

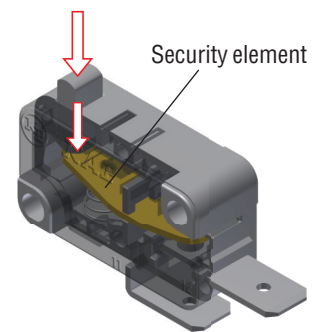
## INSTALLATION INSTRUCTIONS

### ⚠ WARNING

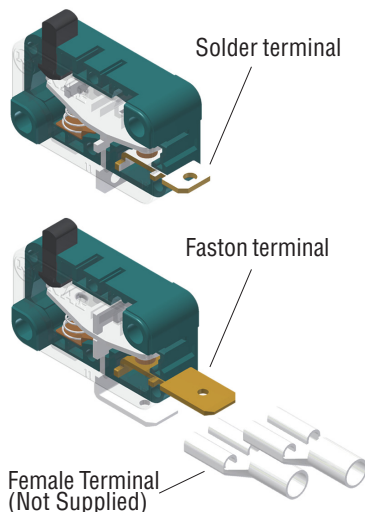
- Turn off the power to make electrical connections or before any maintenance on the switch or equipment where it is applied. **Electric shock will result in death or serious injury.**
- Installation and maintenance services for electrical equipment should be executed only by qualified personnel.
- Read these instructions carefully. Retain instructions for future reference.
- Inappropriate use of the product could result in personal injury and/or property.
- Failure to observe the above precautions may cause irreparable damage to switch.
- To install the product, attempt to the specified limits to ensure a correct performance.
- Do not lubricate or modify the switch at risk of causing the locking mechanism or "short circuit".
- Avoid environments where temperature changes cause condensation or where occur excessive vibration and shock and may damage the proper functioning of the switch.
- Avoid environments where there are explosive or inflammable gas.
- Positive Opening (☞) : attention to the values specified in the catalog to the necessary travel and force to ensure a perfect operation of positive opening system.
- Do not use these products as a mechanical stop.
- Do not use these products as a safety or emergency stop devices or in any other application where the failure of the product could result in personal injury.
- Additional informations: sak@kap.com.br

### 1- Positive Opening

- The symbol ☞ (IEC 60947-5-1 Annex K) identifies a positive opening in the normally closed contact (NC).
- A switch has positive opening when all NC contact elements can be certainly led to open position. There is no elastic connection between the mobile contact and the actuator element where the force is applied.
- With the positive opening system, even with a internal malfunction of the switch, for example welding of contacts, the opening of the NC contact and "shutdown" of the circuit controlled by this switch is guaranteed, provided the "union" strength between the mobile contact and NC contact, does not exceed 10 N (according to item K8.3.7 of IEC 60947-5-1 standard).
- To ensure positive opening, the external actuator element will provide a force on the actuator's switch greater than the necessary force to operate the product in normal use conditions. This force will be applied in the same position of OF.



### 2- Electrical Connections



- Solder terminal:
  - .Soldering at 350 °C. Applying the soldering iron continually for up to 3 s. If necessary, reapply the soldering iron with a minimum interval of 10 s.
  - .Avoid penetration of the soldering or gas flow into the switch. If possible, solder the switch in a favorable position for disposing the solder to flow outside the enclosure and use additional means (continuous airflow) to expel the gases
  - .Do not apply excessive force on the terminals during soldering. Let cool for several minutes before applying any effort.
- Faston terminal (quick-connect):
  - .Avoid the use of solvents in the preparation of the solder terminals. The terminals are ready to receive soldering and require no preparation.
  - .It is not necessary to remove the solder residues on the terminals.
- Faston terminal (quick-connect):
  - .Use female connectors according to IEC 61058-1, appropriated to the specified load and the cable.
  - .When connecting the female connectors, push it until it touches on some mechanical stop (housing, dimple detents or hole detents of the male terminal, etc)
  - .Use appropriate tool to crimp the cable to the female terminal.
  - .Always use new, clean and with suitable pressure connectors for a good electrical contact with the switch terminal.

#### 2.1- Cables (flexible cables)

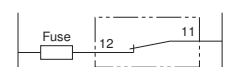
- Recommended cable section: 0,5...0,75 mm<sup>2</sup>
- When installing cables:
  - Use appropriate cables for the applied load.
  - est the fixation drivers before applying the load.

#### 2.2- Short-circuit protective device

- 10A fuse type gG connected in series with the security circuit.

