

# Specification

**Co., Ltd.**

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**MODEL Name : CS-0525SPA00**

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Signature

17th July 2014

**ChungSuk Co., Ltd.**

3 Ma 808, Shiwha Industrial Complex,  
2094-8 Jungwang-Dong Shihung-City,  
Kyonggi-Do 429-450 KOREA

<b>ChungSuk Co., Ltd.</b>	Specification <hr/> BLDC Pump for Hot water Circulation		1 6																																																																	
<p>1. Scope This Standard deals with the performance and safety criteria for Model CS-0525SPA00 which is a circulation pump with BLDC motor drive.</p> <p>2. Test and conformation Stated Performance and Safety characteristics should be tested and meet the given criteria. Tested result is based on the condition of rated flow rate of 20[L/min], if stated any.</p> <p>3. Types of Pump 1) Pump : Canned type Non-self priming pump</p> <p>4. Specification</p> <table border="1" data-bbox="373 846 1350 1659"> <thead> <tr> <th>No.</th> <th>Item</th> <th>Standard</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Rated Voltage (Vm)</td> <td>24 VDC</td> </tr> <tr> <td>2</td> <td>Insulation Classification</td> <td>Class B insulation (Motor coil temperature : Not more than 130℃)</td> </tr> <tr> <td>3</td> <td>Type of motor</td> <td>Brushless DC Motor</td> </tr> <tr> <td>4</td> <td rowspan="3">Pumping characteristics</td> <td>Rated Total capacity</td> </tr> <tr> <td>5</td> <td>Rated head</td> </tr> <tr> <td>6</td> <td>Rated revolution</td> </tr> <tr> <td>7</td> <td>Operating pressure</td> <td>0.5MPa</td> </tr> <tr> <td>8</td> <td>Withstand Pressure/Burst Withstand Pressure</td> <td>0.6MPa/1.0MPa</td> </tr> <tr> <td>9</td> <td>Drive power supply range</td> <td>16~30 V</td> </tr> <tr> <td>10</td> <td>Variable flow-rate voltage</td> <td>0 VDC to 5.5 VDC</td> </tr> <tr> <td>11</td> <td>Power Consumption</td> <td>119 W (at rated voltage)</td> </tr> <tr> <td>12</td> <td>Operating current</td> <td>5.08A (at rated voltage)</td> </tr> <tr> <td>13</td> <td>Current limit set value</td> <td>Peak current : 6.2A ± 7%</td> </tr> <tr> <td>14</td> <td>Dry Running protection</td> <td>Stop after 3 time checking</td> </tr> <tr> <td>15</td> <td>Over temperature protection</td> <td>120℃±5% : Stop 70℃±5% : Restart</td> </tr> <tr> <td>16</td> <td>Over Current protection</td> <td>If it is over 6.2A, it will be stop for 1 sec and restart</td> </tr> <tr> <td>17</td> <td>Pump Locking protection</td> <td>Repeat that if there is no rotation for 2sec, it will be run after 4 sec.</td> </tr> <tr> <td>18</td> <td>Circulating water temperature</td> <td>0℃ ~ 80℃ (Ambient Temperature : Under 60℃)</td> </tr> <tr> <td>19</td> <td>Ambient humidity for use</td> <td>Not more than 95%RH</td> </tr> <tr> <td>20</td> <td>Revolution signal output (F/G)</td> <td>4 Pulses per Rotation</td> </tr> <tr> <td>21</td> <td>Total Weight</td> <td>1.54 kg</td> </tr> </tbody> </table>					No.	Item	Standard	1	Rated Voltage (Vm)	24 VDC	2	Insulation Classification	Class B insulation (Motor coil temperature : Not more than 130℃)	3	Type of motor	Brushless DC Motor	4	Pumping characteristics	Rated Total capacity	5	Rated head	6	Rated revolution	7	Operating pressure	0.5MPa	8	Withstand Pressure/Burst Withstand Pressure	0.6MPa/1.0MPa	9	Drive power supply range	16~30 V	10	Variable flow-rate voltage	0 VDC to 5.5 VDC	11	Power Consumption	119 W (at rated voltage)	12	Operating current	5.08A (at rated voltage)	13	Current limit set value	Peak current : 6.2A ± 7%	14	Dry Running protection	Stop after 3 time checking	15	Over temperature protection	120℃±5% : Stop 70℃±5% : Restart	16	Over Current protection	If it is over 6.2A, it will be stop for 1 sec and restart	17	Pump Locking protection	Repeat that if there is no rotation for 2sec, it will be run after 4 sec.	18	Circulating water temperature	0℃ ~ 80℃ (Ambient Temperature : Under 60℃)	19	Ambient humidity for use	Not more than 95%RH	20	Revolution signal output (F/G)	4 Pulses per Rotation	21	Total Weight	1.54 kg
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			E.S. Kwon	H.W.Park S.T.Choi	Checked C.J.Kim	Approval J.H.Lee																																																														

