

## Notes

### **WARNING for General Applications**

**The use of foot switches on machines, which do not have “point of operation” and “pinch point” protection can cause serious injuries to the operator!**

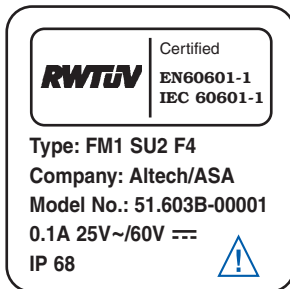
The point of operation and pinch point guarding devices should be properly installed before a foot switch is used. The foot controls should be utilized so that it is impossible for the operator’s hands and fingers to remain within the point of operation during the machine cycle.

**Point of operation** - The point or area of the machine or the equipment where the work piece or material is positioned and work is being performed during any process such as forming, cutting, welding, punching, shearing, assembling, riveting, etc.

**Pinch point** - Any point at which it is possible for a portion of the body to be caught and injured between moving machine or equipment or work piece parts.

### **Additional WARNING for Medical Applications**

Medical environments have high demands for safety and hygiene. The use of inadequate foot switches can cause serious injuries to the user and patient! The Altech/ASA foot switches meet the requirements of IEC 60601-1 for medical electrical equipment.



- **Protection Level IP 68 (Immersion in water)**
- **Limited voltage rating to 25V~ (AC)/60V --- (DC)**
- **UL/CSA, VDE approved switch insert**
- **Installed cable with special pull/bend protection strain relief**
- **Special durability inspection and drop test of housing**
- **Alternative colors to differentiate this special application**

The **IEC 60601-1** certification for this special application is issued by TÜV Essen/RWTÜV. This organization is a Notified Body by the European Union and has Governmental accreditation for all types of certification plans for Medical Devices.

**Nevertheless, it is the responsibility of the user to select the suitable foot switch for his application. Altech can only make suggestions for the proper use in special applications. Otherwise the correct installation and wiring of the foot switch should comply with all Federal, State and Local safety and health regulations.**



## Features Applicable to the FS Series

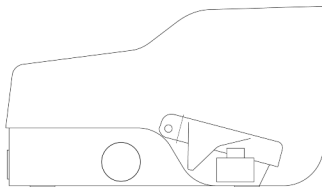


### Safety Foot Switch

To prevent accidents, Altech/ASA has included a special safety foot switch in its line. The concept is based on an extensive survey, which indicated that, in case of an accident the user depresses the foot pedal even harder instead of releasing the pedal. This special safety foot switch is designed to compensate for this emergency situation, by breaking electrical contact when the pedal is completely depressed. It has modified, two stage momentary contact types, with a manual reset button.

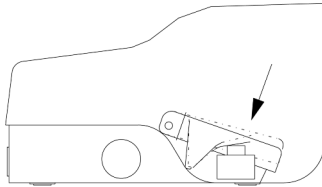
### Safety Foot Switch Functions

“OFF”



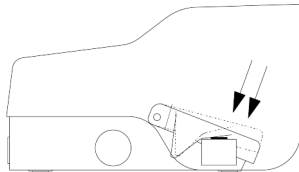
**Step 1:** The pedal is not depressed. The contacts are open. The machine is turned off.

“ON”



**Step 2:** To start the machine, the pedal must be depressed until the “pressure point”, where resistance is noticeable.

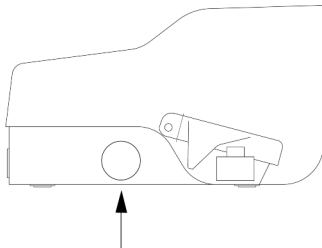
“EMERGENCY -  
OFF”



**Step 3:** In an emergency, if the pedal is depressed beyond the pressure point, the machine will stop. Beyond the pressure point, the contacts are locked in the “OFF” - Position. The machine cannot operate at this time.

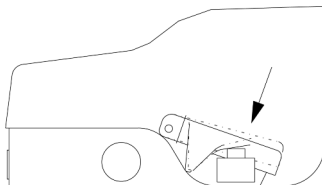
Note: The machine can also be stopped, by releasing the pedal instead of depressing harder. (Back to Step 1)

“RESET”



**Step 4:** The push button on the side of the foot switch must be pushed by hand to enable the foot switch to start the machine function again.

“ON”



**Step 5:** Return to condition described in Step 2.

The safety foot switch is available in the one and two pedal heavy duty with guard versions. See pages 20 and 22 for more information on the FS1 ... U and FS2 ... U Series.

## Features Applicable to the FL and FS Series\*

### Foot Guards

Foot Guards are used to prevent accidentally actuating the foot switch by falling objects such as parts and tools.

