Power Quality

Product Brochure

$AVC_2$ Active Voltage Conditioner
The ABB Active Voltage Conditioner (AVC) is an inverter based system that protects sensitive industrial and commercial loads from voltage disturbances. It provides fast, accurate voltage sag and surge correction as well as continuous voltage regulation and load voltage compensation. It has been optimally designed to provide the required equipment immunity from the level of voltage sags expected on the AC supply network.

The AVC is available in load capacities of 160kVA - 30MVA and has an operating efficiency exceeding 98%. It offers extremely fast response to three-phase sags down to 70%, and single-phase sags down to 55% on the AC supply network.

Standard models offer enhanced performance allowing correction of voltage sags and surges. All AVC models provide continuous regulation within +/-10% of the nominal mains voltage and also remove voltage unbalance from the supply.

**User Benefits**

- Fast (sub-cyclic) response
- Simple user controls
- Rugged overload capability
- Short circuit protected
- Extensive diagnostics
- Fault log and voltage event data logging
- Ethernet connectivity
- Modular construction

**System Benefits**

- Full correction, three-phase sags down to 70% retained voltage and single-phase sags down to 55% retained voltage
- Partial correction, three-phase sags down to 30% retained voltage
- Partial correction, single-phase sags down to 0% retained voltage
- Continuous “ONLINE” regulation
- Correction for voltage vector phase angle errors created by faults in the supply
- Voltage unbalance correction

**Options**

- Flicker correction
- Medium voltage systems
- Custom cabinet design
- Transformer mounted externally
- Customised transformer-enclosure for indoor or outdoor installation
- 40% correction
**Typical Factory Configuration**

Utility Network

The AVC₂ protects UPS operation and gives extended battery life.

**AVC₂ Ratings and Block Diagram**

<table>
<thead>
<tr>
<th>30% AVC₂ kVA Ratings</th>
<th>Frame size</th>
</tr>
</thead>
<tbody>
<tr>
<td>380V  400V  415V  208/480V</td>
<td></td>
</tr>
<tr>
<td>160  165  175  200</td>
<td>0.5B</td>
</tr>
<tr>
<td>240  250  260  300</td>
<td>0.75B</td>
</tr>
<tr>
<td>315  330  345  400</td>
<td>1B</td>
</tr>
<tr>
<td>475  500  520  600</td>
<td>1.5B</td>
</tr>
<tr>
<td>630  650  690  800</td>
<td>2B</td>
</tr>
<tr>
<td>790  830  865  1000</td>
<td>2.5B</td>
</tr>
<tr>
<td>950  1000 1035 1200</td>
<td>3B</td>
</tr>
<tr>
<td>1190 1250 1300 1500</td>
<td>4B</td>
</tr>
<tr>
<td>1585 1650 1729 2000</td>
<td>5B</td>
</tr>
<tr>
<td>1900 2000 2075 2400</td>
<td>6B</td>
</tr>
<tr>
<td>2215 2330 2420 2800</td>
<td>7B</td>
</tr>
<tr>
<td>2530 2660 2765 3200</td>
<td>8B</td>
</tr>
<tr>
<td>2850 3000 3110 3600</td>
<td>9B</td>
</tr>
</tbody>
</table>

**Non Essential Support Loads**
- pumps and fans
- lighting
- air conditioning
- heating

**Essential Process Loads**
- measurement
- monitoring
- control
- variable speed drives
- tools
- vacuum pumps

**Critical Control Loads**
- computers
- PLCs
- DCS
- SCADA

Active Voltage Conditioner
**Technical Specifications**

**Load Capacity**
- Capacity: 160 – 3600kVA up to 30MVA as custom design
- Displacement Power Factor of connected load - 0 lagging to 0.9 leading
- Crest factor 3 at 100% of rated current
- Overload capability from 100% supply voltage - 150% overload for at least 30 seconds, once per 50s

**Input Supply**
- Nominal supply voltage (according to model)
  - 50Hz: 380V, 400V, 415V, 60Hz: 208V, 380V, 400V, 415V, 480V, 600V options, medium voltage options
- Power system type: 3 phase, centre ground referenced
- Supply over voltage category - III
- Fault capacity > 40kA (model specific)
- Oultage – control ride through > 500ms
- Operating voltage range: maximum supply voltage. 110% of nominal supply voltage

**Output Supply**
- Nominal output voltage (V): Set to match nominal supply voltage
- 3ph voltage regulation range: +/- 10% continuous
- 3ph voltage regulation accuracy: +/- 1% typical to +/- 2% maximum
- 3ph balanced sag correction ability
  - 30% model: (from 70% remaining voltage), +30% for at least 30s, -10% continuous
  - 1ph to ground sag correction ability *1
  - 30% model: (from 55% remaining voltage), +45% for at least 30s, -15% continuous
- Sag correction accuracy: (within specified range), +/- 10% of correction ratio
- Sag correction response: Initial <250us, Complete < 0.5 cycle
- Equivalent series impedance (operating): <4% (Model specific)
- Efficiency >98% (typically 99%)

**Bypass**
- Capacity: 100% of model rating (kVA)
  - Maximum overload capacity (in bypass)
    - 10 minutes: 125%
    - 1 minute: 150%
    - 1s: 500%
    - 200ms: 2000%
- Transfer time: Inverter to Bypass < 0.5 ms, Bypass to Inverter < 250 ms
- Equivalent series impedance (bypass): < 2.5% typical

**Serial Comms**
- Access protocol: Ethernet connectivity; Modbus-RTU

**Injection Transformer**
- Transformer type - dry
- Insulation: UL class N, 200°C
- Finish: Dipped finish for moisture proofing
- Frequency: 50Hz or 60Hz models
- Vector group: Diii (delta + 3 independent windings)

**Environmental**
- Cabinet environmental rating: IP20 standard (Nema 1). IP21 by optional roof kit (consult factory)
- Pollution degree rating 2
- Minimum operating temperature: 0°C, 32°F
- Maximum operating temperature: 40°C, 104°F
- Celsius temperature derating: Above 40 °C derate at 2% per °C to a maximum of 50 °C
- Fahrenheit temperature derating: Above 104°F derate at 2% per 1.5°F to a maximum of 122°F
- Capacity derating with elevation: 1.2% every 100m above 1000m, 3000m maximum
- Cooling: Inverter - forced ventilation. Transformer - fan assisted ventilation
- Humidity: < 95%, non-condensing
- EMC emissions: CISPR 11 level A
- Noise: <75dB @ 2m

**Standards Conformance**
- En50178, CISPR11 Level A
- C-Tick, CE pending
- Semi F47 by test

**Technical Dimensions**

- Enclosure Height: 2154mm/84.4”
- 0.5B - 1B system: D 804mm/31.7”, W 809mm/31.9”
- 1.5B - 2B system (Side by side): D 804mm/31.7”, W 1618mm/63.7”
- 1.5B - 2B system (Back to back): D 1608mm/63.3”, W 809mm/31.9”
- 2.5B - 3B system: D 2008mm/71.9”, W 809mm/31.9”
- 4B - 6B system: D 2008mm/79.1”, W 1609mm/63.3”
- Side by side configurations available for all systems

For detailed dimensions contact ABB Power Quality.

All specifications are subject to change without prior notice.

*1 Single-phase-to-ground sag occurring on the utility side of a delta-star distribution transformer.