference

			Example: KB5	F	K	ULS
Basic type	KB5					
Terminals	F	Faston 6.3 × 0.8 mm				
Actuators		No symbol, without lever				
	K	Plain lever 33.5 mm				
	KR	Roller lever 30.5 mm				
Approvals	ULS	UL 100 k operations and CSA approved				
Special Features	/☐☐☐☐	Burgess specialise in customer specific solutions. Additional product variants are available or can be provided. If your requirements cannot be satisfied from the options listed, please contact www.saia-burgess.com or your local SB outlet.				

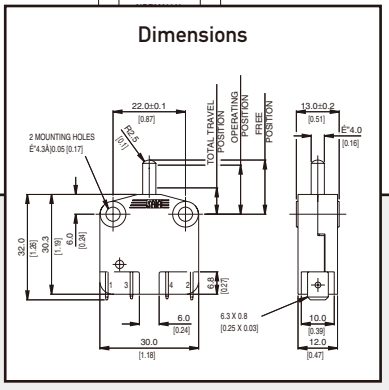
Standard

Forced break Switches

Circuit diagram



Dimensions



JOHNSON ELECTRIC
innovating motion

XP

Characteristics	■ forced double break switching ■ positive-action force break option ■ > 3 mm contact gap at full travel option ■ faston terminals
Rating	400 VAC, 16 A
Dimensions (mm)	30 × 32 × 12
Actuator	■ plain plunger ■ mushroom plunger ■ plunger with external spring (for increased reset security)
Approvals	ENEC, UL, CSA

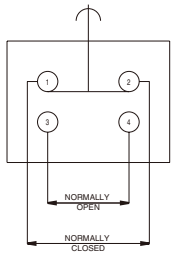
Preferred Range

Ordering Reference	Actuating Force (N)	(ozf)	Operating pos. (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
XP2Z11	3,0	10,0	14,9	0,587	Faston	CO	Straight plunger	Ag nickel	Up to 400 VAC, 16 A
XP42Z11	1,8	6,2	14,9	0,587	Faston	NC	Straight plunger	Ag nickel	Up to 400 VAC, 16 A
XP52Z11	3,0	10,0	13,0	0,511	Faston	NO	Straight plunger	Ag nickel	Up to 400 VAC, 16 A
XP52E1Z11	6,5	23,3	13,0	0,511	Faston	NO	Mushroom plunger, reset	Ag nickel	Up to 400 VAC, 16 A
XP2E2Z11	3,0	10,0	14,9	0,587	Faston	CO	Mushroom plunger, reset	Ag nickel	Up to 400 VAC, 16 A

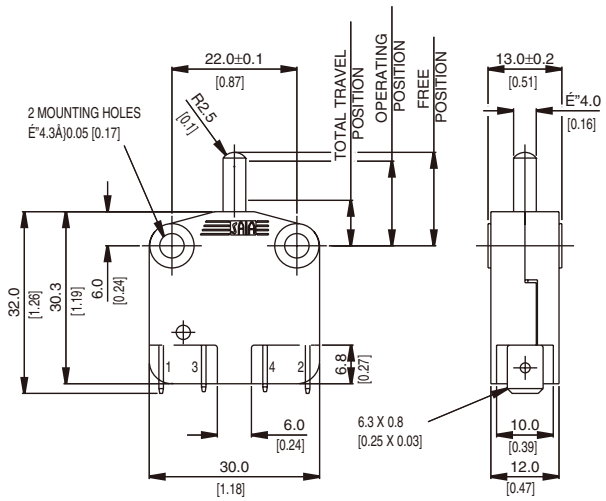
Specifications

Housing	Glass fibre reinforced nylon
Plunger	Glass fibre reinforced nylon
Mechanism	Change-over, normally open, normally closed
Contacts	Silver
Terminals	6.3 mm (0.25 in) faston brass
Temperature range °C	–20°C to +140°C
Mechanical life	10^7 cycles minimum (impact free actuation)
Protection	IP40 (enclosure)
Mounting	Screw mounting
Actuators	Straight or mushroom plunger
Special features	Optional reset spring for increased reset security

Circuit diagram



Dimensions



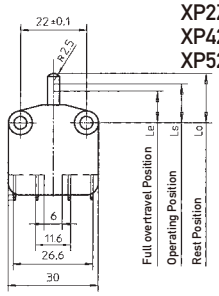
Recommended maximum electrical ratings

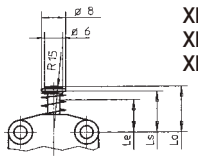
Voltage (max)	Resistive load (A)	Inductive load	Horsepower	Approval
250 VAC	16 (0.75 pf)	-	-	UL 1054/CSA 22.2 No. 55 - 6,000 operations
125 VAC	-	-	¼ HP (0.45 pf)	UL 1054 - Horsepower- 6,000 operations
250 VAC	-	-	¼ HP (0.45 pf)	UL 1054 - Horsepower- 6,000 operations
250 VAC	16	6	-	EN.60158-1 T85 (°C) 50,0000 operations
400 VAC	16	4	-	EN.60158-1 T140 (°C) 10,0000 operations
0-15 VDC	10	-	-	General rating - 50,000 operations
15-30 VDC	7	-	-	General rating - 50,000 operations