Most European accident prevention standards such as the German Berufsgenossenschaft (BG) (similar function to OSHA) require foot guards for many applications. In addition there is a special space under the guard, where certain devices such as, emergency off switches and contactors can be mounted.



### Foot Rests

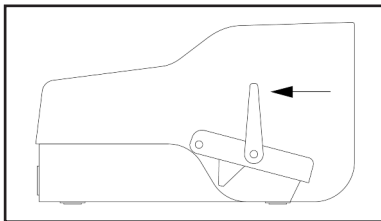
Ergonomically designed foot rests help reduce fatigue that may set in after operating a foot switch for an extended period of time.

Foot rests are available on the one pedal versions of the FL and FS series, with or without a guard.

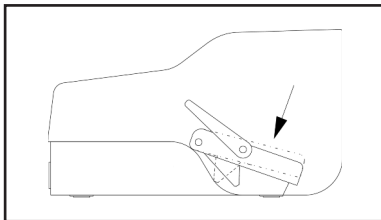


### Anti-Trip Lever Mechanism

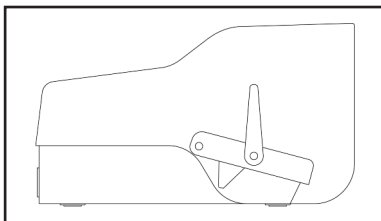
(Prevents the pedal from accidental actuation)



**Step 1:** To depress the pedal, the Anti-Trip lever must be pushed forward. Otherwise, a spring loaded mechanism holds the lever in position.



**Step 2:** After the lever is pushed forward, the pedal can be easily depressed.



**Step 3:** Immediately after releasing the pedal, the spring loaded mechanism brings the lever back to its starting position.

**The maximum human safety and machine protection is provided by the combination of Anti-Trip lever mechanism and Foot Guards!**

### Potentiometers

Foot switches can be ordered with built-in potentiometers to change speed, etc. Typical applications include:

- Coil Winding Machines
- Machine Tools
- Medical Facilities
- Pumps
- Sewing Machines
- Welding Machines

Function: In the "OFF" position the potentiometer is at "zero". A microswitch connected in series to the potentiometer will only provide a voltage to the potentiometer once the foot switch has been activated.



The standard resistance of the potentiometer foot switch is 10k Ohm which provides a proportional signal depending on the position of the foot pedal (Resistances of 100 Ohm to 20k Ohm are also available). Potentiometers are available for the FL and FS Series.

### Two Stage Function

The following describes the mechanical operation of two momentary contact types:

**Stage 1:** To activate the first momentary contact, depress the pedal until resistance is noticeable.

**Stage 2:** To activate the second momentary contact, press the pedal beyond the resistance point.

Both functions are now turned on. By releasing the pedal, the functions will be turned off in reversed direction.



\* The two stage function is applicable to all foot switches.



# Switch Specifications

## Contact Types

### • Momentary

To start the function, press the pedal.  
Release the pedal to stop.  
(Press to start - Release to stop)

### • Maintained

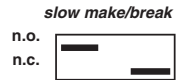
To start the function, press the pedal. After releasing the pedal, the contacts remain in the "ON" position unless the user presses and releases the pedal again.  
(Press to start - Press to stop)



## Switch Types

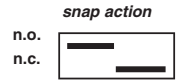
### • Slow make-break

With double throw contacts where the moving contact, in transferring, interrupts one circuit before establishing the other.



### • Snap Action

The action of moving contact members that transfer from one position to another at a speed which is essentially independent of actuator speed.



## Contact Configuration

Foot Switch	Circuit Function	Contact Symbol	Other common expressions used	Description
FM Series & FK Series	SPDT-SB (Single Pole, Double Throw, Single Break)		<ul style="list-style-type: none"> <li>• Form C</li> <li>• Break, Make</li> <li>• Changeover</li> </ul>	With a SPDT-SB contact, one circuit opens at almost the same time another circuit closes. The contact can also be wired as a n.o. (contacts C and 2) or a n.c. (contacts C and 1).
	DPDT-SB (Double Pole, Double Throw, Single Break)		<ul style="list-style-type: none"> <li>• Form CC</li> <li>• 2x Break, Make</li> <li>• 2x Changeover</li> </ul>	Twice the function of a SPDT-SB.
	2x SPDT-SB (2x Single Pole, Double Throw, Single Break)		<ul style="list-style-type: none"> <li>1. Stage SPDT-SB*</li> <li>2. Stage SPDT-SB* (* Form C; Break, Make; Changeover)</li> </ul>	1 SPDT-SB contact before the pressure point and 1 SPDT-SB contact beyond the pressure point.
FL Series & FS Series	SPDT-DB (Single Pole, Double Throw, Double Break)		<ul style="list-style-type: none"> <li>• Form Z</li> <li>• 1 n.o. / 1 n.c.</li> </ul>	Contacts 1 and 2 are the 1 n.c. Contacts 3 and 4 are the 1 n.o.
	DPDT-DB (Double Pole, Double Throw, Double Break)		<ul style="list-style-type: none"> <li>• Form ZZ</li> <li>• 2 n.o. / 2 n.c.</li> </ul>	Contacts 1, 2 and 5, 6 are 2 n.c. Contacts 3, 4 and 7, 8 are 2 n.o.
	2x SPDT-DB		<ul style="list-style-type: none"> <li>1. Stage SPDT-DB*</li> <li>2. Stage SPDT-DB* (* Form Z)</li> <li>• 2x 1 n.o. / 1 n.c.</li> </ul>	Contacts 1 and 2 are n.c., contacts 3 and 4 are n.o., before the pressure point. Contacts 5 and 6 are n.c., contacts 7 and 8 are n.o., beyond the pressure point.

