Technical Information

Touchless Control Technology

HELLA®

Ideas today for the cars of tomorrow

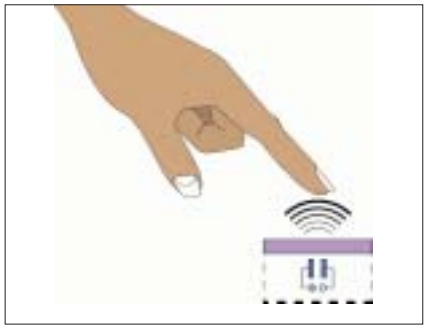
Introduction

The growing number of light sources in the vehicle interior also leads to an increase in the corresponding control elements. Today, premium vehicles frequently feature up to 100 light applications, ranging from simple switch-illumination to interior reading lamps to complex consoles with integrated functions that can be used in a modular manner. New concepts are needed that are adapted to these changed requirements.

In general, switching functions are implemented by means of mechanical components, using both switches and buttons. The disadvantage of mechanical components is that they are subject to severe aging (wear) that may lead to a failure of the function. This does not apply to touchless control systems, since they do not contain mechanical components.

Basically, two principles can be used to realize touchless control concepts: the capacitive principle and the optical principle.

Capacitive Principle

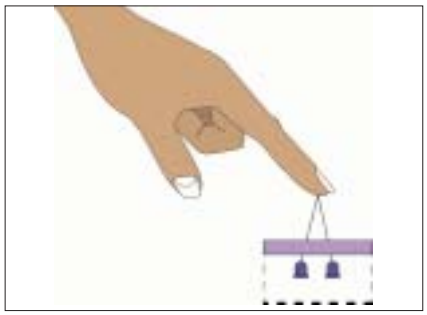


The capacitive control concept is based technologically on the charge transfer principle, with a µC (microcontroller) evaluating the capacitive changes of the sensor surface. If e. g., the hand of the user approaches the sensor surface, the capacity of the sensor surface changes. This capacitive change is evaluated by the microcontroller and accordingly converted into switching information.

Advantages

- Standardized components
- Not susceptible to changing light conditions
- Programmable

Optical Principle



The optical principle utilizes the reflection of light rays in the infrared range that are generated by special LEDs (light emitting diodes).

When the system is in a steady state, the light of the transmitter diode is picked up by the receiver diode in a characteristic way and electronically processed into information. If the light path is deflected, e. g. by a hand being brought into the light path, the received signal changes accordingly.

Advantages

- Flat design
- Design freedom
- Programmable

Limitations of Conventional Touchless Control Technology

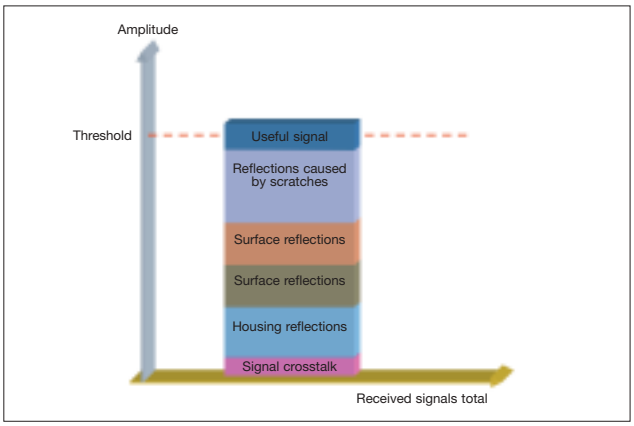
Conventional touchless control technology, used in the case of interior lighting:

Capacitive Principle

- Irritation in the case of certain objects
- Electromagnetic Compatibility (EMC)

Optical Principle

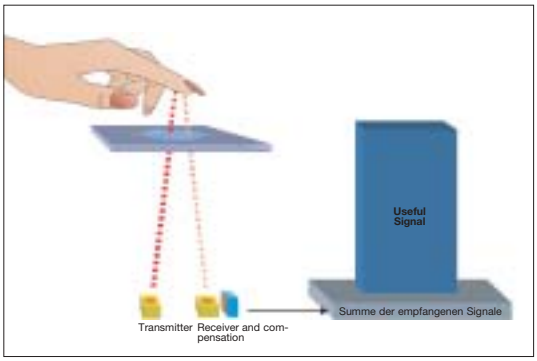
- Stray light
- Soiling and/or damage to the lens (scratches, fingerprints)



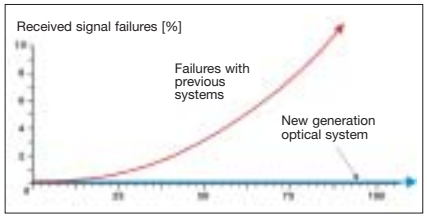
Composition of received signal with conventional systems

New Generation Touchless Control Technology

The new generation touchless control systems that apply the optical principle have succeeded in eliminating previous weaknesses, making interference-triggered operating errors a thing of the past.



Composition of received signal with new generation systems



Advantages

- Not subject to aging
- Unaffected by stray light
- Development and design freedom
- Many functions – easy to program
- Can be controlled through the lens

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