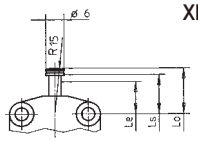
Forced break

Operating Characteristics

Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Operating Position (mm)	(in)	Total Travel Position Maximum (mm)	(in)	Over travel (mm)	(in)
Straight plunger	XP2Z11	3,00	10,0	5,5	19,7	15,3	0,602	14,9 ± 0.4	0,587 ± 0.016	8,0	0,315	4,5	0,177
	XP42Z11	1,75	6,20	5,5	19,7	15,3	0,602	14,9 ± 0.4	0,587 ± 0.016	8,0	0,315	6,5	0,256
	XP52Z11	3,00	10,0	5,5	19,7	16,6	0,653	13,0 ± 0.4	0,511 ± 0.016	8,0	0,315	4,5	0,177
Mushroom plunger with reset spring	XP2E1Z11	6,5	23,3	9,0	32,3	15,3	0,602	14,9 ± 0.4	0,587 ± 0.016	10,5	0,413	2,1	0,082
	XP42E1Z11	3,75	13,4	9,0	32,3	15,3	0,602	14,9 ± 0.4	0,587 ± 0.016	10,5	0,413	4,0	0,157
	XP52E1Z11	6,5	23,3	9,0	32,3	16,6	0,653	13,0 ± 0.4	0,511 ± 0.016	10,5	0,413	2,1	0,082
Mushroom plunger	XP2E2Z11	3,0	10,0	5,5	19,7	15,3	0,602	14,9 ± 0.4	0,587 ± 0.016	8,6	0,339	4,0	0,157







Ordering Reference

Example: XP 2 2 E1 Z11

Basic type	XP	Momentary
	XPS	Positive action forced break (normally closed only)
Circuit	2	Change-over
	4	Normally closed
	5	Normally open
Terminals	2	Faston 6.3 × 0.8
Actuators		No symbol, straight plunger
	E1	Mushroom plunger with reset spring
	E2	Mushroom plunger
Approvals	Z11	UL, cUL, CSA and ENEC

XT

Characteristics	■ 8 mm contact gap, creepage and clearance distances ■ forced double break contacts
Rating	400 VAC, 16,5 A max.
Dimensions (mm)	30 × 32 × 12
Actuator	■ shrouded plunger ■ optional key ■ plain plunger
Approvals	UL, cUL, CSA, ENEC

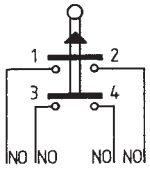
Preferred Range

Ordering Reference	Actuating Force (N)	(ozf)	Operating pos. (mm)	(in)	Terminal	Circuit	Actuator	Contacts	Electrical rating
XTD22AZ1	3,8	13,6	13,0	0,511	Faston	NO	Plunger	Ag nickel	Up to 400 VAC, 16.5 A

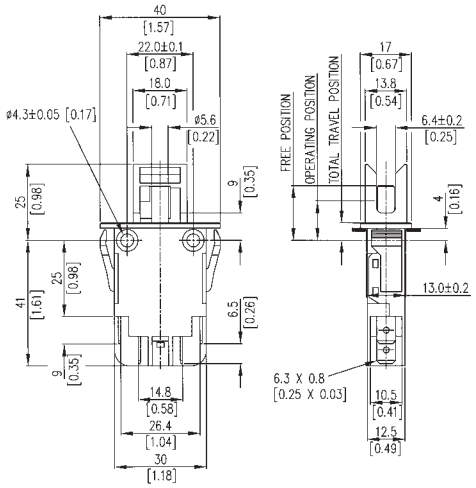
Specifications

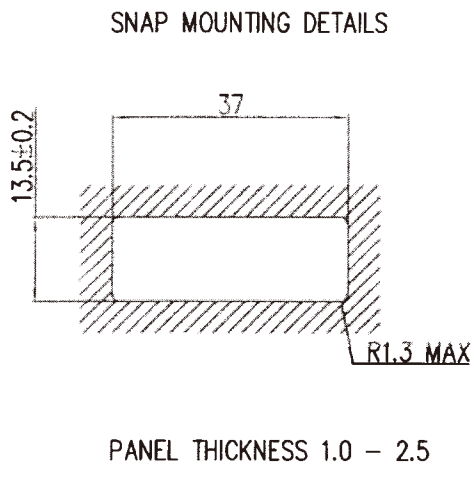
Housing	Glass fibre reinforced polyester
Plunger	Glass fibre reinforced polyester
Mechanism	Normally open
Contacts	Silver nickel
Terminals	6.3 mm (0.25 in) faston - brass
Temperature range °C	–20°C to +85°C
Mechanical life	10^6 cycles minimum (impact free actuation)
Protection	IP40 (enclosure)
Mounting	Snap-on or screw mounting
Actuator	Plunger (can be held depressed for maintenance with optional key shrouded option only)
Accessories	Maintenance key N41784 and multiplug housing XTMHSG

