ABIG1012H1 Spindle operation instructions
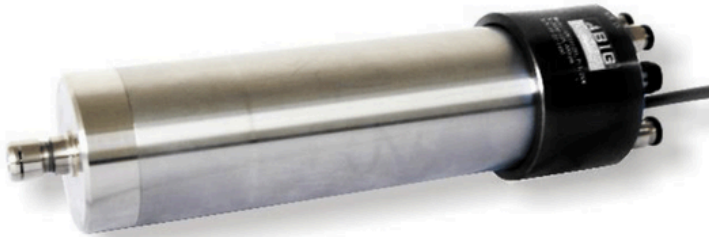
Features：

◆ Low noise、low vibration、very durable、Smooth operation
◆ Reliable structure, excellent airtightness, high precision and long service life
◆ Micro cutting, no mechanical tightening, no polishing

Content

1. Product profile

ABG1012H1 spindle is an air suspension motor spindle independently developed by our company. The shaft core relies on the support of air floating bearing to ensure the low dynamic deflection and stability of the spindle, so as to better improve the reliability and machining accuracy of the spindle.

Application：It is suitable for high gloss processing of glass, graphite, copper, aluminum, acrylic and other materials

2.Spindle parameters

Spindle model	ABG1012H1	Frequency(Hz)	1667
Speed(rpm)	2000-125,000	Voltage(V)	190
Shaft end link	ER11(Φ1-Φ6)	Rated power(KW)	1.2

3. Technical parameters

★ Shaft end run-out(um)   ≤1.0

★ Motor torque（N.m）   ≥0.1

★ Shaft end static deflection(um)   ≤3.0

★ Shaft end dynamic deflection(um)   ≤8

★ Vibration value(mm/s)   ≤1.0

★ Assemble face diameter(mm)   Φ61.9

★ Axial static load coefficient   Min.20kgf

★ Radial static load coefficient   Min.6kgf

★ Cooling   Water or oil

★ Air supply pressure(kgf/c ㎡)   5.0～6.0

★ Coolant flow(L/min)   ≥1.3

★ Motor protection   Thin film platinum resistance

★ Clamping way   ER-11 UP

★ Bearing type   Air

★ Weight   4.6kg

4 Instructions for external wiring

4.1 Power line

Motor spindle stator adopts three phase three wire, the drive equipment provides different phase sequence, can replace any two phases, to ensure the spindle is turning forward.

4.2.Stator power line color distribution table

	Color	Function	Qty
Stator power line	Blue	Three phase U	1
	Red	Three phase V	1
	White	Three phase W	1
	Yellow and green	Ground lead	1

4.3.Signal cable

	Color	Qty
Temperature sensor line	White	1
	White	1

5. Temperature sensing parameters and schematic diagram

Technical parameters

Temperature sensor type:Thin film platinum resistance

Operating temperature：-40～450℃，Measuring current：≤1mA,

Performance and parameter

5.1. Temperature coefficient of platinum resistance element TCR=0.003851,

5.2. Platinum resistance element temperature-resistance characteristic

$R_t = R_0 (1+at-bt^2-ct^{3*}(t-100))$

R_t Resistance at t℃

R_0 Resistance at t℃

a   b   c   Coefficient

coefficient value at TCR=0.003851

温度	a	b	c
t<0	3.90802×10^{-3}	5.80195×10^{-7}	4.27351×10^{-12}
t≥0	3.90802×10^{-3}	5.80195×10^{-7}	0

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5.3. Error of Platinum Resistance element

Grade	Resistance error at zero %	temperature error ℃	temperature coefficient TCR error ohm/ohm/℃
2B	±0.25	±(0.6+0.1 | t |)	0.003851±0.000024

5.4 Temperature-resistance value table

℃	
−50	80. 31
0	100
50	119. 4
100	138. 51
150	157. 33
200	175. 86
250	194. 1
300	212. 05
350	229. 72
400	247. 09
450	264. 18
500	280. 98
550	297. 49
600	313. 71
650	329. 64
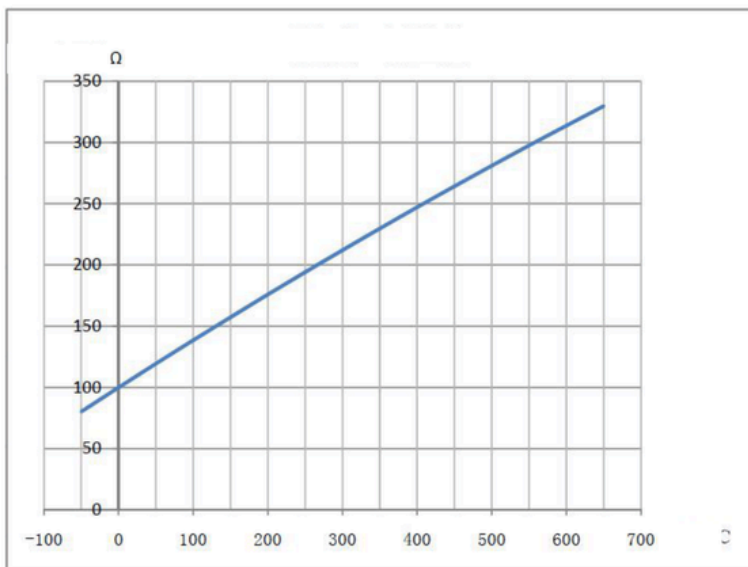
6. Notes for the use of spindle motor

