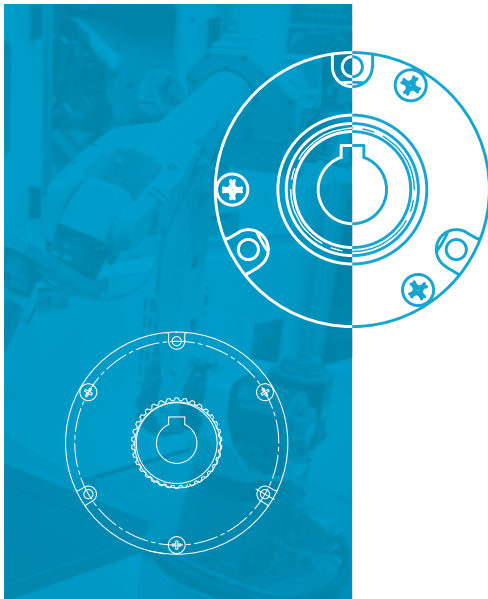




伺服电机弹簧加压电磁制动器

*Spring-Applied Electromagnetic
Brake for Servo Motor*



About REACH

关于瑞迪



成都瑞迪创立于**1993**年，专注提供高端装备核心部件和机构。

产品涵盖传动、控制、驱动三大系统。向人工智能、自动化、电梯、风电、核电、航空、高铁、塔机、起升、叉车、医疗、割草机、代步车、机床等20多个行业全球30多个国家和地区提供专业产品，公司总部位于成都双流西航港经济开发区，并控股两家生产型企业瑞迪佳源和眉山瑞通以及控股位于欧洲的贸易公司JMS。

瑞迪始终坚持以技术为先导的战略发展模式，坚持诚信的质量理念，不断打造以结果和责任为中心的高效管理，公司自主研发的ERP系统为公司各项决策和满足客户需求提供了强有力的数据保证。

瑞迪强调企业文化和核心价值观的影响力和渗透力，不断提高公司的凝聚力和市场的开拓能力。瑞迪的经营理念是通过向客户、市场、社会做出有价值的贡献，获得社会承认，通过技术、品质和管理领先，赢得自身的发展和壮大。

REACH Machinery CO., LTD was established in 1993, focused on core components and core mechanism of High-end equipment.

REACH's products range from power transmission system, control system and driving system for more than 30 countries and regions around the world. They are widely used for more than 20 industries such as artificial intelligence, automation, elevator, wind power, nuclear power, aviation, high-speed rail, tower crane, lifting, forklift, medical, mower, electric vehicles, machine tools, etc. Headquartered in Southwestern Airport Economic Development Zone in Chengdu Sichuan province of China, REACH has become a group company controlled two manufacturing companies REACH Jiayuan and REACH RITONG, as well as JMS, a Europe-based trading company.

REACH has always adhered to the technology-oriented strategic development mode and the quality concept of honesty as the highest standard, and continuously forges efficient management model centered on results and responsibilities. REACH's self-developed tailor-made ERP system provides a reliable guarantee for the company's decision-making and customer demand.

REACH emphasizes the influence and penetration effect of corporate culture and core values, and continuously improves the company's cohesiveness and marketing capabilities. REACH's business philosophy is to gain social recognition by making valuable contributions to customer, the markets and the whole society, and to keep developing and growing through leading technologies, quality and management model.

REB系列电磁制动器

REB Electromagnetic Brake

1 瑞迪是一家始终坚持以满足客户需求为基础,不断超越客户的期望值为理念的电磁制动器专业厂家,我们有着专业的研发团队、优秀的精益生产方式、先进的过程控制技术和强大的供应链配套能力。

In the field of electromagnetic brakes, REACH has always dedicated itself to satisfying customer demands and exceed their expectations. Combining the professional development team, optimized precision production, advanced process control technologies with cohesive supply chain, REACH pushes its technological creativity to its full potential to become a professional manufacturer.

2 拥有完善的研发测试能力,制程在线检测能力。

Complete R&D and testing capabilities, and online detection capability.

