Dead Tank Circuit Breaker 72PM40-C
Proven reliability through common platforms
ABB (www.abb.com) is a leader in power and automation technologies that enables utility and industry customers to improve their performance while lowering environmental impact.

The ABB Group of companies operates in approximately 100 countries and employs around 145,000 people.

A complete range of high voltage circuit breakers
ABB offers the widest range of high voltage circuit breakers on the market. Our portfolio of dead tank circuit breakers ranges from 72.5 kV to 800 kV.

ABB has a long history of developing innovative technologies to address the changing demands of power systems. As these systems continue to evolve, switching solutions must be designed to meet present-day applications as well as anticipate the future state of the grid.
Proven reliability through common platforms

ABB is proud to offer the Type 72PM40-C SF₆ Dead Tank Circuit Breaker, based on well-established interrupter and operating mechanism platforms.

Standards
The 72PM40-C Dead Tank Circuit Breaker is tested for high transient recovery voltage (TRV) performance and is certified for Class C2 capacitive switching and Class M2 mechanical endurance.

- ANSI/IEEE C37.09
- ANSI/IEEE C37.04
- ANSI/IEEE C37.06
- ANSI/IEEE C37.06.1
- IEC 62271-1
- IEC 62271-100

Certifications
- ISO 9001
- ISO 14001
- OHSAS 18001

Applications
The 72PM40-C was designed for:
- overhead transmission lines
- transformer applications
- capacitive switching applications

Type PM circuit breaker family
With just under 50,000 breakers delivered to date, spanning voltages up to 800 kV, the ABB type PM dead tank circuit breakers remain the most purchased brand in the industry. This is due to their low cost of ownership and strong performance, backed by industry-leading service and support.

Benefits of ABB’s advanced technology

Common platform
- The design shares common features and existing technology with other ABB switchgear platforms, ensuring established and time-tested reliability.
- The 72PM40-C offers the most commonly purchased features as standard or available options.

High performance and long life for all applications
- The 72PM40-C dead tank circuit breaker is certified for Class C2 capacitive switching and Class M2 mechanical endurance (10,000 operations).
- Our high performance, dual-motion self-blast interrupter achieves full ratings up to 72 kV, 40 kA.
- The breaker is designed for a design life of a minimum of thirty (30) years under normal operating environments.

Environmental awareness
- The type PM uses SF₆ as the insulating medium. ABB has invested a great deal to reduce SF₆ leaks through design, manufacturing techniques and innovative monitoring technologies, resulting in a leak rate of less than 0.5% per year.

Ease of installation and maintenance
- The type 72PM40-C is shipped completely assembled and filled with positive SF₆ pressure, allowing for the quickest installation time in the industry.
- Only standard tools are required for installation, inspection and normal maintenance and repair tasks.

MSD mechanism
The MSD mechanism incorporates proven design principles from ABB’s earlier spring operating mechanisms, including stable, reliable, low power operating latches and cam disc operation for closing operation control.

The MSD torsion spring operating mechanism is designed with a minimum of components, ensuring a high degree of total reliability and minimal need for maintenance.

An important innovation of the MSD design is the use of the torsion springs for opening and closing energy storage. This allows for a very compact design, with both closing and opening springs contained within the operating mechanism.
Features

**Tanks**
Single-piece tanks are ASME pressure vessel tested and certified, and receive a UM stamp.

**Control cubicle**
ABB prides itself on offering generously sized control cubicles at workable heights to vastly improve access to the equipment over its lifetime.

**Insulating medium**
The Type 72PM40-C uses SF₆ as the insulating medium. ABB has invested in monitoring technology, manufacturing techniques, and innovative designs to reduce SF₆ gas leaks.

**Single-piece interrupter**
Our single-piece high-performance modular interrupters employ state-of-the-art technology that minimizes line-ground insulation components.

**Bushings**
ABB offers a variety of bushing options, including silicone and porcelain insulators, to meet customer application needs and environmental conditions. ABB utilizes tapered designs, where feasible, to reduce the SF₆ volume and therefore installed inventory in our customer’s fleet.

