Application Note

OMRON’ s Anti-Tamper Solution

October 2023

Contents

A. What is Anti-Tamper?

Anti-Tamper is a kind of precaution measure to prevent unauthorized people to access and change the setting of an important device or equipment. Omron can provide various solutions for designers to implement anti-tamper easily and effectively.

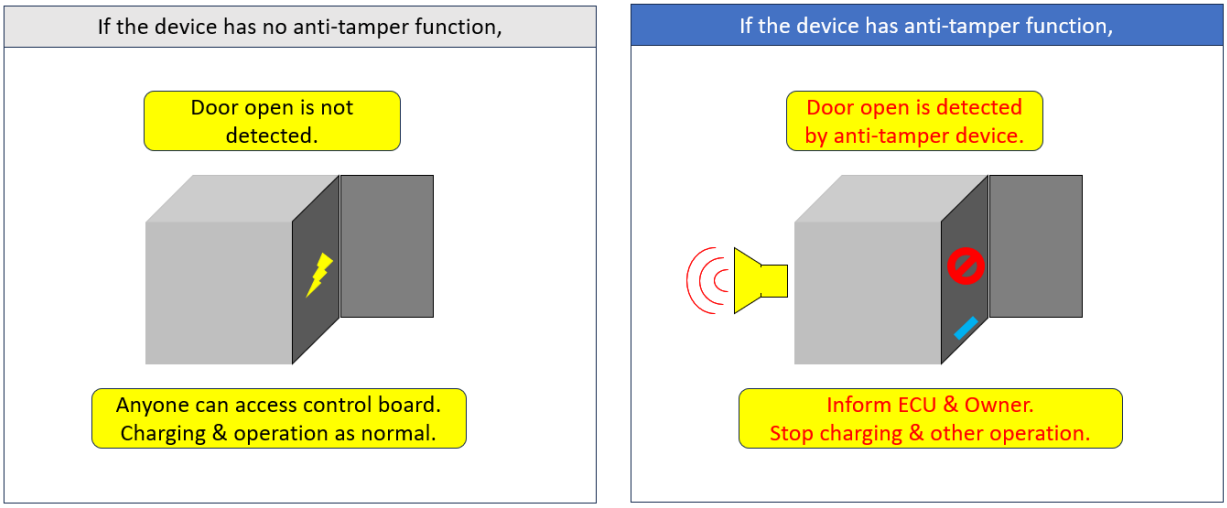

Figure 1 Anti-tamper illustration

Anti-tamper is commonly used in many other applications like smart meter, payment terminal, amusement / casino equipment, vending machines, automated teller machine (ATM), etc.

B. Why does EVSE need Anti-Tampering?

While the public charge point is placed in busy high street or quiet car park and the privately-owned charger (or called as wall box) is placed outside the home's driveway, it becomes more important to protect the charger against unauthorized person accessing or to protect technician/user maintenance. EV charge points must now include a tamper detection mechanism. This device records any attempts to remove the front cover and notifies the charge point's owner. The opening of the charger will notify the owner and to stop the high power (high current & high voltage) charging process with anti-tamper mechanism.

From 30th December 2022, further security requirements for charge points selling in UK becomes effective in the UK government regulation[*1] [*2]. It is possible for other governments or safety standards to add similar kind of anti-tamper requirement to protect the charging equipment and consumer safety in the future.

*1 UK Gov Guidance:
https://www.gov.uk/guidance/regulations-electric-vehicle-smart-charge-points
*2 UK Regulation Details:
https://www.legislation.gov.uk/uksi/2021/1467/schedule/1/made

C. Reliable detection device for Anti-Tampering!

Since each equipment may require different solutions, the design requirements of anti-tempering also vary a lot. As Omron offers a wide range of products & solutions, designer can take this advantage to accomplish design more easily.

