Standards
Fusegear

Switch.

Disconnector.

Switch-disconnector.

Switch-disconnector-fuse.

Fuse-switch disconnector.

Standard IEC 60947-3 (distinguishes three types of utilisation categories)

All requirements and test specifications are laid out in standard IEC 60947-1 (general stipulations) and in standard IEC 60947-3 (specific stipulations).

Definitions

■ **a switch** is a mechanical switching device:
□ capable of making, carrying and breaking currents under normal circuit conditions which may include specified operating overload conditions
□ capable of carrying currents under specified abnormal circuit conditions such as those of short-circuits for a specified time
■ **a disconnector** is a mechanical switching device:
□ capable of opening a circuit exclusively under no-load conditions (no load downstream)
□ which, in the open position, complies with the requirements specified for the isolating function
□ capable of carrying currents under normal circuit conditions and carrying for a specified time currents under abnormal conditions such as those of short-circuits
■ **a switch-disconnector** is a switch which:
□ in the open position, satisfies the isolating requirements specified for a disconnector
■ **a switch-disconnector** (and fuse-switch disconnector) in which:
□ one or more poles have a fuse in series in a composite unit (for a fuse-switch disconnector, the fuse-link forms the moving contact).

Standardised current values for fusegear

■ **conventional thermal current Ith (A)**
This is the maximum current that a switch can carry continuously without excessive temperature rise. This value is provided with an operating temperature indicated by the manufacturer.
E.g. Ith = 25 A at 40° C.
Generally speaking, Ith = Iu (rated uninterrupted current). Ith is in fact the rating for the switch.
■ **rated operational current Ie (A)**
This is the current for which the switch is generally used. It depends on the application (resistive or inductive current).

Utilisation categories

The standard IEC 60947-3 distinguishes three types of utilisation category.
■ AC21: resistive loads
■ AC22: mixed (resistive and inductive) loads
■ AC23: inductive loads
A specific category is defined in the Appendix:
■ AC3: direct switching of individual motors.
For DC loads, the respective categories are DC21, DC22, etc.
The designation (e.g. ACxy) of utilisation categories is completed by the suffix A or B according to whether the intended applications require frequent or infrequent operations:
□ the letter "A" indicates frequent operations, from 2000 to 10 000 (mechanical and electrical), depending on the rating
□ the letter "B" indicates infrequent operations, from 400 to 2000.

Utilisation categories		Characteristics	Applications
Frequent operation	Infrequent operation		
AC21A	AC21B	Switching of resistive loads including moderate overloads (cos φ = 0.95)	Power distribution Final distribution (except motor feeders)
AC22A	AC22B	Switching of mixed resistive and inductive loads, including moderate overloads (cos φ = 0.65)	Medium and high power industrial distribution with motor feeders
AC23A	AC23B	Switching of motor loads or other highly inductive loads (cos φ = 0.45 for I_e > 100 A) (cos φ = 0.35 for I_e ⩽ 100 A)	Motor feeders Occasional motor control (1)
AC3		Switching of motor loads or other highly inductive loads (cos φ = 0.45 for I_e > 100 A) (cos φ = 0.35 for I_e ⩽ 100 A)	Main, indirect control of an individual motor

(1) For this type of application, a contactor is used to control the motor.

Example:
A 125 A switch in the AC23 utilisation category must be capable of:
■ making a 10 In current (1250 A) with a cos φ = 0.35
■ breaking a 8 In current (1000 A) with a cos φ = 0.35.