**Bushing current transformers**
ABB utilizes slipover bushing current transformer (BCT) designs for our dead tank product line which allow for cost effective, efficient and safe removal or exchange without removing the bushings.

**MSD1 mechanism**
The closing springs in the MSD1 mechanism generate the required driving force to close the circuit breaker and charge the opening spring. Immediately after each closing operation, a motor drives the spring charging gear to automatically charge the closing springs. After recharging the closing springs, the circuit breaker is capable of a rapid reclosing with a dead time interval of 0.3 s (i.e. O - 0.3 s - CO stored energy).
### Technical data

**Rated per ANSI and IEC standards**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum continuous voltage</td>
<td>kV</td>
<td>72.5</td>
</tr>
<tr>
<td>Operating frequency</td>
<td>Hz</td>
<td>50 / 60</td>
</tr>
<tr>
<td>Interrupting time</td>
<td>cycles</td>
<td>3 (50 ms)</td>
</tr>
</tbody>
</table>

**Impulse withstand voltage**

- 2 µ-sec chopped wave: kV Peak = 452
- Full wave lightning impulse (BIL): kV Peak = 350

**Power frequency withstand voltage**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 Hz 1 minute dry withstand</td>
<td>kV</td>
<td>160</td>
</tr>
<tr>
<td>60 Hz 1 minute wet withstand</td>
<td>kV</td>
<td>140</td>
</tr>
</tbody>
</table>

**Continuous current**

- A = 2000, 3000, 3150 (2)

**Close and latch current**

- kA = 104

**Short circuit breaking current**

- kA = 40

**Minimum operating gas pressure @ 20° C**

- psig / MPa, abs = 48 / 0.43

**Normal operating gas pressure @ 20° C**

- psig / MPa, abs = 58 / 0.50

**Permissible ambient temperature**

- °C = -50 to +55

**Interrupter enclosure**

- dead tank

### Configuration

- 3 pole units on single frame

### Design

- outdoor

### Expected lifetime

- yrs = ≥30

### Dimensions (H x W x L)

- ft / mm = 11.47 x 7.35 x 7.60 / 3496 x 2239 x 2318

### Weight, SF6 gas

- lbs / kg = 22 / 10

### Operating mechanism

**Type**

- spring-spring, type MSD1

**Quantity per breaker**

- 1

**Energy storage**

- torsion spring

**Standard operating duty**

- O-0.3s-CO-15s-CO

**Seismic rating**

- 0.5g value per IEEE 693

**Charging source**

- universal motor

**Available voltages**

- 48 VDC
- 110 - 125 VDC or VAC
- 220 - 250 VDC or VAC

**Power**

- 900 W

**Operating current**

- 10 A @ 48 V
- 12 A @ 110 V
- 6 A @ 220 V

**Peak starting current**

- 125 A @ 48 V
- 50 A @ 110 V
- 25 A @ 220 V

**Max recharge time**

- 15 seconds

**Available voltages**

- 48 VDC
- 110-125 VDC
- 220-250 VDC

### Charging motor

**Trip and close coils**

**Current**

<table>
<thead>
<tr>
<th>Trip</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 A @ 48 V</td>
<td></td>
</tr>
<tr>
<td>2.1 A @ 110 V</td>
<td></td>
</tr>
<tr>
<td>4.4 A @ 110 V</td>
<td></td>
</tr>
<tr>
<td>2.0 A @ 220 V</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Close</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 A @ 48 V</td>
<td></td>
</tr>
<tr>
<td>2.1 A @ 110 V</td>
<td></td>
</tr>
<tr>
<td>4.4 A @ 110 V</td>
<td></td>
</tr>
<tr>
<td>2.0 A @ 220 V</td>
<td></td>
</tr>
</tbody>
</table>

Above are not necessarily limiting values; further information available upon request.

