Specification

MODEL Name : CS-0512HM1-24M

Signature
22nd Feb. 2012

ChungSuk Co., Ltd.

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

1. Scope

This Standard deals with the performance and safety criteria for Model CS-0512HM1-24M which is a circulation pump with BLDC motor drive.

2. Test and confirmation

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 10[L/min], if stated any.

3. Types of Pump

1) Pump : Canned type non-self priming pump

4. Specifications

No.	Item		Standard
1	Rated Voltage (Vm)		24 VDC
2	Insulation Classification		Class **B** insulation (Motor coil temperature : Not more than 115℃)
3	Type of motor		Brushless DC Motor
4	Pumping characteristics	Rated Total capacity	10L/min
5		Rated head	Not less than 3.5m
6		Rated revolution	3500 rpm
7	Noise	Noise level	Under 35dB(A)
8	Vibration	Amplitude	Under 15 ㎛ (frequency 10 ~ 500Hz)
9	Power Supply range		12 ~ 26 VDC
10	Power Consumption		32W ± 15% (at rated voltage)
11	Operating current		1.25A ± 15% (at rated voltage)
12	Current limit set value		Peak current : 1.7A ± 10%
13	Dry Running protection		Stop after 3 times trial run from detecting
14	Over temperature protection		120℃±7% : Stop 80℃±7% : Restart
15	Over Current protection		If it is over 3.6A, it will be stopped for 1 sec and restarted
16	Pump Locking protection		Repeat that if there is no rotation for 2sec, it will be run after 3 sec.
17	Circulating Fluid temperature		-20℃ ~ 90℃ (Ambient Temperature : Under 40℃)
18	Fluid for circulation		Glycol 50%
19	Ambient humidity for use		Under 95%RH
20	Nominal Operating Pressure		10 ㎏·f/㎠
21	Min Static Pressure (Burst test pressure)		Min. 15 ㎏/㎠ (at, 20℃)
22	Revolution signal output		6 Pulses per Rotation
23	Total Weight		0.68 kg

Note 1. When the Ambient temperature is below zero, the circulation fluid should not be frozen.

Date regislated	2012. 02. 22	Standard				
Revision		Signature	Prepared		Checked	Approval

5. Structure and Dimensions

5-1. Structure

1) Each parts should be assembled with bolts and have enough strength and sealing structure. and sealing structure.

2) No damaged parts and No trouble under nominal usuage condition.

3) No rust , Crack and other damages by sight.

5-2. Dimension

Dimensions should follow the drawing no. CSBP-032-2000

6. Characteristics

The characteristic values in Table1,2 and 3 are measured using clean water with normal temperature of 20℃ ~ 25℃.

1) Starting test

The pump should start rotation min 11VDC of power supply.

2) Performance

The performance of pump should satisfy the values in the table 6-1, 6-2 and 6-3 under the rated conditions of Vm:DC 24V

Note. Tested values should be taken within 3 minutes.

Table 6-1. Head

Flow rate (L/min)	Head (m) ± 10%
0	5.0
6	4.5
10	3.5

Table 6-2. Current

Flow rate (L/min)	Current (A) ± 10%
0	1.04
6	1.22
10	1.33

Table 6-3. Power consumption

Flow rate (L/min)	Power consumption (W) ± 10%
0	25
4	29
10	32

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 10 L/min under rated operating condition of Vm:DC 24V using clean water with temperature of 90℃ (note : ambient temperature is 40℃)

Table 7-1. temperature

Tested Position	standard	
	Test Method	criteria
Motor Coil surface	Thermometer	below 115℃
Power IC Surface	Thermometer	below 105℃

8. Insulation Resistance

8-1. Insulation Resistance : Over 100㏁ measured at DC 500V

8-2. Dielectric strength : No damages at AC1200V during 1 second.

9. Vibration

No abnormal vibration and noise at running with rated Vm:DC 24V and flow rate of 10 L/min. The vibration level should be under the displacement of15㎛.(note, measuring frequency band is from 10 to 500Hz.)

