

RoHS

**REACH
SVHC**

规格承认书

Specification For Approval

产品名称： 交流电动机电容器
Product Name: A.C. Motor Capacitor
产品型号： CBB60
Product Type: CBB60
产品编码：
Product Code:
客户名称：
Customer name:
客户编码：
Customer Code:
日 期： 2018 年 10 月 10 日
Date: 2018.10.10



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1.适用范围 Scope

本产品规格书适用于 CBB60 型交流电动机电容器。该电容器为适用于和频率 100Hz 及以下的单相异步电动机绕组连接的，以及和三相异步电动机连接从而使这些电动机可由单相系统来供电的电动机电容器。

The specification applies to the A.C. motor capacitors type CBB60. The capacitors are made of metallized polypropylene film and intended to be applied to starting and running of AC single-phase motors at 50Hz/60Hz frequency.

2.性能指标 Performance reference

| | | |
|--------------------------------------|--------------|---------------------------------|
| 电容量偏差 Capacitance | | ±5% (J) |
| 额定电压 (有效值) Rated voltage(RMS) | U_n | 250/450VAC (370/400/440/500VAC) |
| 额定频率 Rated frequency | f | 50/60Hz |
| 损耗角正切 Dissipation factor (100Hz, 1V) | $\tan\delta$ | $\leq 20 \times 10^{-4}$ |
| 极间电压 Voltage test between terminals | U_{TT} | $2U_n/2s$ |
| 运行温度 Operating temperature | | -40°C~+70°C (-40°C~+85°C) |
| 运行等级 Class of Operation | | C Class (A、B、D Class) |
| 安全防护等级 Class of safety protection | | S0 (S3) |

上表括号里的产品如果需要也可以提供。

The products in parentheses can also be provided if Required.

3.使用条件 Service conditions

电容器应避免阳光直射、雨雪，以防止电容器出现电极间绝缘下降。电容器的使用条件如下：

The capacitor should be prevented from exposing in sunlight directly and rain or snow will cause fall of insulation between terminals and terminals to case of the capacitor. Followings are detailed service conditions:

3.1 海拔 Altitude

安装运行地区海拔不超过2000m。

Not exceeding 2000m (7500 feet) .

3.2 投入时的剩余电压 Residual voltage while loading

电容器投入时的剩余电压不超过额定电压的10%。

Not exceeding 10% rated voltage.

3.3 污秽 Pollution

安装运行地区为轻污秽地区。

The capacitors are suitable to operating in lightly polluted atmospheres.

3.4 湿热严酷度 Damp heat severity

电容器的湿热严酷度为21天。

Damp heat severity of the capacitor is 21 days.

4.过负荷 Overloads

4.1 最高允许电压 Maximum permissible voltage

应适于在引出端间电压有效值不超过 $1.1U_n$ 的异常条件下长期运行。

Not exceeding 1.1 times the rated voltage.

4.2 最大允许电流 Maximum permissible current

应适于在电流有效值不超过由额定正弦波电压和额定频率所产生的电流的 $1.3I_n$ 下运行。

Not exceeding 1.3 times the current that occurs at rated sinusoidal voltage and rated frequency.

4.3 最大允许容量（无功功率） Maximum permissible reactive output

在超过 U_n 和 I_n （虽然在 4.1 和 4.2 规定限值内）下运行所造成的过负荷应不超过 $1.35Q_n$ 倍额定容量。

The overloads resulting from operation at voltage and current exceeding the rated values (even though within the limits indicated in 4.1 and 4.2) should be less than 1.35 times the rated output.