<p><b>Chungsuk Co., Ltd.</b></p>	<p style="text-align: center;">Product Standard</p> <hr style="border: none; border-top: 1px solid black; width: 100%;"/> <p style="text-align: center;">BLDC Pump for Hot water Circulation</p>	<p style="text-align: center;">2</p> <hr style="border: none; border-top: 1px solid black; width: 100%;"/> <p style="text-align: center;">6</p>																								
<p><b>5. Structure and Dimensions</b></p> <p>5-1. Structure</p> <ol style="list-style-type: none"> <li>1) Each parts should be assembled with bolts and have enough strength and sealing structure.</li> <li>2) No damaged parts and No trouble under nominal usage condition.</li> <li>3) No rust , crack and other damages by visual.</li> </ol> <p>5-2. Dimension</p> <p>Dimensions should follow the drawing no. CSBP-045-1010.</p> <p><b>6. Characteristics</b></p> <p>The characteristic values in table 1,2 and 3 are measured using clean water with normal temperature of 20℃~25℃</p> <p>1) Starting test</p> <p style="padding-left: 20px;">The pump should start rotation over 70% of rated voltage of Motor at designed flow control voltage.</p> <p>2) Performance</p> <p style="padding-left: 20px;">The performance of pump should satisfy the values in the table 1,2 and 3 under the rated conditions of Vm:DC 24V, Vsp:5.5V</p> <p style="padding-left: 20px;">Note. Tested values should be gotten within 3 minutes.</p> <p>Table 1. Head (Vm:DC 24V, Vsp:5.5V)</p> <table border="1" data-bbox="373 1169 1291 1303"> <thead> <tr> <th>Flow rate (L/min)</th> <th>Head (m) ± 10%</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>18.9</td> </tr> <tr> <td>20</td> <td>14.0</td> </tr> <tr> <td>40</td> <td>8.9</td> </tr> </tbody> </table> <p>Table 2. Current (Vm:DC 24V, Vsp:5.5V)</p> <table border="1" data-bbox="373 1397 1291 1532"> <thead> <tr> <th>Flow rate (L/min)</th> <th>Current (A) ± 10%</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4.62</td> </tr> <tr> <td>20</td> <td>5.08</td> </tr> <tr> <td>40</td> <td>5.51</td> </tr> </tbody> </table> <p>Table 3. Power consumption (Vm:DC 24V, Vsp:5.5V)</p> <table border="1" data-bbox="373 1626 1291 1760"> <thead> <tr> <th>Flow rate (L/min)</th> <th>Power consumption (W) ± 10%</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>109</td> </tr> <tr> <td>20</td> <td>119</td> </tr> <tr> <td>40</td> <td>128</td> </tr> </tbody> </table>			Flow rate (L/min)	Head (m) ± 10%	0	18.9	20	14.0	40	8.9	Flow rate (L/min)	Current (A) ± 10%	0	4.62	20	5.08	40	5.51	Flow rate (L/min)	Power consumption (W) ± 10%	0	109	20	119	40	128
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**7. Temperature rising test**

1) It should be satisfied the temperautre criteria of table 7-1 in the steady state temperature after continuous running with flow rate of 20 L/min under rated operating condition of Vm:DC 24V,Vsp:DC 5.5V using clean water with temperature of 80 °C ( note : ambient temperature is 25 °C)

Table 7-1. temperature

Tested Position	standard	
	Test Method	criteria
Motor Coil surface	Thermometer	below 130 °C
IC Surface	Thermometer	below 120 °C

