Moisture-resistant Heating Tape for HBQ High-voltage Motor

Patent Number:ZL2005 2 0091329.X UL File No.: E326107 CE File NO: TCCE01087

I. Overview

For motors, especially for high-voltage motors in moist environment, it is very important to protect them from moisture damage. As long as the motor is powered off, the moisture-resistant heating tape for HBQ high-voltage motor starts working to keep the temperature of the motor winding always 5℃ higher than that of the ambient environment, so as to prevent the motor coil winding from moisture condensation and ensure the normal working of the high-voltage motor even in moist environment.

II. Features

The moisture-resistant heating tape for HBQ high-voltage motor is mainly made of silicone rubber. Encapsulated in a fiberglass sleeve and tied up to the outer ring of stator winding, it, with motor, is impregnated with lacquer, so that the heat of the heating tape can be better conducted to the motor winding coil and be better utilized. It, characterized by reasonable structure and easy mounting, can replace the like products imported from foreign countries.

III. Technical Parameters

1 .Insulating and voltage-withstanding
2. Outgoing line and shielding layer are voltage-withstanding
3. Insulating material is temperature-resistant
4. When the ambient temperature is 40℃ , the temperature of heating tape surface is ≤ 125℃ (which is the temperature of the heating tape in stable state after being powered on when it has been twined around one time in an encapsulated cylindrical metal cavity)
5. The main material is silicone rubber

V. Model Selection of Heating Tape

Choose the model of the HOB moisture-proof heating tape according to the number of the engine base and the number of poles about the high-voltage electric machine, and the specific parameters are showed below:

HBO Type

Type	Rated power (w)	The number of heaters which the electric motor uses.	Heater length(m)		Lead wire length (m)	Width and thickness of the heater (mm)	Rated voltage (AC)			The base number of electric motor	Note	
			4~6	8~12							Electric motor two ending covers' internal distance	Electric motor ending cover's diameter
HBQ0S	S0	1	1.62~1.67	1.64~1.69	1.5~3.0	26±2×7±1	A	B	E	H355	0.9S	0.95
HBQ10	100	2	1.93~1.9S	2.09~2.14		26±2×7±1	220	110	3S0	H400	1.44	0.97
HBQ13	130	2	2.04~2.14	2.26~2.31		26±2×7±1				H450	1.59	1.0S
HBQ16	160	2	2.27~2.37	2.4S~2.5S		26±2×7±1				H500	1.74	1.20
HBQ19	190	2	2.52~2.67	2.71~2.S6		26±2×7±1				H560	1.S7	1.35
HBQ22	220	2	2.70~2.S5	2.S7~3.02		26±2×7±1				H630	1.97	1.4S
HBQ25	250	2	3.12~3.27	3.22~3.27		26±2×7±1				H710	2.24	1.43
HBQ3S	3S0	2	3.43~3.5S	3.43~3.5S		26±2×7±1				HS00	2.44	2.05
HBQ25	250	4	3.36~3.51	3.36~3.51		26±2×7±1				H900	2.SS	2.22
HBQ30	300	4	4.40~4.55	4.40~4.55		26±2×7±1				H1000	3.26	2.46

Introduction

(1) As the table shows, the quantity of the heater used is equally distributed by the electric motor stator's front end and the back end. For example, the electric motor's machine base number is H630, the total power is 440w, the power of the heater is 220w, thus the quantity of driving end is one and quantity of the none riving end is one.

(2) The selection of heater' s power:

According to standard "JB/T7S36.1-2005 electric motor heater for electric motor 1st part of general technical condition "the power selection principle of anti-condensation heater is that the temperature of stator winding inside an airproof electric motor when it is not working should be 5K higher than that of circumstance, under the conditions of not considering the ambient influence and the released quantity of heat completely absorbed by electric motor stator winding, the approximate power value of the anti-condensation heater is decided by the formula as follows :

$$W=\frac{DL}{3.25}$$

In the formula W - the output power of anti-condensation heater (kw)

the D - the diameter of the end shielding of electric motor(m)

the L - the distance between the inner surface of both end shielding of electric motor(m)

But, when using the heater belt, because the heater is directly wrapped around the outside of the stator end winding, the winding coil is directly heated, according to overseas and the domestic experience the formula is: $W=\frac{DL}{6.5}$

For example: The electric motor 's machine base number is the H500, L=1.74m, D=1.20m

then $W=\frac{DL}{6.5}=\frac{1.74\times1.2}{6.5}=0.32kw$

So, two 160W heaters should be fixed on the 2 winding ends of the stator separately.

(3) The choice of the heater' s length According to the heater can not be overlapped on top of itself, but the total length of the heater is no less than the 90% perimeter of the stator end winding, and is 30mm shorter the perimeter. For example H500. The perimeters of 4poles and 6poles are 2.402m to 2.543m. Then the length of the heater is 2.27~2.37 m.

(4) The heater's lead wire length: Depend on the user 's demand.