10. Noise

The sound pressure level should be under 35dB(A) measured at the distance of 1m from the back side of pump on the running condition of rated operating voltage (Vm:DC 24V) and the flow rate of 10 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.

11. Life Time

It should be run without failure during 20,000 hours continuously with rated conditions.

Water temperature 80℃(clean water)

Ambient temperature 20℃

Flow rate 10 L/min

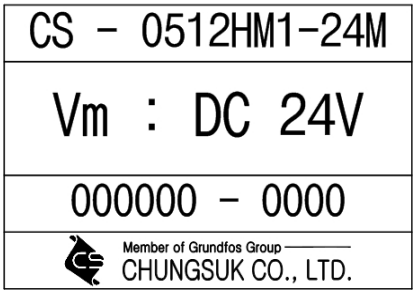
For validation test, the static pressure is only pumping pressure.

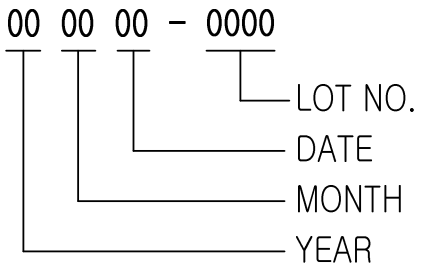
We do not add any pressure into the testing apparatus.

12. Resisting Water Pressure

Fill water into the pump and pressurize with 10 ㎏·f/㎠ during 5 minutes for validation by sampling.
Leakage do not allowed.
In mass production, we apply 1 minutes, for productivity.

13. Name Plate Specification





14. Packing

Apply CSK Standard

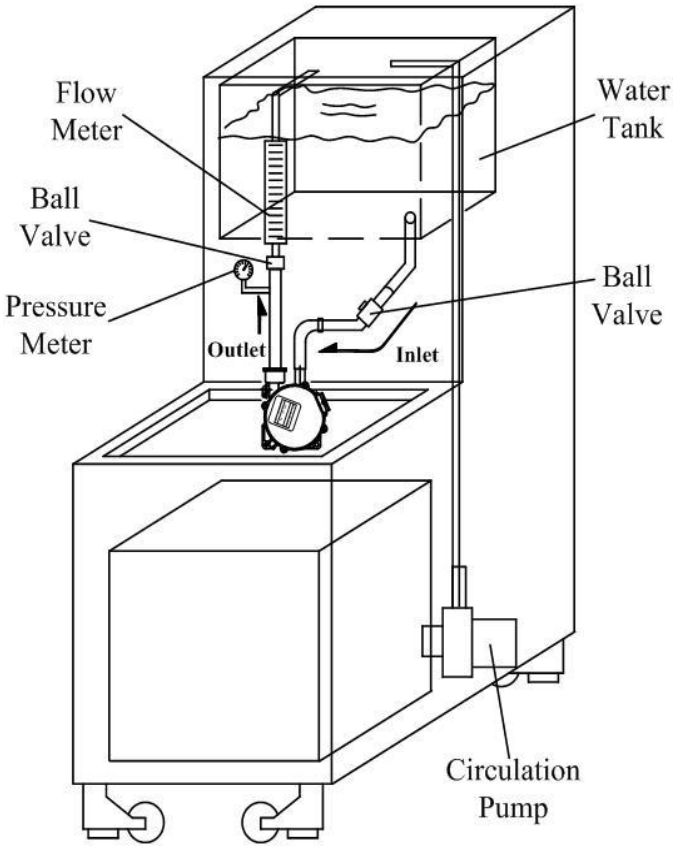
15. Operation and Use

1) Install the pump remaining shaft horizentally 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) Circulating fluid is 50% of Glycol with water without any foreign matters.
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 sticking of rotating parts.

16. 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 does not have any prevention device for freezing , so If expected any possibility of freezing, do not use before preparing freezing-free device.
4)* Do not use this pump for potable water supply.
5)* Use the power supplied by a Class2 transformer or equivalent circuit.

17. Characteristic Test Apparatus



18. Protective function

1) Limitting Current

When the current flows 1.7 ± 10%, then current is controlled to remain that value.

2) Locked Rotor Protection

Checking the revoluction of rotor with real time, cut the current 3 second and restart when the rotational speed is zero.