Circuit diagram



Dimensions



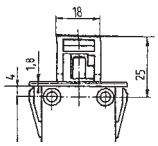


Forced break

Recommended maximum electrical ratings

Voltage (max)	Load (A)	Inductive load	Horsepower	Approval
125 VAC	15.5 (0.75 pf)	-	-	UL 1054/CSA 22.2 No. 55 - 100,000 operations
250 VAC	15.5 (0.75 pf)	-	-	UL 1054/CSA 22.2 No. 55 - 100,000 operations
125 VAC	-	-	½ HP (0.45 pf)	UL 1054 - Horsepower- 100,000 operations
250 VAC	-	-	½ HP (0.45 pf)	UL 1054 - Horsepower- 100,000 operations
125 VAC	-	-	1½ HP (0.45 pf)	UL 1054 - Horsepower- 100,000 operations
250 VAC	-	-	1½ HP (0.45 pf)	UL 1054 - Horsepower- 100,000 operations
30 VAC	0,5	-	-	EN.60158-1 T85 (°C) 50,0000 operations
400 VAC	16,5	8	-	EN.60158-1 T85 (°C) 50,0000 operations
30 VDC	0,5	-	-	UL 1054/CSA 22.2 No. 55 - 6,000 operations

Operating Characteristics

	Actuator	Reference	Actuating Force Maximum (N)	(ozf)	Release Force Minimum (N)	(ozf)	Free Position Maximum (mm)	(in)	Operating Position (mm)	(in)	Total Travel Position Maximum (mm)	(in)	Over travel (mm)	(in)
Plunger		XTD22AZ1	3,8 (± 0.5)	13,600 (± 3.5)	5,8	20,8	18,0	0,708	13,0 ± 0.4 (main contact)	0.511 ± 0.016	10,0	0,394	3,0	0,118
									12,6 (low voltage contact)	0,496				

Ordering Reference

Example: XTD | 22 | J | AZ1

Basic type	XTD	
Terminals	22	6.3 × 0.8 mm faston terminals
	66	4,8 × 0.5 mm faston terminals
Form	–	Without identification: snap-on mounting with shroud
	J	Snap-on mounting without shroud
	P	Without shroud, without snap-on mounting
	K	
Approvals	AZ1	UL, cUL, CSA and ENEC

Forced break

Table of preferred products

Snap-action Microswitches	Type	Preferred Products	Preferred Products	Page
Ultraminiature	F1	F1T8GPUL	F1T8Y1GPUL	18
	F4	F4T7UL F4T7GPUL F4T7Y1UL	F4T7Y1GPUL F4T7YCUL F4T7YCGPUL	21
	F5	F5T8UL F5T8GPUL F5T8Y1UL	F5T8Y1GPUL F5T8YCUL F5T8YCGPUL	24
	F1NS	F1NST8 F1NST8A1	F1NST8AC	27
	F6	F6T85		30
	FK4	FK4T7UL FK4T7Y1UL FK4T7YCUL	FK4T8UL FK4T8Y1UL FK4T8YCUL	33
Subminiature	V4L	V4LS V4LSA1 V4LSA2 V4LST7	V4LST7A1 V4LST7A2 V4LT7	37
Miniature torque	600	BBR/R-51		42
Miniature sealed	V3S	V3SUL V3SYRUL	V3SYR1UL V3SY1UL	44
Standard	PN4	PN401 PN402 PN402 PN4K152 PN4K63 PN4KZ56	PN4GK48 PN4GK26 PN41 PN4G PN4GH	48
	3BR	3BR103	3BR510	52
	K5	K5UL K5CUL K5KUL	K5KRUL K5QUL	54
Metal housed	V9N	V9N V9NLR V9NLR1 V9NL V9NML V9NV	V9NLRV V9NLR1V V9NLV V9NMLV V9NMRV V9NMLRV	58
	4BR	4BR	4BR510	62
Miniature	BVM3	BVM3FULS BVM3FYULS	BVM3FYRULS	66
	KB5	KB5FULS KB5FKULS	KB5FKRULS	69
Forced break	XP	XP2Z11 XP42Z11 XP52Z11 XP2E1Z11	XP42E1Z11 XP52E1Z11 XP2E2Z11	73
	XT	XTD22AZ1		76

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The data used in this Product Overview may be used as a guideline only. Specific operational characteristics of our products may vary according to individual applications. It is strongly recommended that specific operating conditions are clarified with Johnson Electric before application.

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All data may be subject to change without notice.