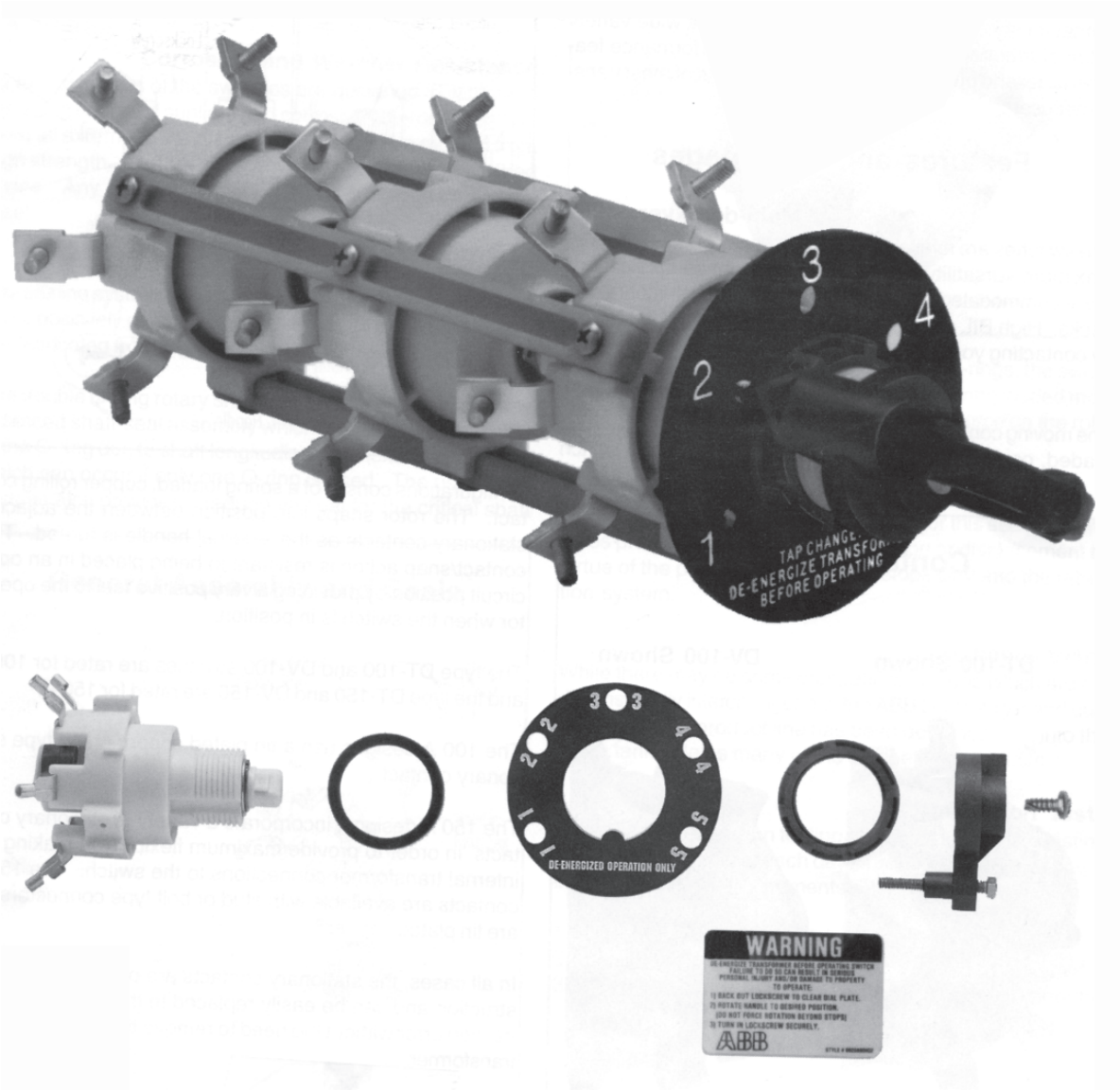
De-energized Switches
Type DT & DV
PTAT-NID953
IZUA 4643-500

Technical Guide



General Description

The ABB “D” series of tap changers and dual voltage switches are de-energized, rotary-type switches, suitable for use in distribution transformers, both pole and pad mounted. The switches are mounted through the tank wall and are operable from outside the transformer. They are available in single and multi-deck configurations with various types of coil lead connector styles so that they can be used in a wide variety of transformer applications. Ratings and performance features meet and often exceed the requirements of most transformer users.