5.电容器试验 Capacitor Test

未尽事宜参照 GB/T3667.1—2016 或 IEC 60252-1:2013《交流电动机电容器》的相关规定执行。

| 项 目 | 性 能 | 试验方法 |
|-----|-----|------|
|-----|-----|------|

| | | |
|----------|--|---|
| 1. 外观 | 1. 标志应位于规定的位置; 2. 引出端镀层完好, 不得生锈, 且引出端不得弯曲、变形; 3. 外壳上无裂痕、损伤等。 | 目 视 |
| 2. 外形及尺寸 | 见电容器外形图 | 游标卡尺 |
| 3. 耐电压 | 表 1 耐电压测试 | |
| | 试验场所 | 试验电压 (有效值) |
| | 极 间 | 2Un |
| | 加压时间 | 型式 60s 常规 2s |
| 4. 绝缘电阻 | RC≥3000MΩ·μF (测试时间≤1min, 测试电压 100VDC) | |
| 5. 电容量 | 允许偏差: ±5% (J) | GB 3667.1—2016 |
| 6. 损耗角正切 | 0.2%以下 (100Hz, 1V) | |
| 7. 耐久性 | <p>试验应在强制循环空气中进行, 使电容器外壳温度尽可能接近最大允许工作温度。</p> <p>根据表 2 的条件进行试验, 试验后的值要符合表 3。</p> <p>表 2 连续耐久性试验条件</p> | |
| | 恒温箱温度 | 最高运行温度 70℃ (85℃) ±2℃ |
| | 试验电压 和时间 | C 级: 1.25Un/600h (A 级: 1.35Un/3000h 或 1.25Un/3000h; B 级: 1.35Un/1000h 或 1.25Un/1000h; D 级: 1.25Un/200h) |
| | 表 3 判定基准 | |
| | 试验项目 | 试验后的值 |
| | 外观 | 无显著异常变化 |
| | 电容量 | 对于初期值的变化率在±3%以内 |
| 8. 耐湿热性 | <p>按照表 6 的条件进行试验, 试验后的值应符合表 7。</p> <p>表 4 耐湿性试验条件</p> | |
| | 恒温恒湿箱的温度 | 40±3℃ |
| | 湿度 | 90~95% |
| | 试验条件 | 500h±12h |
| | <p>试验后, 将电容器放置在标准大气条件下恢复 2 小时, 再进行下列判别。</p> <p>表 5 判定基准</p> | |
| | 试验项目 | 试验后的值 |
| | 外观 | 无异常显著的变化 |
| 电容量 | 对于初期值的变化率在±0.5%以内 | |
| 9. 自愈性 | 对电容器施加 60 秒 50/60Hz 正弦波或近似正弦波的电 | GB 3667.1—2016 |

