

DS1 Diode-based transient-free capacitor switch

FAQs



This document presents the Frequently Asked Questions about DS1 with the intent of giving basic information about the product and its applications.

Please, check DS1 webpage for additional material.

Feel free to contact ABB for any further question or material.

1. What is this apparatus?

DS1 is a very compact capacitor switch based on diode technology and synchronization with AC network, which allows it to perform transient-free switching without the possibility of restriking and prestrike. It is insulated with dry air. The required electronics is integrated in DS1 and no additional equipment is necessary for its functioning, a part of one ABB KEVA A3 voltage sensor for the synchronization. The electronics provides self-adjustment synchronization based on environmental and DS1 conditions. It also provides selfdiagnostics features of the whole apparatus by periodically checking its status and constantly communicating it to the user.

2. What is its application?

DS1 is designed to switch capacitor banks up to 17.5 kV and 630 A at 50 Hz or 15.0 kV and 600 A at 60 Hz, both single step and back-to-back, with ungrounded start configuration. DS1 is for indoor applications. Its main application is switching capacitor banks for reactive power compensation and for Power Factor Correction at distribution level. Its benefits are greatly highlighted in case of capacitor banks in back-to-back configuration, where

transient phenomena due to switching operations are critical and negatively impacting on network reliability and stability or plant productivity. With DS1, inrush current and voltage transient will be just a memory .

3. Why should a custom

- Improved network reliability DS1 control unit is able to detect any anomaly concerning the apparatus and communicating it to the user in advance. This is directly translated into improved reliability because possibility of unsuccessful operation and consequently network/plant outages is reduced to the minimum. The same benefit is powered by DS1 thanks to its characteristics of performing restriking and prestrike-free operations, thus eliminating the risk of sudden fatal damage to capacitors.
- Improved network efficiency DS1 is increase network or plant efficiency thanks to its extended electrical life and its ability to perform transient-free and frequent switching also in back-to-back configuration.
- Extended product durability DS1 ability of perform transient-free switching, namely without overvoltage, inrush current and inrush frequency, allows the extension of the life of all components connected to the capacitor bank, as well as the capacitor bank itself.

- Light predictive maintenance The maintenance of DS1 is defined as light-maintenance, meaning that only minor activities have to be performed on it, such as measuring of contact resistance and visual inspections. Moreover, the most important DS1 parameters are monitored by the control unit which allows to perform a predictive maintenance of DS1.
- Solution compactness and simplicity DS1 has reduced dimensions (phase distance equal to 210 mm), integrated electronics (no additional relay for the synchronism) and the ability to perform transient-free switching allows avoiding inrush reactors.

4. Are there any references available?

ABB has a pilot installation in Manhattan, New York, with Con Ed, one of the most influential American utilities. DS1 is in service since May 2014 and it switches a 10 MVAR capacitor bank at 13.8 kV on a daily basis. Such capacitor is in back-to-back with other 5 capacitor banks of the same size. The customer was experiencing capacitors failures and network disturbances when switching the capacitor banks. The customer is fully satisfied by DS1 performance in terms of switching, maintenance and diagnostic functions. Also Controllix, the OEM that supported ABB with the pilot installation, was satisfied about DS1 compactness, ease of installation and integration with existing systems. Please, find the dedicated article about the pilot installation on DS1 webpage.

5. According to which standards is the product tested?

DS1 has been classified as “special purpose switch” for switching capacitor banks with class C2, according to IEC 62271-103. DS1 capacitive switching tests have been performed according to IEC 62271-100 because such standard have testing conditions and pass/fail criteria more demanding than the ones of IEC 62271-103. Such tests have the same applicability, conditions and requirements as IEEE C37.09a.

6. What is the expected lifetime?

Expected lifetime is 25 years at 45 °C, or 50.000 mechanical CO. Light maintenance should be performed periodically according to Installation and Maintenance Manual.

7. Can I just exchange an existing circuit breaker with it?

Yes, if the existing circuit breaker is used to switch the capacitor bank and not to protect it. In any case, DS1 shall always have an upstream protection, as a contactor or a normal switch. ABB suggestion is to protect it with upstream fuses.

8. In what type of ABB switchgear can I use the device?

DS1 is for indoor applications and can easily fit Metal Enclosed Capacitor Banks, such as ABB ABBACUS. Thanks to its compact and simple design, it can easily be hosted in MECB manufactured by any OEM. DS1 has a similar layout of HD4 and VD4 with a phase distance equal to 210 mm. The current version is fixed, but it could fit panels similar to UniGear 800 and PowerCube. Please, ask to ABB the DS1 2D and 3D Technical Drawings if you are interested in including it in your switchgear.

9. How can I give open and close commands?

Open and close commands can be managed by a normal relay able to provide such outputs, since DS1 manages such commands as binary input rated 110-220 V DC. Auxiliary power supply has the same voltage rating, but could be provided separately with respect to binary inputs. Please, refer to DS1 Catalogue on DS1 webpage for further details.

—
For more information please contact:



—
More product information:
abb.com/mediumvoltage
Your contact center:
abb.com/contactcenters
More service information:
abb.com/service