3) Over heat protection

The current is on and off when the below condition is reached.

- Trip on : 120 ℃ ± 7%
- Trip off : 80 ℃ ± 7%

4) Over current protection

When the current in operational state is raised rapidly and its value reachs around 3.6A, then pump stops during 1 second and restarts.

5) Dry running protection

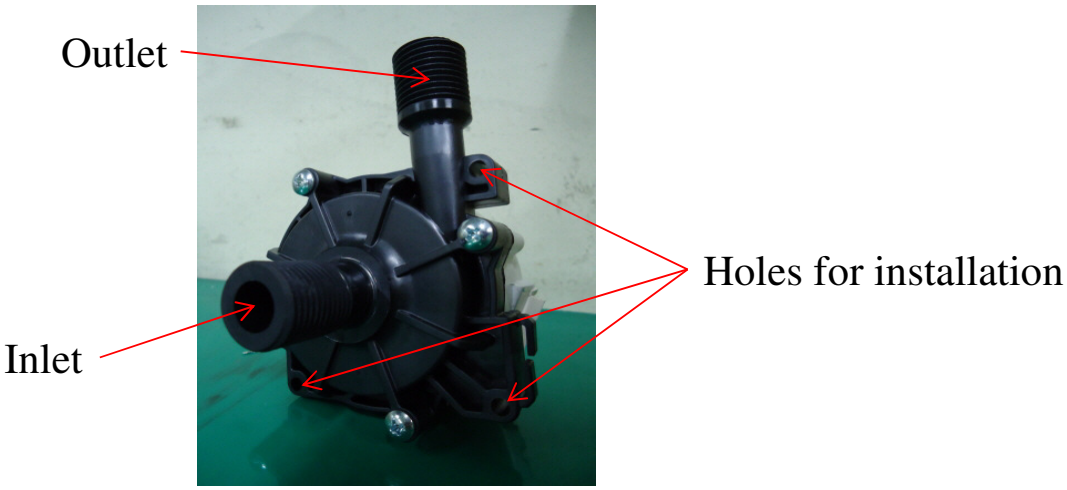
When the RPM goes up 5,500RPM (F/G:550Hz), the system judge it as a dry running and makes speed down to 2,000rpm(F/G:550Hz) after 1 sec from detecting it.

The system will repeat this process 3 times and finally make pump stop, if the same phenomenon occurs.

You should reset power(turn off and on) to restart pump from stop state.

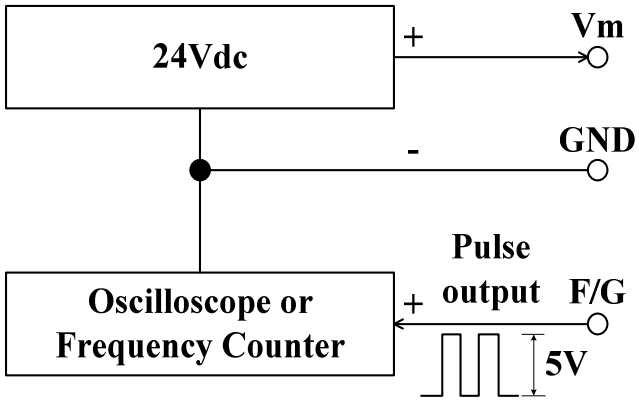
19. Installation Method

1) Prepare bracket or equivalent installation structure according to the dimension of install holes.
2) Prepare proper installation tool.
3) Fix the pump to the bracket prepared to the system through 3 install holes in pump.
   In this time, make sure that outlet of the pump should be upward to prevent air pocket.
4) Connect the inlet and outlet using the adequate mating connection.
5) Check the leakage at the connecting regions by pressurizing the system.



20. Revolution signal output measurement (F/G Port)

F/G port shows up the RPM and the pulse output of F/G port is 5Vdc Level of pulse.
It can measure by Oscilloscope or Frequency Counter as below picture.