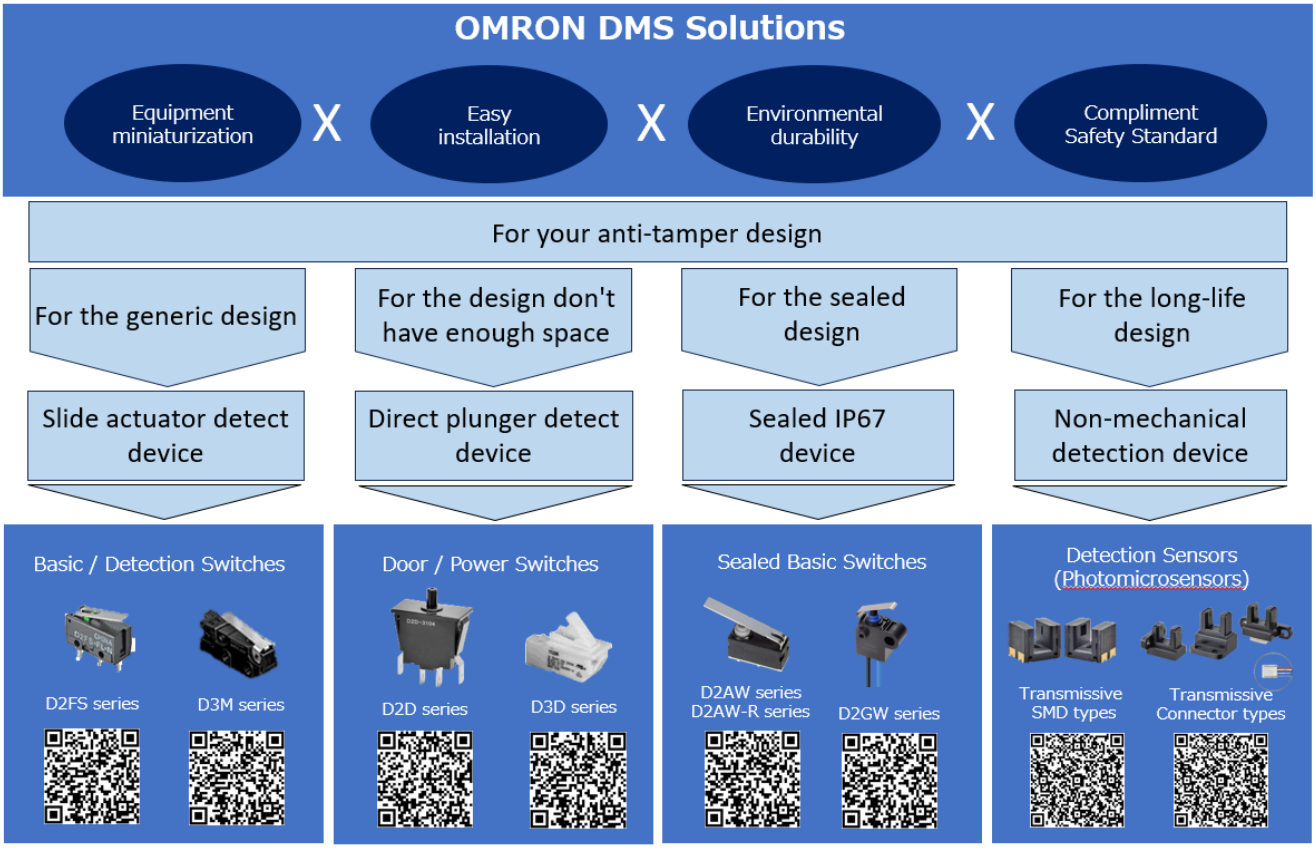

Figure 2 Omron offer wide range of solution to satisfy various design requirements.
Note. OMRON's Device & Module Solutions Company (DMS)
Note1. The QR code above links to OMRON Europe website. For any questions or requests, please contact us from your local website.

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C-1. For the generic design

The most generic design is using a PCB mounted switch to detect the

cover opening. Omron D2FS series (Figure 3) is a simple ultra subminiature micro switch developed for long time high reliability applications and can satisfy such design requirement. Low frequency of use is common in anti-tampering and is also a high challenge to the detection switch reliability.

Figure 3 Omron D2FS series

Figure 4 Omron D3M series

If the design needs the switch placed nearby the enclosure or cover, the switch with soldering terminals or quick connect terminals is the best solution. Omron D3M series (Figure 4) basic switch is specially designed with quick-connect terminals to assure easy wiring and with horizontal layout to save mounting spaces.

C-2. For the design don't have enough space

Omron D3D series (Figure 5) miniature door switch is another solution to give >9mm long stroke and with either plunger or lever actuator. Its crimp-type connector offers easy & efficient wiring work and its snap-fit attachment is easy for installation. Its rating 1A 125VAC / 0.5A 250VAC is certified under UL & VDE standards.

Figure 5 Omron D3D series

Figure 6 Omron D2D series

Omron D2D series (Figure 6) power door switch is another solution giving higher ratings 16A 250VAC with UL & VDE standards. It offers the minimum contact gap of 3mm required for power switches as standard type.

C-3. For the sealed design

If the anti-tamper mechanism requires a higher level of protection against

water spill and dust penetration, Omron offers a wide range of sealed micro switches (Figure 7).