3 REB电磁制动器有着瑞迪独特的降噪方式,具有高精度回转背隙、体积小、低温升等显著特点。

REACH unique noise-reduction method, featuring high-precision rotary backlash, small volume, low temperature rise etc.



瑞迪的优势

Superiority

技术优势

- 专业的工程师队伍和多项制动器的专利体现出我们在伺服制动器领域的实力
- 客户需求为导向的设计理念,可为您提供定制解决方案
- 为多家行业顶尖客户提供优质产品,积累了大量行业和工况经验

Technical advantages

- Professional engineers and several patents of brakes, showing the Corporation's strength in the filed of servo brake
- Customer demand-oriented design concept, provide customized solutions
- Longtime cooperated with industrial top customers, accumulated a lot of industry and application experiences

质量管理

- GB/T 19001-2016/ISO 9001:2015
- GB/T 24001-2016/ISO 14001:2015
- 独立的检测中心和齐全的检测设备
- 智能定子综合测试系统
- 磁通量测试仪
- 多功能摩擦材料测试机
- 磨损试验台
- 在线全自动检测系统
- 高低温急停测试台
- 空载时拖磨损测试台
- 静态寿命测试台
- 弹簧合力测试台

Quality management

- GB/T 19001-2016/ISO9001:2015
- GB/T 24001-2016/ISO 14001:2015
- Independent inspection center and complete inspection equipments
- Intelligent Stator Integrated Test System
- Flux Tester
- Multi-functional Friction Materials Tester
- Abrasion Test Board
- On-line automatic detection system
- High and low temperature emergency stop test
- Drag wear test when no load
- Static life test
- Spring force test



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动作原理

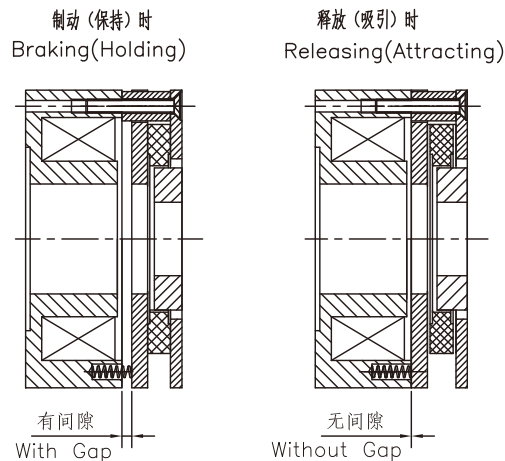
REB制动器是单片式制动器，有两个摩擦表面。

电机轴与方形毂（花键轮毂）连接，当定子断电时，弹簧所产生的力作用在衔铁上，将电机轴通过方形毂（花键轮毂）带动旋转的转子紧紧夹在衔铁与盖板之间，从而产生制动力矩。此时，在衔铁与定子之间会产生一个间隙。当需要放松制动时，定子接通直流电，所产生的磁场吸引衔铁向定子移动，衔铁移动时压缩弹簧，此时转子被松开，制动解除。

Operation Principle

REB Brake is single-plate brake, with two friction surface.

The motor shaft connects with square wheel or spline wheel, when the stator power off, the force from spring generates on the armature, and the motor shaft with square wheel or spline wheel drives the Rotor to rotation, and pinched between Armature and Flange, then generate Braking force. There is a gap between Armature and Stator, when required release of brake, the stator connected to DC, and magnetic field generated attracts armature to move to stator, the armature will press the spring when moving, and now the rotor is released, brake released.