| | <p>压, 电压值为 2.0 倍额定电压。如果在这一时间内发生的自愈性击穿少于 5 次, 则应将电压以每分钟不超过 200V 的速度升高, 直至从试验开始发生 5 次自愈性击穿, 或电压达到最高值 3.5Un 为止。</p> <p>此后, 电压应降到发生第 5 次自愈时电压的 0.8 倍或电压最高值的 0.8 倍, 并保持 10s。在这期间, 应允许在每台电容器内再发生一次自愈性击穿。</p> <p>试验期间的自愈性击穿可由示波器或声响法以及高频试验法探测。</p> <p style="text-align: center;">表 6 判定标准</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">外 观</td> <td>无显著变化</td> </tr> <tr> <td>电容量</td> <td>对于初期值的变化率在 0.5% 以内</td> </tr> <tr> <td>RC 值</td> <td>≥100s</td> </tr> </table> | 外 观 | 无显著变化 | 电容量 | 对于初期值的变化率在 0.5% 以内 | RC 值 | ≥100s | | | | | | | | | | | | | | | | |
|----------|---|------------------|-------|--------|--------------------|------------------|--------|---------|---------|---------|---------|---------|--------|---------|---------|----------|--------|--------|----------|----------|----------|--|--|
| 外 观 | 无显著变化 | | | | | | | | | | | | | | | | | | | | | | |
| 电容量 | 对于初期值的变化率在 0.5% 以内 | | | | | | | | | | | | | | | | | | | | | | |
| RC 值 | ≥100s | | | | | | | | | | | | | | | | | | | | | | |
| 10. 机械试验 | <p>引出端强度: 对引出端施加 20N 的负荷。</p> <p>振动: $f=10\sim 55\text{Hz}$, $a=\pm 0.35\text{mm}$</p> <p>每一轴向试验持续时间为 10 个频率周波 (三个轴向互成 90°), 每分钟一倍频程。</p> <p style="text-align: center;">表 7 判别标准</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">外 观</td> <td>无显著变化</td> </tr> <tr> <td>极壳间耐电压</td> <td>不发生介质击穿或闪络</td> </tr> </table> | 外 观 | 无显著变化 | 极壳间耐电压 | 不发生介质击穿或闪络 | GB/T 3667.1—2016 | | | | | | | | | | | | | | | | | |
| 外 观 | 无显著变化 | | | | | | | | | | | | | | | | | | | | | | |
| 极壳间耐电压 | 不发生介质击穿或闪络 | | | | | | | | | | | | | | | | | | | | | | |
| 11. 破坏试验 | S0 电容器不进行破坏试验。S3 电容器使用同时进行直流交流试验用试验设备进行破坏试验, 试验后电容器容量小于额定容量的 1%。 | GB/T 3667.1—2016 | | | | | | | | | | | | | | | | | | | | | |
| 试验分类 | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">常规试验</th> <th colspan="2">型式试验</th> </tr> </thead> <tbody> <tr> <td>1. 外观</td> <td>1. 外观</td> <td>7. 耐久性</td> </tr> <tr> <td>2. 结构尺寸</td> <td>2. 结构尺寸</td> <td>8. 耐湿热性</td> </tr> <tr> <td>3. 极间耐压</td> <td>3. 极间耐压</td> <td>9. 自愈性</td> </tr> <tr> <td>4. 绝缘电阻</td> <td>4. 绝缘电阻</td> <td>10. 机械试验</td> </tr> <tr> <td>5. 电容量</td> <td>5. 电容量</td> <td>11. 破坏试验</td> </tr> <tr> <td>6. 损耗角正切</td> <td>6. 损耗角正切</td> <td></td> </tr> </tbody> </table> | 常规试验 | 型式试验 | | 1. 外观 | 1. 外观 | 7. 耐久性 | 2. 结构尺寸 | 2. 结构尺寸 | 8. 耐湿热性 | 3. 极间耐压 | 3. 极间耐压 | 9. 自愈性 | 4. 绝缘电阻 | 4. 绝缘电阻 | 10. 机械试验 | 5. 电容量 | 5. 电容量 | 11. 破坏试验 | 6. 损耗角正切 | 6. 损耗角正切 | | |
| 常规试验 | 型式试验 | | | | | | | | | | | | | | | | | | | | | | |
| 1. 外观 | 1. 外观 | 7. 耐久性 | | | | | | | | | | | | | | | | | | | | | |
| 2. 结构尺寸 | 2. 结构尺寸 | 8. 耐湿热性 | | | | | | | | | | | | | | | | | | | | | |
| 3. 极间耐压 | 3. 极间耐压 | 9. 自愈性 | | | | | | | | | | | | | | | | | | | | | |
| 4. 绝缘电阻 | 4. 绝缘电阻 | 10. 机械试验 | | | | | | | | | | | | | | | | | | | | | |
| 5. 电容量 | 5. 电容量 | 11. 破坏试验 | | | | | | | | | | | | | | | | | | | | | |
| 6. 损耗角正切 | 6. 损耗角正切 | | | | | | | | | | | | | | | | | | | | | | |

Please see The following Table and refer to the relative items indicated in GB/T 3667.1-2016 or IEC 60252-1:2013.

| Items | Performances | Testing methods |
|-----------------------|---|-----------------|
| 1. Visual examination | 1. Mark shall be on the place specified on the drawing 2. Coating layers of terminals shall be not damaged, and terminals shall not rust, bend and distort | Visual check |