(5) The selection of electric motor's inner end cover diameter:

If the choice of electric motor's inside end cover is a circle, then its diameter is circle diameter which is expressed by Φ. if the choice of electric motor's inside end cover' s shape is a rectangle, then the diameter

Formula is $\Phi=2\sqrt{\frac{High\times width}{\pi}}$

For example: The electric motor is H500, its height is 1110-(10×2)=1090mm, The width is 1062-(10×2)=1042, then

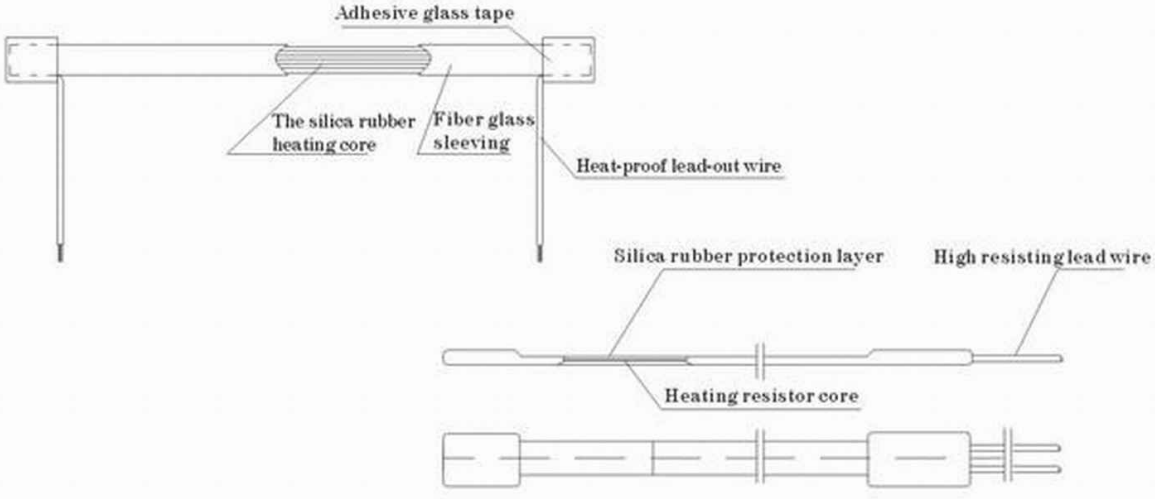
$\Phi=2\sqrt{\frac{High\times width}{\pi}}=2\sqrt{\frac{1.09\times1.04}{\pi}}=1.2m$

(6) This heater is shielded (prevented high-pressured induction causing lead wires to catch fire ,and create electric discharge) It is better connect the shielded lead wire to the electric motor shell. If you do not use the shielded lead wire, shear its leading-out terminals.

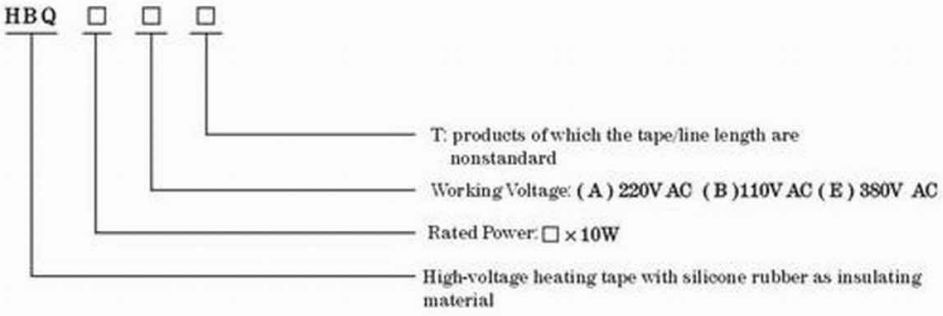
(7) This length of the heater may independently be designed by the users. The power of each square centimeter on the heater<=0.3W, the length of the heater $L=\frac{Power}{Width\times0.3(w)}$

For example: the heater of HBQ is 200W, its length's minimization is $L=\frac{200}{3.5\times0.3(w)}=1.9047$ (about 1.9 meters)

5. THE CONSTRUCTIONAL DIAGRAM OF HBQ MODEL HEATER

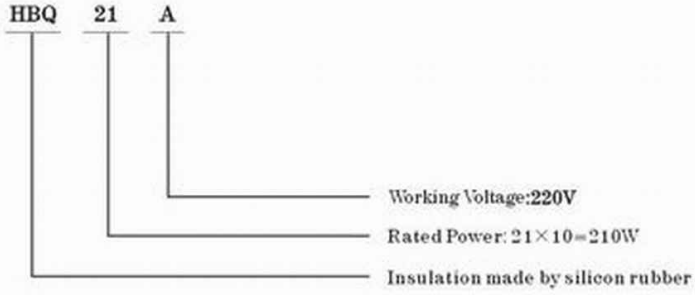


VI. Specification and Model

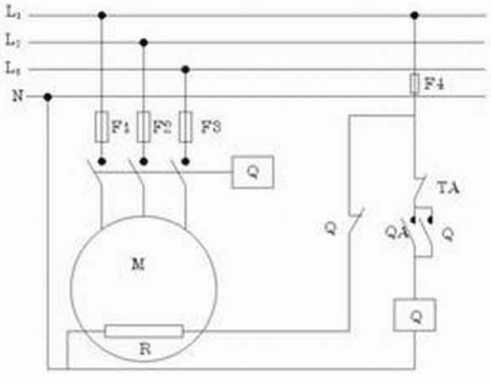


Note: Choose the power and the length of the heating tape according to the number of the engine base and the number of poles offered by the consumers.