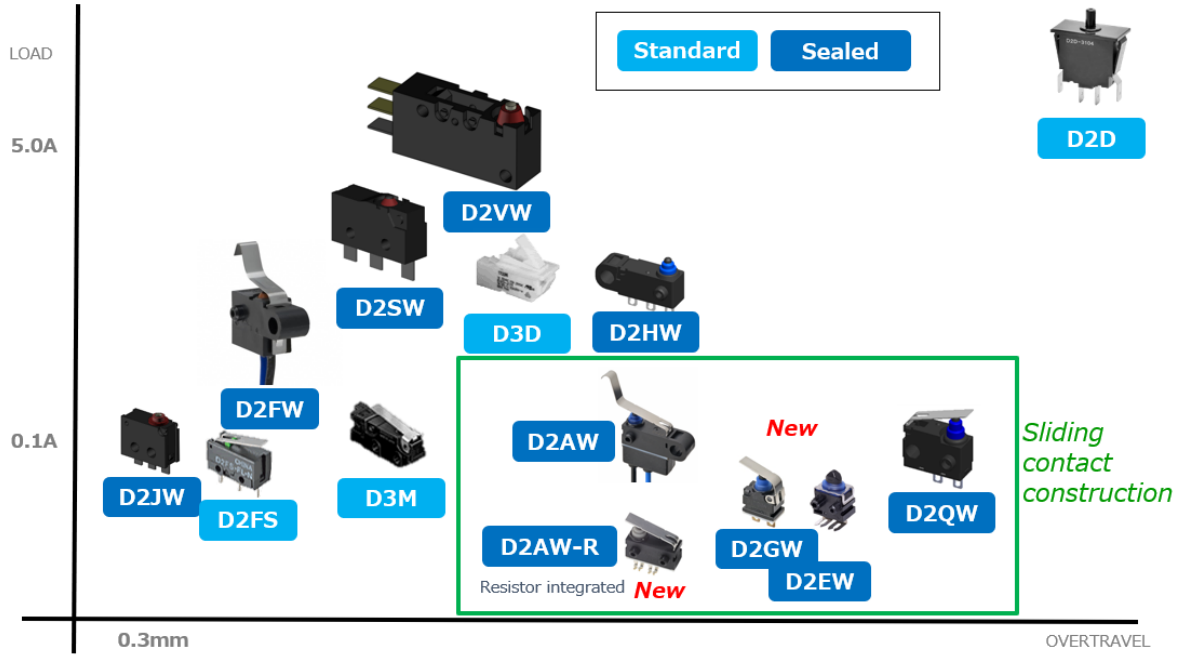

Figure 7 Omron basic switches Line-up

Sealed basic switches or automotive switches are often used in EV charge point as referencing to automotive applications, however, they are usually not required to approve under UL safety approval. But residential EV charge point will require UL safety approval because it will be connected to household electricity. Omron D2HW series (Figure 8) is a kind of sealed ultra subminiature basic switches widely recognized in automotive industry and also qualified with UL safety approval. PCB terminals, solder terminals and lead-wires also give more choice in design.

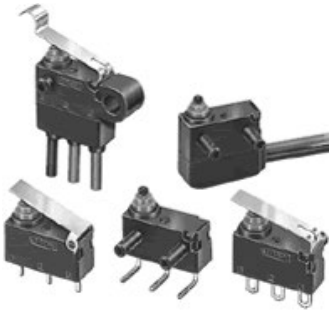

Figure 8 Omron D2HW series

C-4. For the long-life design

If silent operation is required, Omron D2AW series (Figure 9) ultra subminiature basic switch has the same dimension as D2HW series and could satisfy the silent requirements. Omron D2AW-R series (Figure 10) is

the extension with integrated resistors so the system can identify signals (switch ON/OFF, short circuit, open circuit) by observing the value of resistances, which can enhance the safety of charge point system.

Figure 9 Omron D2AW series

Figure 10 Omron D2AW-R series

Omron D2GW series (Figure 11) and D2EW series (Figure 12) sealed ultra subminiature basic switch are currently the smallest and the latest sealed micro switches to satisfy design requirements in limited space.

Figure 11 Omron D2GW series

Figure 12 Omron D2EW series

Figure 13 Omron EE-SX series

If the design needs to meet automotive requirements, Omron can also offer dedicated automotive basic switches for customer selection.

In some circumstances, customer will need to use optical sensor to secure reliable signal output. Omron also provides a wide range of photomicrosensors such as EE-SX (Transmissive types, SMD or Connector mount) (Figure 13) to satisfy different design requirements.

D. Do you know OMRON Solutions?

Besides of the abovementioned products suggested for anti-tampering

applications, Omron also offers a wide range of product for different applications.

- **Relays: Power relays, Signal relays, MOSFET relays, …**
- **Switches: Tactile switches, DIP switches, …**
- **Connectors: FPC/FFC connectors, Push-in terminal block connectors, ….**
- **Sensors: Photomicrosensors, Light Convergent Reflective Sensors, Displacement Sensors, …**

Figure 13 Omron products

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