应用范围

- ⊙ 工业机器人
- ⊙ 服务机器人
- ⊙ 工业机械手
- ⊙ 数控机床
- ⊙ 精密雕刻机
- ⊙ 自动化生产线

Application

- ⊙ Industry Robot
- ⊙ Service Robot
- ⊙ Industrial Manipulator
- ⊙ CNC
- ⊙ Precision Engraving Machine
- ⊙ Automatic Control Technique

产品特点

- ⊙ **保持制动用**
可承受一定次数的紧急刹车
- ⊙ **小体积大扭矩**
扭矩范围0.5-200 (N.m)
- ⊙ **使用寿命长**
使用进口的高耐磨摩擦片，持久耐用
- ⊙ **满足高温低温环境使用**
制动器使用环境温度-10~+100 (°C)
- ⊙ **两种设计方式满足不同机型安装**
100机座以下采用方形轮毂，100机座以上采用花键轮毂

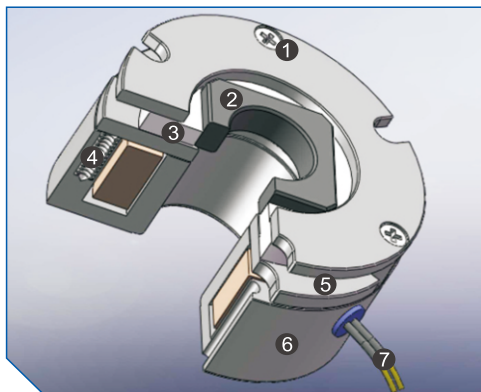
Product Features

- ⊙ **Holding Braking**
Afford certain times of braking on the occurrence of emergency
- ⊙ **Large Torque offered by Small Body**
Torque : 0.5-200 (N.m)
- ⊙ **Long Service Life**
Durable by using imported highly-wearable friction plate
- ⊙ **Adapt to Extreme Temperature**
Working temperature : -10~+100 (°C)
- ⊙ **Two designs to meet different installation**
Square wheel adopted for base No.below 100, spline wheel for base No.above100



① 制动器安装位置
Brake mounting position

基本构造



Basic Structure

- | | |
|---------------|--------------------------------|
| ① 盖板 | ① Flange |
| ② 方形毂 (或花键轮毂) | ② Square wheel or Spline wheel |
| ③ 转子 | ③ Rotor |
| ④ 弹簧 | ④ Spring |
| ⑤ 衔铁 | ⑤ Armature |
| ⑥ 定子 | ⑥ Stator |
| ⑦ 软导线 | ⑦ flexible conductor |

伺服电机制动器

Servo motor brake

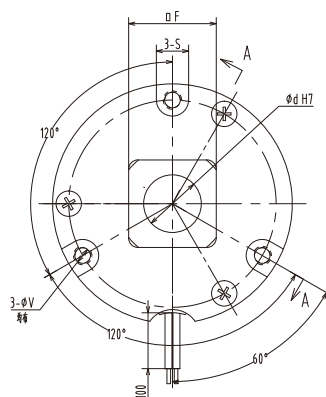
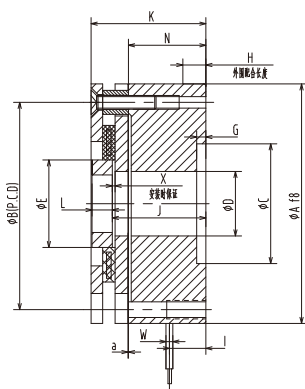
REB18-方形轮毂型

REB18-Square Wheel Type

技术参数

Technical Data

机座号 Base No.	静扭矩 Static torque (N.m)	线圈参数(20℃时) Coil parameters (at 20℃)				耐热等级 Heat Resistance	最高转速 Maximum speed of rotation (r/min)	转子转动惯量 Rotor rotation inertia J(kg.m ²)	容许制动功率 Allowable brake power Eba (J)	总制动做功 Total brake power output (J)	吸引时间 Attracting time (ms)	释放时间 Releasing time (ms)	背隙 [°] Gap	质量 Mass (kg)
		电压 Voltage (V)	功率 Power (W)	电流 Current (A)	电阻 Resistance (Ω)									
40	0.32	24	6.1	0.25	94.4	F	6000	1.36X10 ⁻⁷	18	3600	35	20	1.5	0.11
60	1.3	24	7.2	0.3	80	F	6000	1.17X10 ⁻⁶	104	20800	50	20	1	0.32
	1.5	24	7.6	0.31	76	F	6000	1.17X10 ⁻⁶	104	20800	50	20	1	0.32
80	3.2	24	10	0.48	50.1	F	6000	3.68X10 ⁻⁶	240	48000	60	40	1	0.51
100	6	24	23	0.96	25	F	4000	2.28X10 ⁻⁵	400	80000	80	40	1	0.89