6.1. The coolant provided for the spindle can be clean water (to be filtered), the temperature requirement is 23 ≤ 26 ℃, and the water flow rate is strictly controlled at ≥ 1.3 L / min. (if the cooling water can not meet the flow requirements, the spindle will heat up, resulting in the spindle core being jammed and will be regarded as illegal operation). The inlet and outlet positions will be connected strictly according to the spindle identifier (see the below figure)

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Water outlet

air inlet

Water inlet
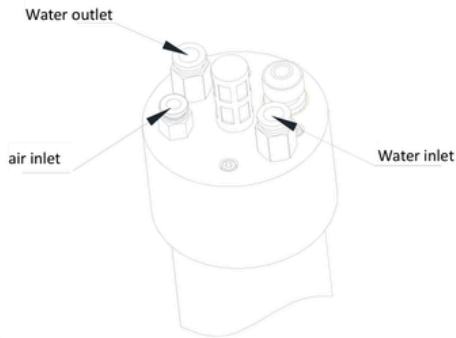
6.2. The air provided for the motor spindle must be clean gas that must remove oil, water and other impurities, requiring filtration accuracy < 1umm, oil content < 0.01mg/m3, solid particles < 1um. filter and follow-up filter shall be inspected regularly as required by the equipment. It is recommended to use SMC three-grade filtration device to filter gas, water, oil and steam in compressed air, Filter type as follows:

af30p-060s (5micron) (pre-filter fluid, water);
afd30-f03d(0.01micron) (Activated carbon removes oil vapor);
afm30p-060as(0.3micron) (Condensate filter removes oil)

6.3. Compressed air and coolant must be connected before the spindle starts, and water and air are not allowed to   be cut off during the rotation of the shaft core,otherwise the spindle components will be damaged(Note: turn on the air source then coolant before starting the spindle, and then turn off the coolant then air source when the   spindle is shut down)

6.4. After the spindle stops rotating, the air supply and coolant can be cut off

6.5. Overspeed operation of the spindle is forbidden, and the operating parameters should be adjusted according

to the range in the technical parameters table

6.6. Please check all relevant parameters carefully before running the motor spindle.

6.7. It shall not be disassembled and operated by untrained personnel.

6.8. Must use special disassembling tool when disassembling the collet
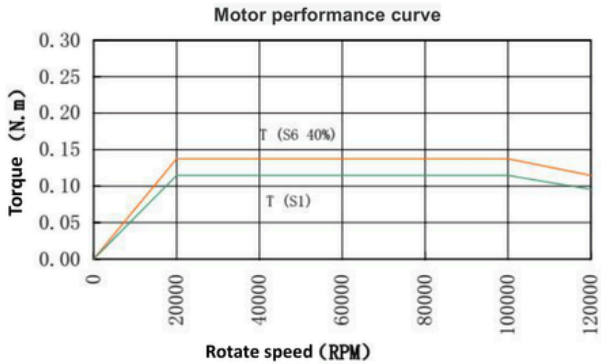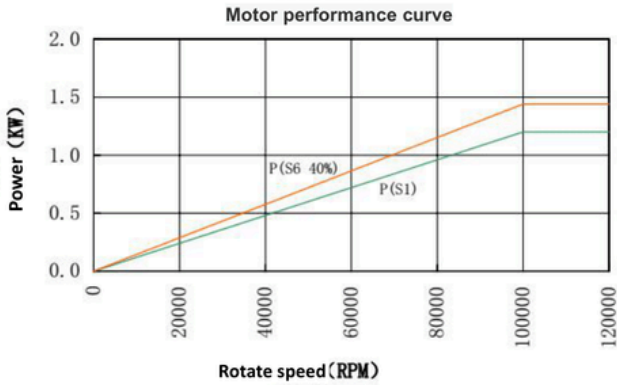
6.9. Recommended machining parameters：

1）When milling，Feed rate≤0.1∼0.15mm，feed speed≤4m/min，spindle speed 45000∼55000rpm

2）When high-gloss processing，Feed rate≤0.06mm，feed speed≤5m/min，spindle speed 65000∼80000rpm

7. Characteristic curve of spindle motor

Motor performance curve

Power (KW) vs Rotate speed (RPM)

P(S6 40%)
P(S1)