The calculation method is as below

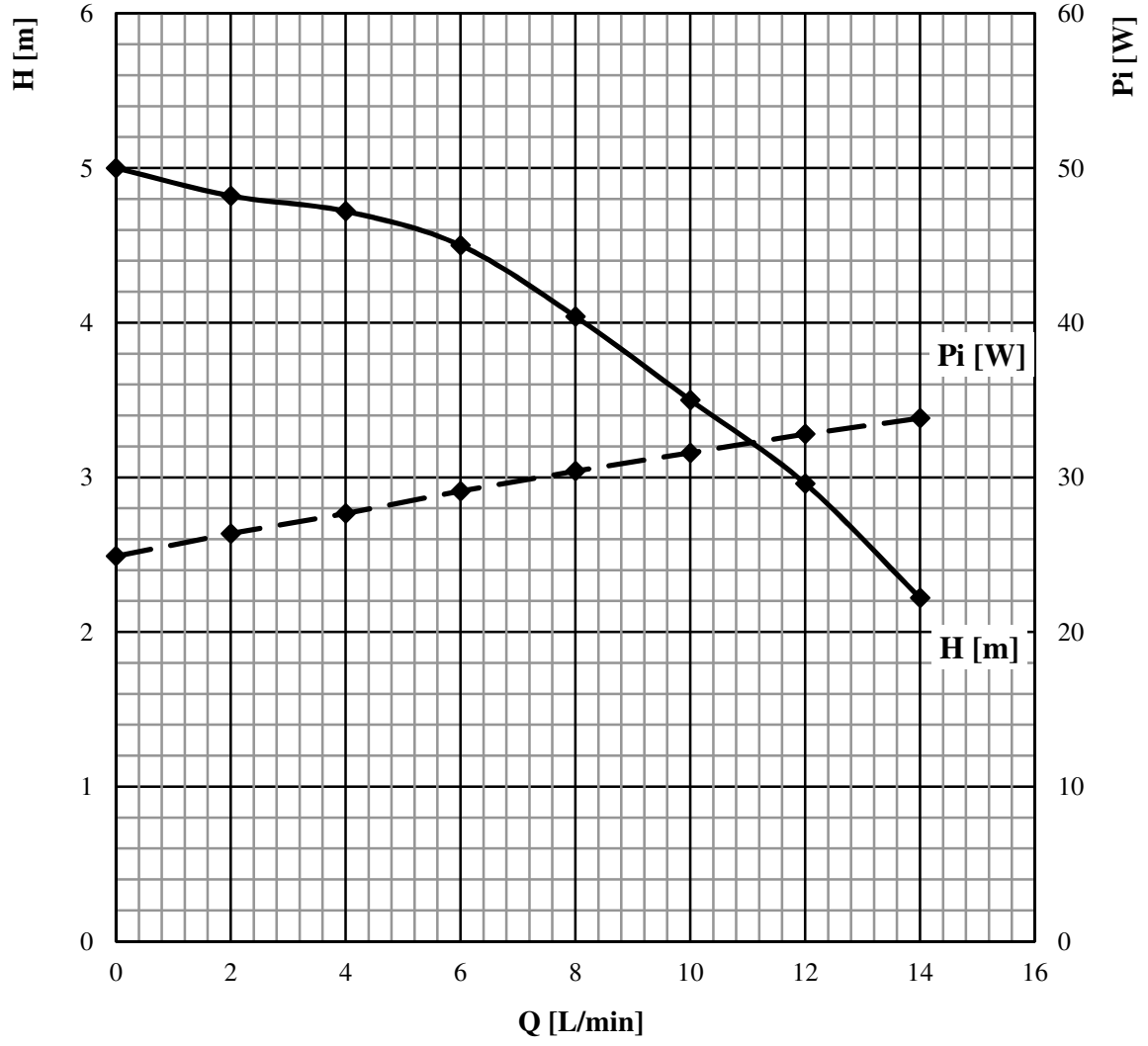
※ **Rotation[rpm] = F/G Pulse[Hz] × 10**
→ 6 Pulses / Rotation

CS-0512HM1-24M (Performance Curve)