均布
Even Distribution

安装时保证
Confirm During Installation

外圆配合长度
Length Of Outside Circle

机座号 Base No.	径向尺寸/Radial Dimension										轴向尺寸/Axial Dimension						轴径/Axial Radius	
	A	B	C	D	E	S	V	F	G	H	I	J	K	W	N	L	d	dMax
40	33	26.5	17	9	14	6	3.3	12	0.1	4	19	25.5	30.1	AWG26	22.8	4	6	8.5
60	48	42	24	14	22	8	3.3	18	0.1	5	18	25.4	30.1	AWG22	22.6	5	8	12
	52	45	26	14	24	7	3.4	19	2	4	8	20.3	25	AGW22	16.8	4.4	8	12.5
80	64	56	31	22	30.5	8	4.3	25	0.2	4	16	25.3	30.2	AWG22	21.5	4.5	10	17
	65	58	40	24	23	7	4.5	19	0.2	6	7	22.6	33.9	AWG22	21	6.5	10	14
100	85	75	48	32	36	9	4.3	28	0.2	8	12	27	35.8	AWG22	21.6	8.8	12	18

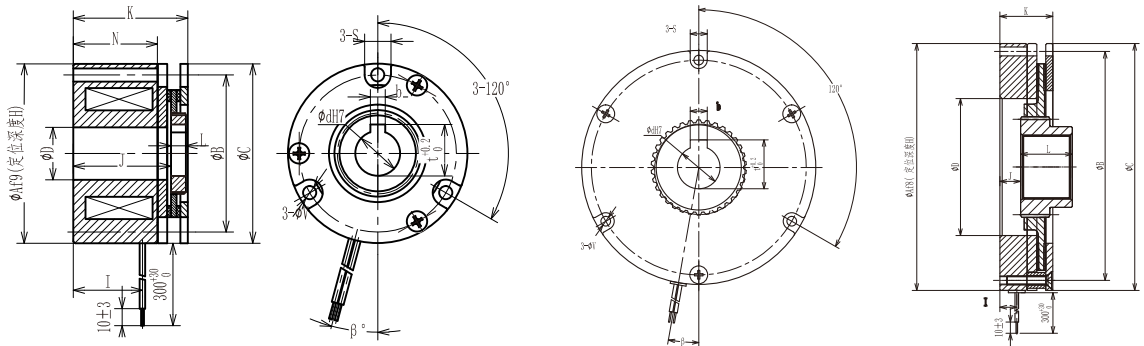
REB70-花键轮毂型

REB70-Spline Wheel Type

技术参数

Technical Data

机座号 Base No.	静扭矩 Static Torque (N.m)	线圈参数(20℃时)Coil(20℃)				耐热等级 Heat Resistance	最高转速 Max. Rotation Speed (r/min)	转子转动惯量 Moment of Inertia of Rotator J(kg.m ²)	容许制动功率 Allowable Braking Power Eba (J)	总制动做功 Total Brake Power Output (J)	吸引时间 Engaging Time (ms)	释放时间 Releasing Time (ms)	背隙 [°] Gap	质量 Weight (kg)
		电压 Voltage (V)	功率 Power (W)	电流 Current (A)	电阻 Resistance (Ω)									
40	0.35	24	6.3	0.26	91.43	F	6000	3.7X10 ⁻⁷	18	3600	40	20	0.5	0.14
60	1.5	24	7.2	0.30	80.00	F	6000	2.4X10 ⁻⁶	104	20800	50	20	0.5	0.3
80	3.2	24	8.5	0.35	67.76	F	6000	8.6X10 ⁻⁶	240	48000	60	20	0.5	0.5
110	10	24	17.7	0.74	32.54	F	5000	3.7X10 ⁻⁵	500	1X10 ⁵	100	40	0.5	1
130	16	24	23	0.96	25.04	F	5000	1.6X10 ⁻⁴	1000	2X10 ⁵	110	40	0.5	1.5
180	45	24	24	1.00	24.00	F	3600	4.5X10 ⁻⁴	1500	3X10 ⁵	120	60	0.5	3.6