| | | | | |
|-----------------------------|---|--|--------------------------------------|--------------------------------|
| | 3. No crack and damage of appearance. | | | |
| 2. Structure and dimensions | Conform as the drawings and materials list | | | Measuring with vernier caliper |
| 3. Voltage test | Table 1: Voltage test | | | GB /T3667.1—2016 |
| | Test Site | Test voltage | Test time | |
| | Between terminals | 2Un (2times the rated voltage) | Type test: 60 s Routine test: 2 s | |
| 4. Insulation resistance | RC≥3000MΩ.μF (Duration: no more than 1min, Testing voltage: 100 VDC) | | | |
| 5. Capacitance | Tolerance : ±5% | | | GB /T3667.1—2016 |
| 6. Dissipation factor (DF) | ≤20×10 ⁻⁴ (100Hz,1V) | | | |
| 7. Endurance test | The test shall be carried out in air with forced circulation so that the capacitor case temperature is as close as possible to the maximum permissible operating temperature. After the test as Table 2, the results shall meet Table 3. | | | GB /T3667.1—2016 |
| | Table 2 Endurance test conditions | | | |
| | Temp. in const.-temp. chamber | maximum permissible operating temperature 70°C (85°C) ±2°C | | |
| | Test voltage and Duration | C Class: 1.25Un/600h(A Class: 1.35Un/3000h or 1.25Un/3000h; B Class: 1.35Un/1000h or 1.25Un/1000h; D Class: 1.25Un/200h) | | |
| | Table 3 Requirements | | | |
| | Test item | Values after test | | |
| | Visual examination | No obvious change | | |
| Capacitance | Within ±3% the original value | | | |
| 8. Damp-heat test | After the test as Table 4, the result shall meet Table 5. | | | GB /T3667.1—2016 |
| | Table 4 Damp-heat test conditions | | | |
| | Temp. & humidity in constant temperature and damp chamber | 40±3°C 90~95% | | |
| | Duration | 500h±12h | | |
| | After the test, the capacitors shall be stored under standard atmospheric conditions for recovery for 2 hours, then be measured. | | | |
| | Table 5 Requirements | | | |
| Test item | Values after test | | | |
| Appearance | No abnormal obvious change | | | |
| Capacitance | Within ±0.5% the original value | | | |

| | | | | |
|------------------------|---|---------------------------------------|--------------------------|----------------------|
| 9. Self-healing test | <p>Capacitors shall be subjected to an a.c. voltage test. The test shall be carried out with a substantially sinusoidal voltage that is $2U_n$ at 50 or 60Hz. If fewer than five self-healing breakdowns occur during this time, the voltage shall be increased at a rate of not more than 200v/min until five clearings have occurred since the beginning of the test or until the voltage has reached a maximum of $3.5U_n$.</p> <p>The voltage shall then be decreased to 0.8 times of the voltage at which the fifth clearing occurred or 0.8 times the maximum voltage and maintained for 10s, one additional clearing in each capacitor shall be permitted during this period.</p> <p>Self-healing breakdowns during the test may be detected by an oscilloscope or by acoustic or high-frequency test methods.</p> <p style="text-align: center;">Table 6 Requirements</p> | | | GB /T3667.1—2016 |
| | Visual examination | No obvious change | | |
| | Capacitance change | Within 0.5% | | |
| | Value of RC | Above 100 s ($M\Omega \cdot \mu F$) | | |
| 10. Mechanical tests | <p>Robustness of terminals: the load to be applied shall be 20N for terminals. After the test, no damage occurs.</p> <p>Vibration : $f=10\sim 55\text{Hz}$, $a=\pm 0.35\text{mm}$</p> <p>Test duration per axis=10 frequency cycles (3axes offset from each other by 90°) 1octave per minute.</p> <p style="text-align: center;">Table 7 Requirements</p> | | | GB /T3667.1—2016 |
| | Visual examination | No obvious change | | |
| | Capacitance | Within $\pm 0.5\%$ the original value | | |
| | | | | |
| 11. Destruction test | <p>S0 capacitors do not carry out destructive tests. S3 capacitor is used for testing the test equipment for the simultaneous DC and AC test, and the capacitor capacitance is less than 1% of the rated capacitance after the Test.</p> | | | GB /T3667.1—2016 |
| Testing classification | Routine test | | Type test | |
| | 1. Visual examination | | 1. Visual examination | 7. Endurance test |
| | 2. Structure & dimensions | | 2. Structure & dimension | 8. Damp-heat test |
| | 3. Voltage test | | 3. Voltage test | 9. Mechanical test |
| | 4. Insulation resistance | | 4. Insulation resistance | 10. Self-healing |
| | 5. Capacitance | | 5. Capacitance | 11. Destruction test |
| 6. DF | | 6. DF | | |