Rated Votage : Vm DC 24[V] **Glycol 50%**

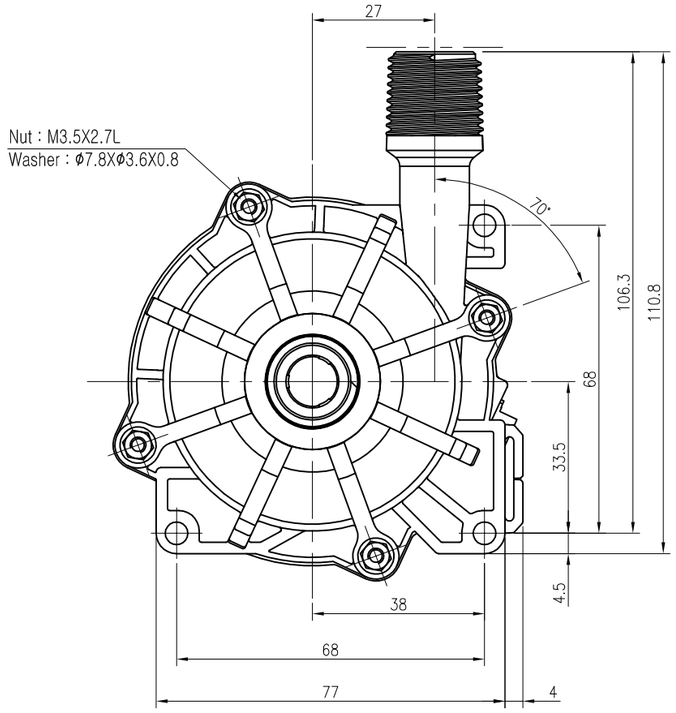
Q [L/min]	**H** [m]	**Pi** [W]	**I** [A]	**N** [rpm]
0	5.0	25	1.04	4026
2	4.8	26	1.11	3907
4	4.7	28	1.16	3794
6	4.5	29	1.22	3671
8	4.0	30	1.28	3565
10	3.5	32	1.33	3466
12	3.0	33	1.39	3373
14	2.2	34	1.43	3293

