

C&K® Tactile Switches Dual Circuit Technology

Dual Circuit Technology Definition

Dual Circuit Technology refers to a feature that creates two independent output signals inside the body of one tactile switch—**Single Pole Double Throw (SPDT)**. See below SPDT circuitry. The tactile switches have a common pin, a Normally Close (NC) and a Normally Open (NO) Pin. If the customer chooses to use both NC and NO circuitry, it provides a Changeover signal, and allows the customer to use both circuitries to define the logic of the signal, and take actions based on the defined logic.

In an automotive door handle as an example, both NC and NO circuitries are used before making any decision. The logic is at rest, the NC contact is closed while the NO contact is open. When a user pushes the button, nothing will happen until the NC contact is opened, and the NO contact is closed. See below table, this gives the customer only one logic for correct execution, and the other three are malfunctions.



Figure 1: KSC DCT, KSC2 DCT, and TLSM Series



Figure 2: DCT Switch Function

Judgment	Scenario-1		Scenario-2		Scenario-3		Scenario-4
Circuits	Rest	Push	Rest	Push	Rest	Push	Rest
NC	Close	Open	Close	Open	Close	Close	Open
NO	Open	Close	Open	Open	Open	Close	Open/Close
Automotive: Door handle	Door: unlatched		Door: not unlatched— Switch damaged or external issue on PCB		Door: not unlatched— Switch damaged or external issue on PCB		Door: not unlatched— Switch damaged or external issue on PCB
Automotive: EV charger	Charger: can be unhooked from charging pile		Charger: can be unhooked from charging pile		Charger: can be unhooked from charging pile		Charger: cannot be unhooked from charging pile
	System: charging		System: not charging— Switch damaged or external issue on PCB		System: not charging— Switch damaged or external issue on PCB		System: not charging— Switch damaged or external issue on PCB
Power tools: Snow blower	Motor: switched on		Motor: not switched on— Switch damaged or external issue on PCB		Motor: not switched on— Switch damaged or external issue on PCB		Motor: not switched on— Switch damaged or external issue on PCB

Table 1: Examples: Only One Logic For Correct Execution

Benefits

- **Enhanced functionality:** the KSC DCT switches enable more complex control schemes, which can enhance the user experience and the functionality of the device.
- **Versatility:** a single input can be connected to one of two outputs, allowing it to control multiple circuits or functions from a single switch.
- **Compact design:** By incorporating multiple functions into a single switch, the KSC DCT tactile switch with its 6x6mm footprint saves space, which is crucial in compact devices.
- **Reliability:** A clear tactile feedback is provided to the user, ensuring reliable and precise operation. This is particularly important in applications where accurate control is critical.
- **Simplified circuit design:** using an SPDT switch can reduce the number of switches and wiring needed in a circuit, simplifying the overall design and potentially reducing the cost and complexity of the circuitry.

Applications

- Automotive applications
- Medical devices
- Consumer electronics
- Industrial equipment



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