Features and Advantages

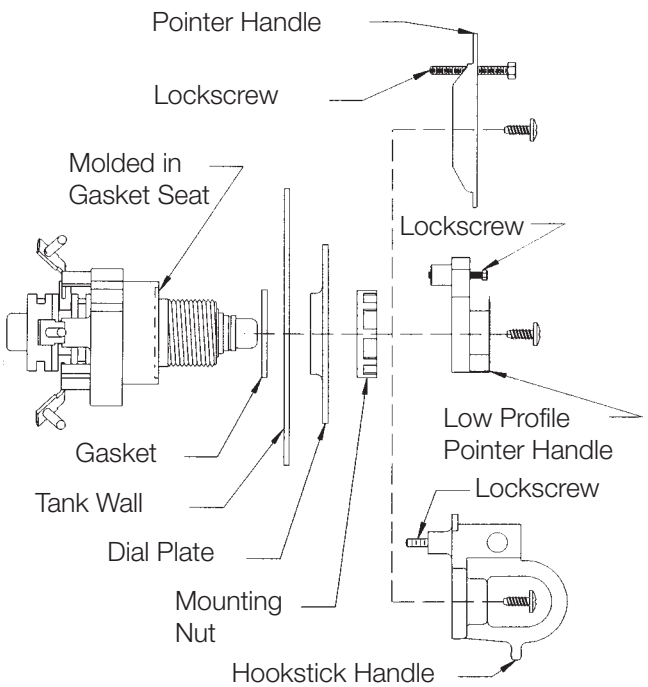
Multi-deck versatility

The switches are available in various deck configurations for maximum versatility. Single and three phase applications are accommodated through the use of multiple interconnected decks. High BIL designs are available and may be ordered by contacting your ABB representative.

Contact System

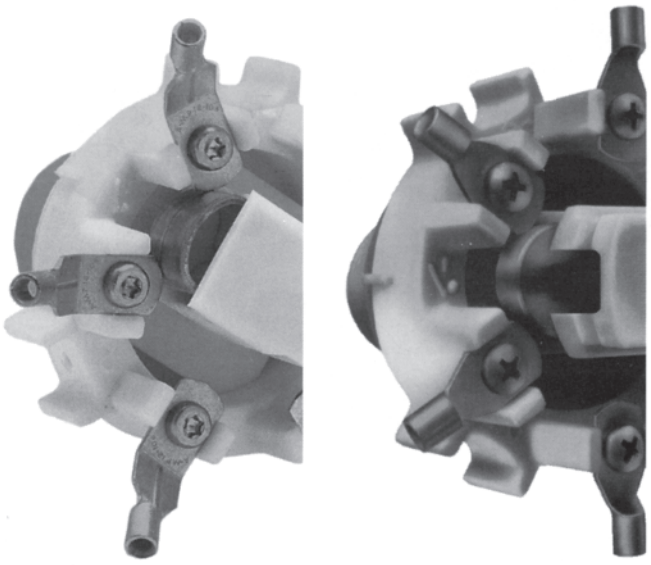
The moving contact system for the DT-100 consists of a spring loaded, copper wiping contact while the remaining switch configurations consist of a spring loaded, copper rolling contact. The rotor snaps into position between the adjacent stationary contacts as the external handle is turned. This contact/snap action is resistant to being placed in an open circuit position by providing a very positive feel to the operator when the switch is in position.