6. 包装和储存 Packing and storing

电容器采用双瓦楞纸箱包装，在 -40°C 时能保证电容器运输和储存不影响电容器性能。运输和储存时，请注意防潮、轻放、向上，包装箱的堆码极限为8层。请按照指示方向开箱。

The capacitor is packed in double corrugated paperboard box , which is able to guarantee the capacitor in conveyance and deposited at forty degrees below zero. The capacitors should be damp-proofed, discharged gently, stacked in less than eight floors and upwards when they are conveyance and storing. Please open the box as the direction indicating on the box.

电容器应贮存在温度为 10~38℃，相对湿度小于 70%的对电容器性能无影响的地方，贮存期为一年。

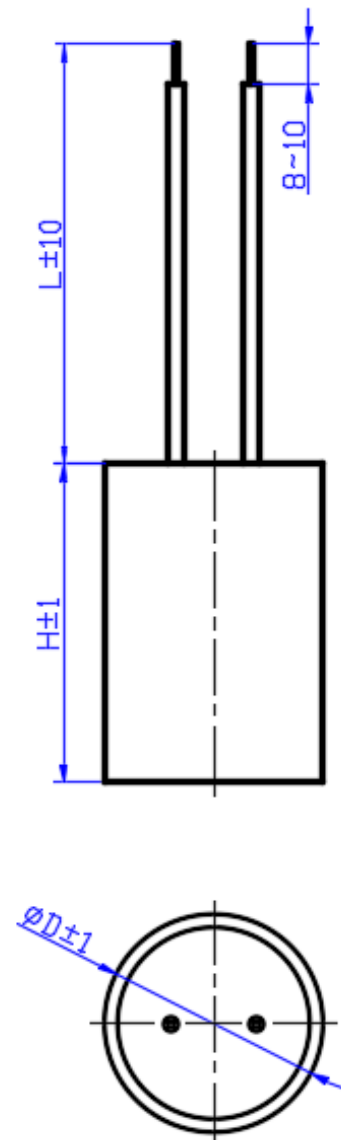
The capacitor must be stored under the temperature between 10~38℃ and relative humidity less than 70% for less than one year.

7. 外形和尺寸 Outline and dimension

尺寸表一为引线电容器尺寸。

Dimension table 1 for lead wire capacitor size.

| 额定电压 Rated voltage (VAC) | 额定电容量 Rated capacitance (μ F) | Φ D(mm) | H(mm) |
|--------------------------------|--|--------------|-------|
| 250 | 1 | 20 | 40 |
| 250 | 1.5 | 20 | 40 |
| 250 | 2 | 20 | 40 |
| 250 | 2.5 | 20 | 40 |
| 250 | 3 | 20 | 40 |
| 250 | 3.5 | 20 | 40 |
| 250 | 4 | 20 | 40 |
| 250 | 4.5 | 20 | 40 |
| 250 | 5 | 22 | 40 |
| 250 | 5.5 | 25 | 48 |
| 250 | 6 | 25 | 48 |
| 250 | 6.5 | 25 | 48 |
| 250 | 7 | 25 | 48 |
| 250 | 7.5 | 25 | 48 |
| 250 | 8 | 27 | 48 |
| 250 | 8.5 | 27 | 48 |
| 250 | 9 | 27 | 48 |
| 250 | 10 | 27 | 48 |
| 250 | 12 | 30 | 48 |
| 250 | 15 | 30 | 48 |
| 250 | 16 | 30 | 48 |
| 250 | 18 | 33 | 50 |
| 250 | 20 | 33 | 50 |
| 250 | 25 | 35 | 50 |
| 250 | 30 | 37.5 | 50 |
| 250 | 35 | 36 | 60 |