**8. Insulation Resistance**

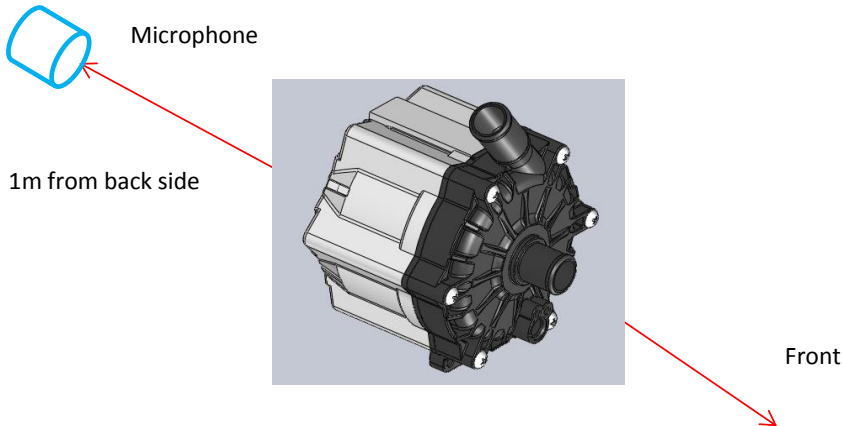
- 8-1. Insulation Resistance : Over 100MΩ measured at DC 500V
- 8-2. Dielectric strength : No damages at AC1200V during 1 second.(2mA)

**9. Vibration**

No abnormal vibration and noise at running with rated Vm:DC 24V,Vsp:DC5.5V and flow rate of 20 L/min. The vibration level should be under the displacement of 15 μm.  
 Note. Measuring frequency band is from 10 to 500Hz.

**10. Noise**

The sound pressure level should be **Max. 45dB(A)** measured at the distance of 1m from the back side of pump on the running condition of rated operating voltage (Vm : DC 24V,Vsp: DC 5.5V) and the flow rate of 20 L/min after draining out remaining air inside the pump.  
 Do not allow abnormal noise.  
 Note. The measuring frequency band is from 3.15Hz to 20kHz.



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**11. Life Time**

It should be run without failure during **40,000 hours** continuously with rated conditions.

Water temperature 80 °C (clean water)

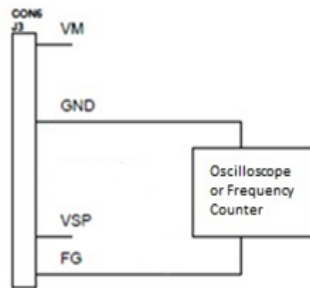
Ambient temperature 15~25 °C

Flow rate 20 L/min

For validation test, the static pressure is only pumping pressure.

We do not add any pressure into the testing apparatus.

**12. Detection of output signal for RPM**



4 pulse out per 1 revolution

**13. Resisting Water Pressure**

Fill water into the pump and pressurize with 0.5MPa for validation by sampling.

Leakage do not allowed.

This test is performed instead of air case test

**14. Notice in Use**

- 1) Do not use near the corrosive environment.
- 2) Do not use near the oily environment and their neighbor.
- 3) This product do not have any prevention device for freezing , so If expected any possibility of freezing, do not use before preparing freezing-free device.

**15. Protective Function**

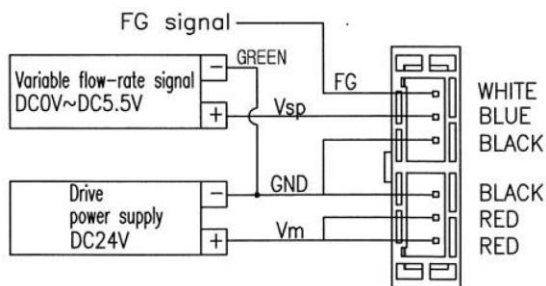
- 1) Over heat protection  
The current is on and off when the below condition is reached.  
- Trip on : 120 °C ± 5%  
- Trip off : 70 °C ± 5%
- 2) Limiting Current  
When the current flows 6.2A ± 7%, then current is controlled to remain that value.
- 3) Locked Rotor Protection  
Checking the revolution of rotor with real time, cut the current 4 second and restart when the rotational speed is zero.
- 4) Over current protection  
When the current in operational state is raised rapidly and its value reaches around 60A, then pump stops during 1 second and restarts repeatedly.