#### 2.3- Circuitry

- Marking: IEC 60947-5-1
- Circuitry: IEC 60947-5-1 form B



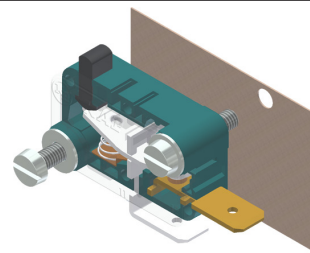
#### 2.4- Low Current Circuits

Do not use switches with low operating force, and if possible add a resistor to the circuit to increase the current controlled by the switch.

## INSTALLATION INSTRUCTIONS - continuation

### 3- Housing Fixing

- Use M3 screws with flat washer
- Fixing torque: 0,2...0,3 Nm / 1.8...2.7 lb.in
- An insulating plate must be inserted between the switch and the mounting position whenever the latter is metallic.

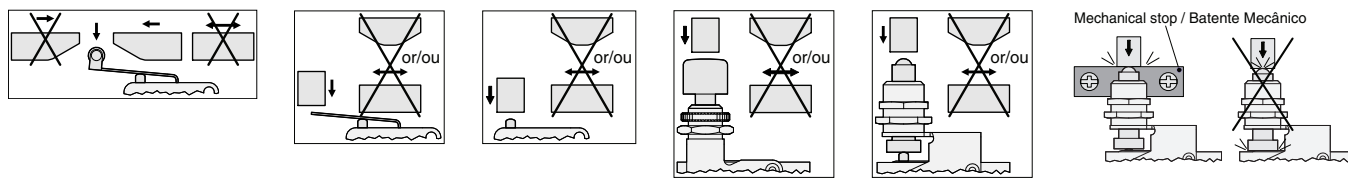


### 4- Technical Data

- In conformity with standards	IEC 60947-5-1/ EN 60947-5-1/ IEC 60947-1/ EN 60947-1/ IEC 60529/ EN 60529
- Utilization Category	AC-15      DC-13
- Rated Operational Voltage (Ue)	240 V      125 V
- Rated Operational Current (Ie)	3 A      0,16 A
- Rated Insulation Voltage (Ui)	300 V
- Conventional Free Air Thermal Current (Ith)	10 A
- Rated Impulse Withstand Voltage (Uimp)	1500 V
- Rated Frequency	50/60 Hz
- Contact Resistance	50 mΩ maximum initial (at 1 A, 5 Vdc)
- Rated Conditional Short-circuit Current	100 A
- Ambient Temperature	+85°C maximum
- Mechanical Durability	1.000.000 cycles until 90 cycles/min max.
- Electrical Durability	10.000 cycles until 6 cycles/min max.
- Operating Speed	8 mm/s minimum until 1 m/s maximum (at pin plunger)
- Degrees of Protection (IEC 60529)	Housing: IP40; terminals: IP00 (non-protected) Protection of equipment: protected against ingress of solid foreign objects >= 1,0 mm diameter (IP4X); non-protected against ingress of water (IPX0) Protection of Persons: against access to hazardous parts with wire (IP4X)
- Pollution Degree	2 (IEC 60947-1)
- Electromagnetic Compatibility (EMC)	not applicable (IEC 60947-1) - Immunity: equipment not incorporating electronic circuits - Emission: electromagnetic disturbances can only be generated by equipment during occasional switching operations and the duration of the disturbances is of the order of milliseconds
- Housing Material	Glass-reinforced polymer

### 5- Operation Recommendations

The correct way to operate the switch may affect significantly their durability. Check below some examples of actuators and their directions of operation.

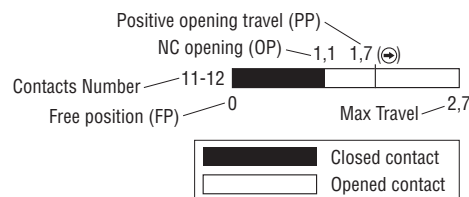
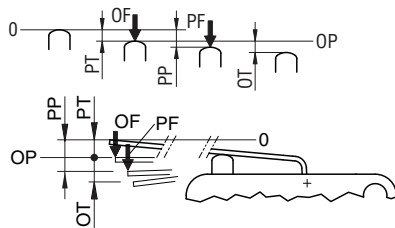


- The manual operation of a metallic actuator can only be done with an intermediate component made of insulating material.
- The attack element should be designed so that the switch does not receive any violent shocks.
- Avoid keeping the actuator pre-activated because this will damage the internal mechanism of switch. The attack element should be designed to keep free the switch actuator when it at rest.
- **For all models use mechanical stop. Do not use these products as a mechanical stop.**

### 6- Travels<sup>①</sup>

#### Terminology::

- OF..... Operation force
- PF..... Positive opening force
- PT..... Pre travel
- FP..... Free position
- OP..... Operating position
- PP..... Positive opening travel
- OT..... Overtravel



① Forces and travels values vary for each model and can be obtained from commercial catalog at [www.kap.com.br](http://www.kap.com.br).



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