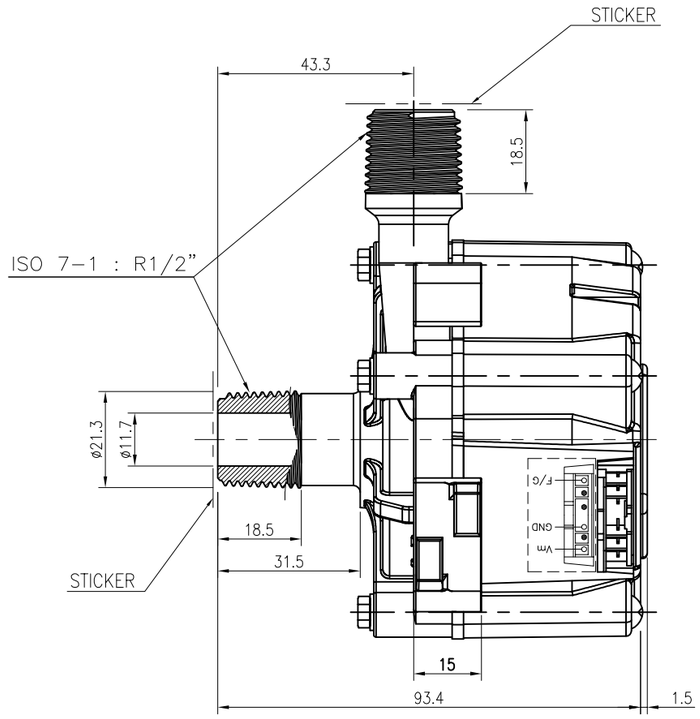
Q-H Curve

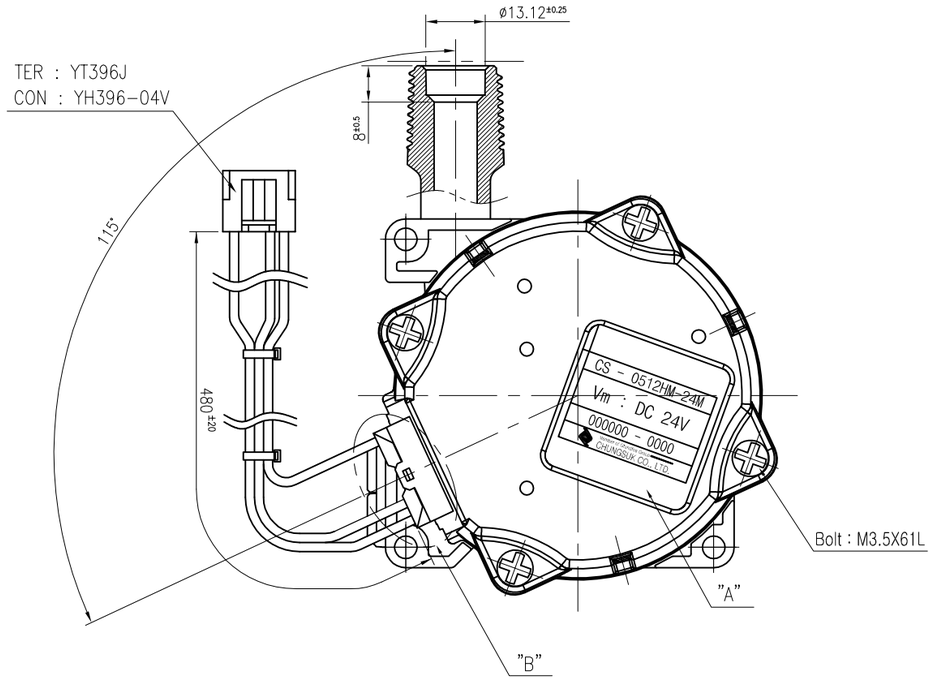


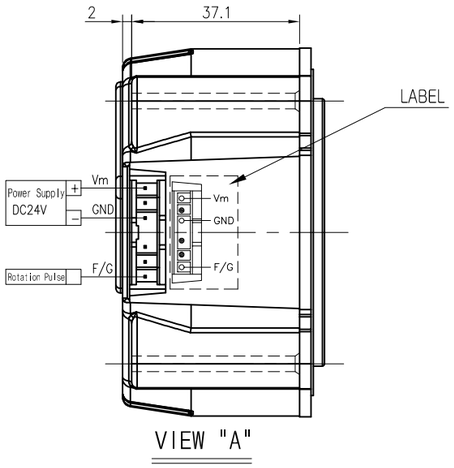
NO	DATA	NAME	CONTENTS	NOTE	APPROVAL

DWG NO. CSBP-032-2000









VIEW "A"

** NOTE **

1) Rotation way: Counter clock wise when you see from inlet side. (C.C.W.)
2) Power Supply : Vm = DC 24V
3) Stick Name plate on the "A" part.
4) Apply thread-locker to prevent thread loosing after fastening of Nut.
5) There is no clack and leak with 10kg/㎠ of pressure for 1 min.
6) Fastening torque of bolt should be in 8~10kgf.cm

TOLERANCE (±)	SIZE RANGE	V	F	M	C	H	ANGLE
	10 BELOW	0.05	0.1	0.2	0.3	0.5	1°
	10 ~ 30	0.1	0.2	0.3	0.5	0.8	
	30 ~ 50	0.2	0.3	0.4	0.6	1.1	30'
	50 ~ 150	0.3	0.4	0.6	0.8	1.4	
	150 ~ 300	0.4	0.6	0.8	1.0	1.7	15'
	300 ~ 500	0.6	0.8	1.2	1.5	2.0	
	500 EXCESS	0.8	1.2	1.6	2.0	2.5	5'

PART NO.	PARTS NAME	DRAWING NO.	MATERIAL	DIMENSION	Q'TY	REMARK

SCALE	1/1	3 rd	UNIT	mm
DRAWN	DESIGN	CHECK	APPROVAL	NAME
	D.W,KIM		J.H,LEE	
	Feb/17/12		Feb/17/12	

Member of Grundfos Group
CHUNGSUK CO., LTD.

Pump Assembly

CS-0512HM1-24M

DWG NO. CSBP-032-2000