| | | | |
|-----|-----|------|------|
| 250 | 40 | 40 | 60 |
| 250 | 50 | 40 | 70 |
| 250 | 60 | 42 | 72.5 |
| 250 | 70 | 45 | 92.5 |
| 250 | 80 | 45 | 92.5 |
| 250 | 100 | 50 | 92.5 |
| 450 | 1 | 20 | 40 |
| 450 | 1.5 | 20 | 40 |
| 450 | 2 | 22 | 40 |
| 450 | 2.5 | 25 | 48 |
| 450 | 3 | 25 | 48 |
| 450 | 3.5 | 25 | 48 |
| 450 | 4 | 27 | 48 |
| 450 | 4.5 | 27 | 48 |
| 450 | 5 | 30 | 48 |
| 450 | 5.5 | 30 | 48 |
| 450 | 6 | 30 | 48 |
| 450 | 6.5 | 36 | 48 |
| 450 | 7 | 36 | 48 |
| 450 | 7.5 | 36 | 48 |
| 450 | 8 | 36 | 48 |
| 450 | 8.5 | 36 | 48 |
| 450 | 9 | 36 | 48 |
| 450 | 10 | 37.5 | 50 |
| 450 | 12 | 36 | 60 |
| 450 | 15 | 40 | 60 |
| 450 | 16 | 40 | 60 |
| 450 | 18 | 40 | 70 |
| 450 | 20 | 40 | 70 |
| 450 | 25 | 45 | 92.5 |
| 450 | 30 | 45 | 92.5 |
| 450 | 35 | 45 | 92.5 |
| 450 | 40 | 50 | 92.5 |

尺寸表二为盖板电容器尺寸。

Dimension table 2 for Cover capacitor size.

| 额定电压 Rated voltage (VAC) | 额定电容量 Rated capacitance (μ F) | Φ D(mm) | H(mm) |
|-----------------------------------|---|--------------|-------|
| 250 | 5 | 26 | 55 |
| 250 | 5.5 | 26 | 55 |
| 250 | 6 | 26 | 55 |
| 250 | 6.5 | 26 | 55 |
| 250 | 7 | 26 | 55 |
| 250 | 7.5 | 30 | 55 |
| 250 | 8 | 30 | 55 |
| 250 | 8.5 | 30 | 55 |

| | | | |
|-----|-----|----|----|
| 250 | 9 | 30 | 55 |
| 250 | 10 | 30 | 55 |
| 250 | 12 | 30 | 55 |
| 250 | 15 | 34 | 55 |
| 250 | 16 | 34 | 55 |
| 250 | 18 | 34 | 55 |
| 250 | 20 | 40 | 55 |
| 250 | 25 | 40 | 55 |
| 250 | 30 | 40 | 70 |
| 250 | 35 | 40 | 70 |
| 250 | 40 | 40 | 70 |
| 250 | 50 | 45 | 75 |
| 250 | 60 | 45 | 75 |
| 250 | 70 | 45 | 95 |
| 250 | 80 | 45 | 95 |
| 250 | 100 | 50 | 95 |
| 450 | 2 | 26 | 55 |
| 450 | 2.5 | 26 | 55 |
| 450 | 3 | 26 | 55 |
| 450 | 3.5 | 30 | 55 |
| 450 | 4 | 30 | 55 |
| 450 | 4.5 | 30 | 55 |
| 450 | 5 | 30 | 55 |
| 450 | 5.5 | 34 | 55 |
| 450 | 6 | 34 | 55 |
| 450 | 6.5 | 34 | 55 |
| 450 | 7 | 34 | 55 |
| 450 | 7.5 | 40 | 55 |
| 450 | 8 | 40 | 55 |
| 450 | 8.5 | 40 | 55 |
| 450 | 9 | 40 | 55 |
| 450 | 10 | 40 | 55 |
| 450 | 12 | 40 | 70 |
| 450 | 15 | 40 | 70 |
| 450 | 16 | 45 | 75 |
| 450 | 18 | 45 | 75 |
| 450 | 20 | 45 | 75 |
| 450 | 25 | 45 | 95 |
| 450 | 30 | 45 | 95 |
| 450 | 35 | 50 | 95 |
| 450 | 40 | 50 | 95 |