## Standards and Cable Information

### IEC 60601-1

International Standard for medical electrical equipment. General requirements for safety.



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The Altech/ASA foot switches meet the requirements of IEC 60601-1 for medical electrical equipment.

- **Protection Level IP 68**
- **Limited voltage rating to 25V~ (AC)/60V --- (DC)**
- **UL/CSA, VDE approved switch insert**
- **Installed cable with special pull/bend protection strain relief**
- **Special durability inspection and drop test of housing**
- **Alternative colors to differentiate this special application**

The IEC 60601-1 certified foot switches are available in the FM, FL, and FS series.



### Explosion Protected - EX

In many industries and environments explosion protected foot switches are required. Applications include, but are not limited to:

- **Petrochemical Industries**
- **Chemical Industries**
- **Plastic Molding Machines**
- **Printing Machinery**
- **Converting Machines**
- **Wood Processing Machinery**
- **Food Processing Industries**

Altech/ASA foot switches use the principle of flame proof enclosures. Possible explosions are contained inside the foot switch and cannot cause any damage outside.

Altech/ASA Explosion Protected foot switches use special switch inserts which meet the EEX, d, ||C and T6 classifications and can be used in zone 1 and 2 applications to DIN VDE 0165.

EEX = Ex protected to European EN 50014

d = Flameproof enclosure

||C = Explosion group ||C

T6 = Temperature class 6

Due to the increased safety requirements Altech/ASA EX - Foot switches are always delivered complete with a 3 meter (10 ft.) cable and an EX approved strain relief.

Explosion protected foot switches are only available in the FS Series.

### Cable Chart

Foot Switch	AWG Size/ No. of Cond.	Voltage Rating/V	Current Carrying Capacity/Amp.	Overall Diameter		Material	Applications
				Inches	mm		
FM Series, FK Series, PCFS-3M Series	20/2	300	8	.200 - .265	5.08 - 6.73	SJT - Plastic SJO - Neoprene SJTO - Plastic SJOOW - Plastic	Light and medium duty service such as small tools, small motors, sound, office, and medical equipment, etc.
	20/3	300	8	.210 - .292	5.33 - 7.42		
	20/4	300	8	.240 - .322	6.10 - 8.18		
	20/6	300	7	.260 - .381	6.60 - 9.68		
	20/9	300	7	.317 - .439	8.05 - 11.15		
	20/12	300	7	.338 - .478	8.59 - 12.14		
	20/20	300	5	.430 - .561	10.92 - 14.25		
	18/2	300	10	.230 - .301	5.84 - 7.65		
	18/3	300	10	.242 - .318	6.15 - 8.08		
18/4	300	7	.254 - .330	6.45 - 8.38			
FL Series & FS Series	18/2	600	10	.335 - .375	8.51 - 9.53	ST - Plastic SO - Neoprene STO - Plastic SJOOW - Plastic	Heavy duty service such as heavy tools, industrial equipment controls, industrial machinery, medical equipment, etc.
	18/3	600	10	.360 - .390	9.14 - 9.91		
	18/4	600	7	.385 - .420	9.78 - 10.67		
	16/2	600	13	.340 - .400	8.64 - 10.16		
	16/3	600	13	.355 - .420	9.02 - 10.67		
16/4	600	10	.390 - .450	9.91 - 11.43			
This cable chart is only to be used as a guide. If the conditions of use vary (i.e., high temperature, hazardous environments, etc.) the normal cable should not be used. Please contact Altech for special applications.							Note: SJO, SJTO, SO, STO, and SJOOW are resistant against oil, grease, and acid.