Tap Changer and Hardware



Contact Assembly

DT-100 Shown **DV-100 Shown**



The type DT-100 and DV-100 switches are rated for 100 A and the type DT-150 and DV-150 are rated for 150 A.

The 100 A designs use a tin plated copper crimp type stationary contact.

The 150 A designs, incorporate a variety of stationary contacts in order to provide maximum flexibility in making the internal transformer connections to the switch. The 150 A contacts are available with stud or bolt type connectors; all are tin plated copper.

In all cases, the stationary contacts are of heavy duty construction and can be easily replaced in the event of a connection error without the need to remove the switch from the transformer.

Hardware Kits (Sold Separately)

The hardware kits available are illustrated on pages 11 and 14 of Dimension Sheets 44-888. Each kit includes a handle with mounting screw, a mounting nut, an indicator plate, a gasket, and a warning label.

Three types of operating handles are available: A hook stick operable handle (which is lockable), a 300 series stainless steel pointer type handle, and a low profile pointer type handle. The hook stick handle and the low profile pointer handle are molded from a glass reinforced, high strength resin.

The external indicator plate is a molded black plate with white letter position indication and operating information. It is available with a variety of imprints to designate positions and/or ratings. See the ordering information section of this document for more details.

Corrosion and Weather Resistance

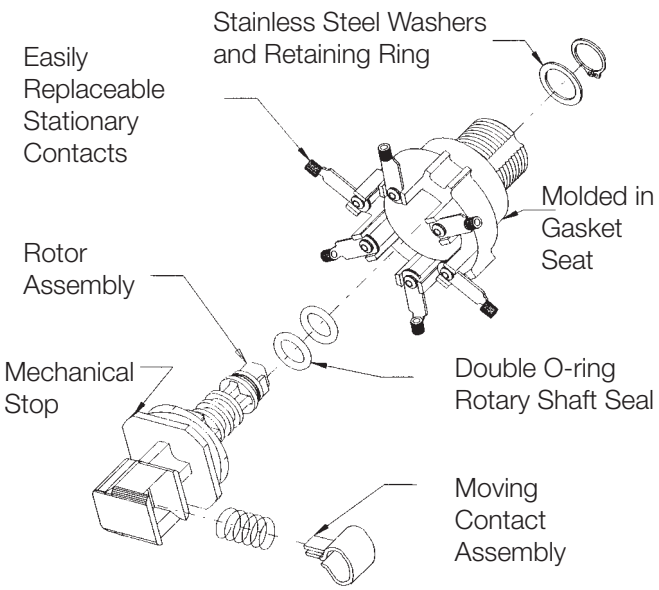
All external parts of the switches are designed to withstand the aging effects of sunlight and corrosive environments. Almost all external parts are nonmetallic and are molded from high strength, weather-resistant, UV grade glass reinforced resins. Any metal external parts are 300 series stainless steel.

Sealing System

The sealing system features a double O-ring rotary shaft seal and a positively retained static tank seal; all elastomeric seals are fabricated from high temperature Nitrile elastomer.

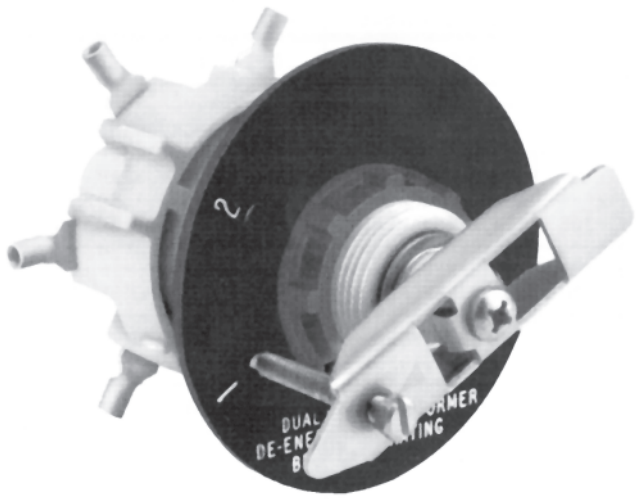
The double O-ring rotary shaft seal provides a mechanically balanced shaft-seal assembly which prevents overstressing of the O-ring due to shaft longitudinal and flexural movement which can occur if only one O-ring is used. The use of two O-rings also provides a redundant seal for the critical shaft seal application. In addition to the double O-rings , the switch contains mechanical stops to prevent the spring loaded moving contact from applying an asymmetrical force on the rotor seals.