**Notes**

(1) Requires tank heaters on applications with ambient temperatures less than -40° C

(2) Limited continuous current ratings at greater than +40 C
Dimensions and specifications

<table>
<thead>
<tr>
<th>Physical data</th>
<th>Metric</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height - installed</td>
<td>137.64 in (3496 mm)</td>
<td></td>
</tr>
<tr>
<td>Width - installed</td>
<td>88.15 in (2239 mm)</td>
<td></td>
</tr>
<tr>
<td>Length - installed</td>
<td>91.26 in (2318 mm)</td>
<td></td>
</tr>
<tr>
<td>Shipping weight</td>
<td>5809.18 lb (2635 kg)</td>
<td></td>
</tr>
<tr>
<td>Footprint of frame</td>
<td>37.0 in x 43.0 in (940mm x 1092mm)</td>
<td></td>
</tr>
<tr>
<td>Phase spacing</td>
<td>42.52 in (1080 mm)</td>
<td></td>
</tr>
<tr>
<td>Minimum height to ungrounded parts</td>
<td>108.27 in (2750 mm)</td>
<td></td>
</tr>
<tr>
<td>Typical installed weight with porcelain bushings and maximum BCT's</td>
<td>6084.76 lb (2760 kg)</td>
<td></td>
</tr>
</tbody>
</table>
Protection and control interfaces

Typical electrical drawings

AC schematic
- 42-1: Motor contactor
- 88-1: Motor
- 23-1: Non-adjustable thermostat

Primary DC trip
- 9A – 11A: Remote trip pole 1
- 52A: Auxiliary switch contact
- 52TC1: Trip coil

Notes:
1) Secondary trip is same as primary

Typical controls features

<table>
<thead>
<tr>
<th>Accessory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual trip coils</td>
</tr>
<tr>
<td>125 VDC</td>
</tr>
<tr>
<td>AC / DC transfer</td>
</tr>
<tr>
<td>Mini-monitor</td>
</tr>
<tr>
<td>EB-27 CT terminal blocks</td>
</tr>
<tr>
<td>Cabinet light - door activated</td>
</tr>
<tr>
<td>20 A GFI (cabinet exterior)</td>
</tr>
<tr>
<td>Non-insulated wire terminals</td>
</tr>
<tr>
<td>Fused knife switches</td>
</tr>
<tr>
<td>Open/close push buttons</td>
</tr>
<tr>
<td>Undervoltage relays</td>
</tr>
<tr>
<td>Local remote switch</td>
</tr>
<tr>
<td>Screw down device nameplates</td>
</tr>
</tbody>
</table>

DC close - pole 1
- 52X1: X relay, closing
- 52Y1: Y relay, anti pump
- 52B: Auxiliary switch contact
- 5A – 6B: Remote close and reclose
- 52CC-1: Close coil
- 63: Permissive contact / alarm contact

Popular CT options

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Accuracy</th>
<th>Metering</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANSI</td>
<td>Relaying</td>
<td>600:5 MR</td>
</tr>
<tr>
<td>1200:5 MR</td>
<td>C-400 / C-800</td>
<td>0.3B-1.0</td>
<td>CLASS 0.5@30VA</td>
</tr>
<tr>
<td>2000:5 MR</td>
<td>C-400 / C-800</td>
<td>0.3B-1.0</td>
<td>10P20@50VA</td>
</tr>
<tr>
<td>3000:5 MR</td>
<td>C-400 / C-800</td>
<td>0.3B-1.8</td>
<td>CLASS 0.5@30VA</td>
</tr>
<tr>
<td>4000:5 MR</td>
<td>C-400 / C-800</td>
<td>0.3B-2.0</td>
<td>CLASS 0.2@15VA</td>
</tr>
</tbody>
</table>
Shipping and installation

With the exception of the high voltage terminals and extension legs, the type 72PM40-C ships fully assembled with positive gas pressure. For domestic deliveries, all components are transported to the customer on a flatbed truck. Weight of gas at shipping pressure is provided with test report.

Installation and commissioning

The compact design is ideal for new or existing substation layouts for voltages up to 72 kV. The breaker fits within most existing footprints and can be used to quickly address the need for greater protection for minimal cost.

Those familiar with the PM line of breakers can typically install and commission the breaker within 2 days given a prepared foundation.

ABB offers supervision, installation, commissioning, and maintenance service on all ABB breakers.