Motor performance curve

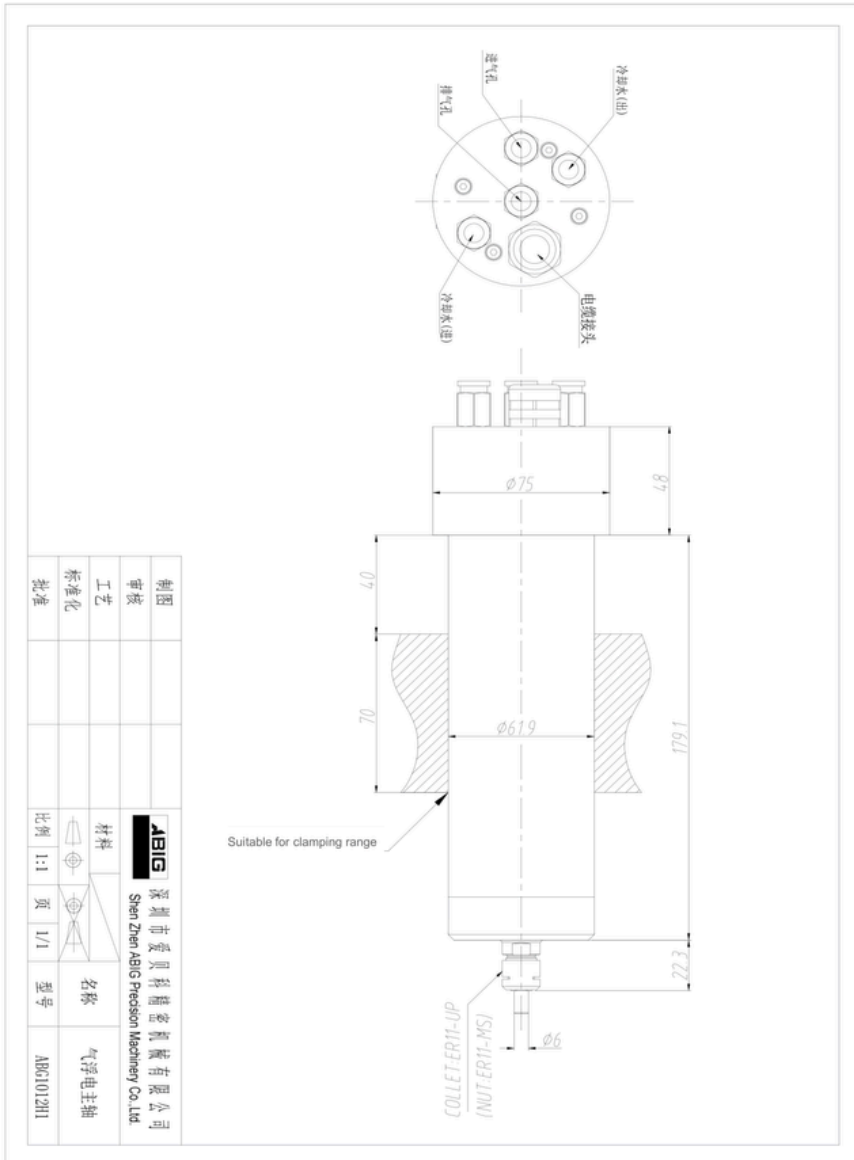Torque (N.m) vs Rotate speed (RPM)

T (S6 40%)
T (S1)

8. Variable-frequency Drive parameter setting

8.1 In order to ensure the normal operation of the spindle, 1.5KW" frequency converter is used as an example to illustrate the parameter selection of the frequency converter (data for reference, actually setting according to the standard data of the manufacturer's frequency converter instruction).

Parameter code	Parameter function	Setting range
01-00	Maximum operating frequency setting	1667
01-01	Motor rated frequency setting	1667
01-02	Motor rated voltage setting	200
01-07	Output frequency upper limit setting	90
01-03	Intermediate frequency setting	900
01-04	Intermediate voltage setting	115
01-09	The first acceleration time setting	12
01-10	The first deceleration time setting	10
01-23	Acceleration and deceleration unit time setting	00
03-01	Multifunctional output MO1	When no other overtorque load prompts the servo system to stop feeding, any of the three items can be selected as the stop feeding signal. The setting range is:04
03-02	Multifunctional output MO2	
03-03	Multifunctional output MO3	
06-02	Overcurrent stall prevention during operation	100
06-03	Selection of over-torque detection function	02
06-04	Overtorque detection level setting	65
06-05	Ove torque detection time	0.5
07-04	Motor pole number setting	2

Remark： 1. Device controller must have overtorque stop servo feed function；

2. The device controller must perform a quick brake on the spindle while stopping the feed；

3. If the spindle speed reach to125000rpm，should use "Delta VFD-VE" series frequency converter，The corresponding parameter code needs to be reset，Specific parameter setting should be according to "Delta VFD-VE" instructions；

9.Outline drawing of spindle

Suitable for clamping range

Ø75

Ø61.9

Ø6

179.1

COLLET ER11-UP
(NUT ER11-MS)

冷却水(出)

进气孔

排气孔

冷却水(进)

电缆接头

ABIG

深圳市爱贝科精密机械有限公司
Shen Zhen ABIG Precision Machinery Co.,Ltd.

气浮电主轴

ABG1012H1

比例 1:1
页 1/1
型号
名称
材料

制图
审核
工艺
标准化
批准