General Assembly and Seals



External Hardware

DV-100 Shown with Pointer Handle



The molded-in gasket seat provides full retention of the static tank seal, ensures accurate placement for this seal, and provides protection from over compression or displacement by virtue of the positive compression stops built into the retention system.

Interchangeability

While there may be some competitive designs which are not dimensionally interchangeable, the ABB tap changer and dual voltage switch product line has been designed to fit into the same tank hole as many of the competitive products.

Production Tests

In addition to the design testing, the following routine testing is done on a sample of each day's production to insure ongoing compliance to requirements.

1. Dimension check to verify all critical dimensions.
2. Leak test to verify the shaft seal integrity.
3. Mechanical operation test to verify mechanical integrity.

Order Information
Tap Changers and Dual Voltage Switches
(Mounting Hardware Kits Sold Separately)

Ampere	Terminal Type & Connection Size	Terminal Angle	Terminal Style #	1 Deck TC 150 kV BIL	2 Deck TC 150 kV BIL	3 Deck TC 150 kV BIL	1 Deck DV 125 kV BIL	2 Deck DV 125 kV BIL	3 Deck DV 125 kV BIL
100	Crimp-# 12-10 AWG	0	9820A44H01	1C11075G02[1]	609C227G09	609C178G12	609C176G05	609C177G09	609C181G12
100	Crimp-# 12-10 AWG	0	9820A44H02	1C11075G01[1]	609C227G18	609C178G05	609C176G09	609C177G05	609C181G05
100	Crimp-# 12-10 AWG	45	9820A44H04	1C11075G03[1]	609C227G15	609C178G15	609C176G15	609C177G15	609C181G15
100	Crimp-# 12-10 AWG	90	9820A44H03	1C11075G04[1]	609C227G16	609C178G16	609C176G16	609C177G16	609C181G16
150	Hole-0.25 (6.3mm)	45	1B11081H04	609C175G12	609C227G12	609C178G09	609C176G12	609C177G12	609C181G08
150	Hole-0.25 (6.3mm)	90	1B11081H02	609C175G07	609C227G11	609C178G14	609C176G11	609C177G11	609C181G11
150	Stud-0.25-20 Thread	45	1B11082G04	609C175G13	609C227G13	609C178G13	609C176G13	609C177G13	609C181G13
150	Stud-0.25-20 Thread	90	1B11082G02	609C175G08	609C227G14	609C178G11	609C176G08	609C177G08	609C181G09

[1] Refer to DS 44-888 Page 13 for dimensions of single phase de-energized tap changer.

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Design Tests

The ABB tap changers and dual voltage switches passed a series of tests which were designed to verify their suitability for use in oil filled distribution transformers and their long term reliability. The tests are listed below:

- Full Wave Impulse Test
- Low Frequency Voltage Withstand Test
- Corona and RIV Test
- Mounting Flange Strength Test
- Mechanical Life Test
- Safe Transit Test
- Cantilever Load Test
- Shaft Torque Test
- Side Thrust Test
- Contact Temperature Rise Test
- Thermal Runaway Test
- Thermal Cycle Withstand Test
- Coil Oven Bake Test
- Short Circuit Tests
- Helium Leak Test
- Pressure-Powdered Chalk Test

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