VIII. How to Order



7.PARAMETER CONNECTION DIAGRAM



M: Electric motor

R: Heater

Q: Electromagnetic switch

TA: Switch off button

QA: Switch on button

8. OPERATING INSTRUCTION

Safety attention

● **Installation**

Attention ※ Please install in not burning material such as two ends' winding outer layer of the electric motor stator.
※ Do not use the sharp tools to install, in order to avoid causing the product damage.

● **Wiring**

Danger ※ When wiring, please confirm the alternating current is cut off in order to avoid getting an electric shock.
※ The wiring work must be handled by the special electrician, in order to avoid getting an electric shock or catching fire.
※ Before wiring, the product should be correctly installed, otherwise there may be the danger of getting an electric shock.
Please confirm the product rated voltage must be consistent with the alternating current voltage, in order to avoid damaging products or catching fire.

Attention Do not pull the product's lead wires hard , prevents the lead wires from being broke off.
Please familiarize the instruction first before use the heater, select and match the suitable heater according to the different types of electric motors.

1 INSTALLATION

※ Please confirm the type of the heater must conform to the electric motor's matching requirement.
※ Clean up the electric motor stator and the winding coil.
※ If the electric motor uses one piece of anti-condensation heater, please install the heater in the electric motor' s driving end.
※ If the electric motor uses two pieces of anti-condensation heaters, one heater should be installed in the driving winding end, the other heater should be installed in the non-driving winding end.
※ Wrap the header around the stators without overlapping. Strap the header with polyester tie. Fix the leading wire in the junction box. Dip the header with the coil of electrical motor together into lacquer. Dry them and the work is completed. See Chart 1 and Chart 2.

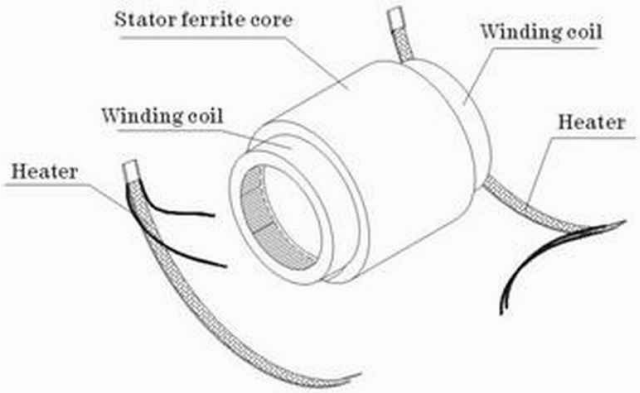


Chart 1

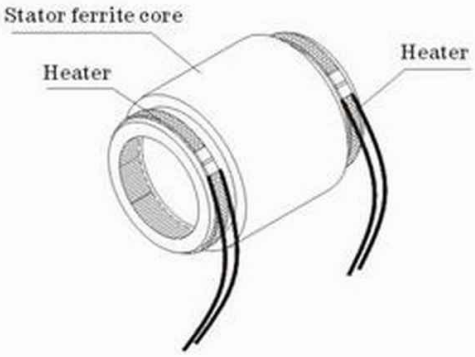


Chart 2

2.WIRING

Connect the heater' s lead wires to the electric motor junction box.

Connect the lead wires to the right wiring terminal and fix it firmly.

Before wiring, please read the technical data related to electric motor's wiring.

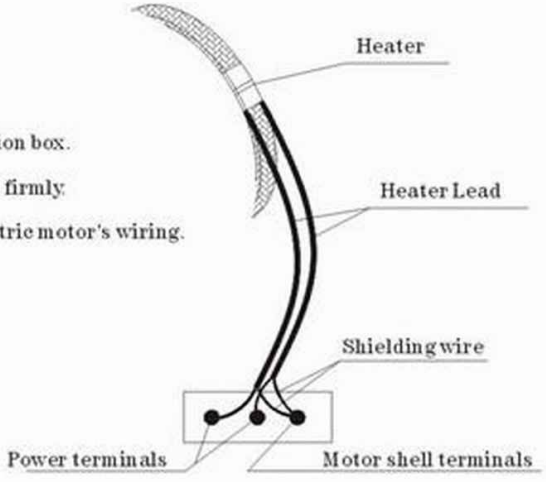


Chart 3

3. BREAKDOWN AND MEASURE

Breakdown	Reason	Measure
Heater doesn't to work	1. The power source was unconnected. 2. The contact of the lead wire and the wiring terminal is not good. 3. Heater's interior was damaged.	1. Connect the power source. 2. Firm the contact of lead wires and wiring terminal. 3. Replace the heater
Sometimes works, sometimes does not work	The contact of the lead wire and the wiring terminal is not good.	Firm the contact of lead wires and wiring terminal.