5) Dry running protection

Rotational speed exceeds 6000rpm Abnormal state is not removed after 3times trial, then finally decide that the operation is under dry state running and cut off the power to stop pump.

Reset should be made by Power off and on after resolution of dry running cause to run the pump.

**16. Placement of Power Pin**



**17. Name Plate ( One of example, basic form )**



1) Production No.  
 00 00 00  
 year month day

2) Print with oily ink

**18. Packing**

Apply CSK Standard Or needed discussion with Chungsuk.

**19. Operation and Use**

- 1) Install the pump remaining shaft horizontally to prevent abnormal running.
- 2) Do not allow running without water inside the pump and cutoff running to prevent rapid wear of carbon bearing. But allow within 5 seconds conditionally and 2 times in inevitable case limitedly.
- 3) Use clean water only.  
 But in case of using other media as circulation fluid, you should test enough time for preventing unexpected failures.
- 4) If expected mixture of any foreign material, for example a hair, a down, small stone and iron powder, install mesh screen to suction side for preventing locking of rotating parts.

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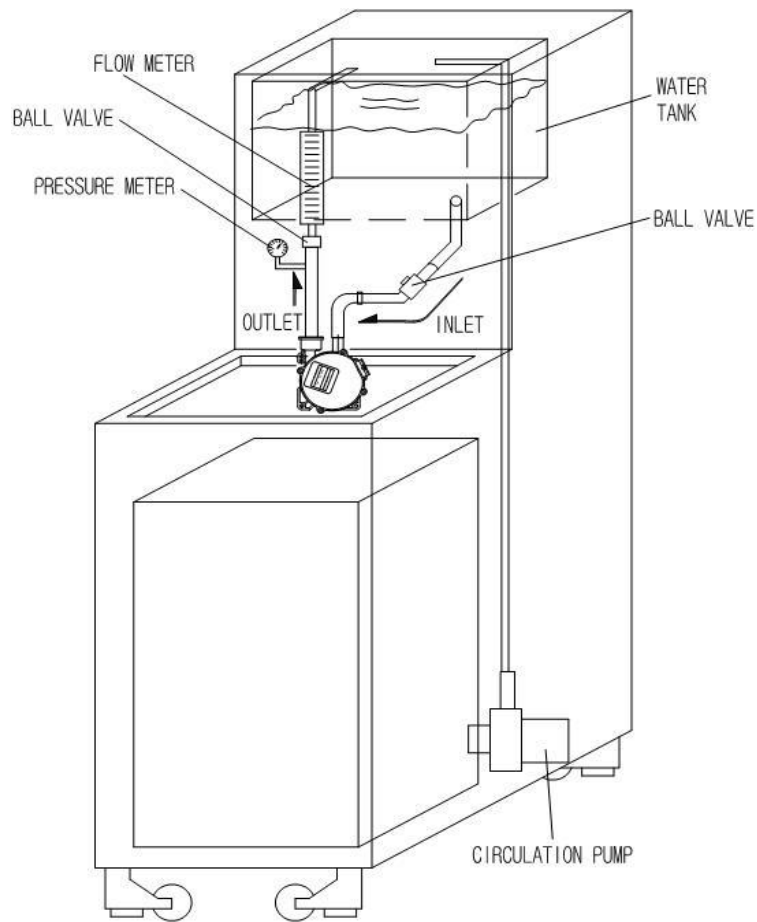
**20. Other**

When the specification is changed, It is meditated both provider and user before the implement.

**21. The term of gurantee**

It is Determined separately

**22. Characteristic Test Apparatus**



# Performance Data

Model : CS-0525SPA00

Rated Voltage : Vm 24VDC, Vsp 5.5VDC

Vsp5.5[V]				
Q [L/min]	Ht [m]	Ii [A]	Pi [W]	N [rpm]
0	18.9	4.62	108.7	4908
10	16.2	4.87	114.4	4547
20	14.0	5.08	118.9	4088
30	11.8	5.28	123.2	3914
40	8.9	5.51	128.3	3564
50	6.0	5.66	131.5	3401