机座号 Base No.	径向尺寸/Radial Dimension [mm]								轴向尺寸/Axial Dimension [mm]							轴径/Axial Radius [mm]			
	A	B	C	D	E	S	V	H	I	J	K	W	N	β	L	d	b	t	d Max
40	35	29.5	35	9	\	6.5	3.4	4	6.5	22	26	AWG26	19	-30	4	8.5	3	9.3	8.5
60	48	42	48	14	\	8	3.4	4	18.5	26.1	30.5	AWG22	22.5	0	4	12	4	13.8	15
80	64	57	64	22	\	8	3.4	4	17.5	25.5	30.3	AWG22	21.5	-30	4	17	5	19.3	20
110	84	74	84	32	\	10	4.5	4	9.5	27.5	34.5	AWG22	22	15	30	20	7	23	25
130	115	104	115	65	\	10	4.5	4	14.8	18	28	AWG22	18.8	0	30	25	8	28.3	30
180	150	135	150	55	\	12	6.5	4	13.5	26.2	36	AWG22	18.5	30	30	30	8	33.3	40

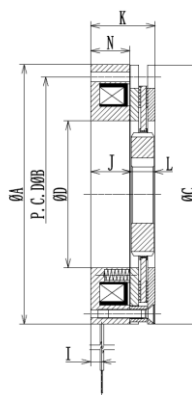
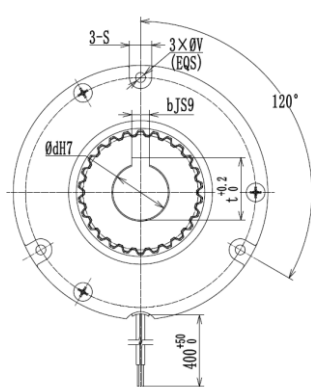
REB71-花键轮毂型

REB71-Spline Wheel Type

技术参数

Technical Data

机座号 Base No.	静扭矩 Static Torque (N.m)	线圈参数(20℃时)Coil(20℃)				耐热等级 Heat Resistance	最高转速 Maximum speed of rotation (r/min)	转子转动惯量 Rotor rotation inertia J(kg.m ²)	容许制动功率 Allowable brake power Eba (J)	总制动做功 Total brake power output (J)	吸引时间 Attracting time (ms)	释放时间 Releasing time (ms)	背隙 [°] Gap	质量 Weight (kg)
		电压 Voltage (V)	功率 Power (W)	电流 Current (A)	电阻 Resistance(Ω)									
100	5	24	17.6	0.73	32.7	F	5000	3.43×10^{-5}	500	2.0×10^5	50	20	1	1
110	12	24	19.4	0.81	29.7	F	5000	6.75×10^{-5}	800	2.0×10^5	80	20	1	1.3
130	16	24	21.5	0.9	26.8	F	5000	2.32×10^{-4}	1500	2.2×10^6	110	50	1	1.5
150	30	24	23.7	0.99	24.3	F	5000	3.02×10^{-4}	1500	2.5×10^6	120	30	1	2.5
180	55	24	31	1.29	18.6	F	3600	8.54×10^{-4}	1800	1.5×10^6	150	50	1	3.2
220	120	24	32	1.33	18	F	3600	7.1×10^{-4}	2000	1.0×10^6	300	100	1	6



机座号 Base No.	A	B	C	D	S	V	I	J	K	N	L	d	b	t	d Max
100	83.5	76	82	47	9	4.5	9.5	17	25	14.7	7	20	6	22.8	30
110	93.5	85	92	49	10	4.5	8	19	27	15.7	7	20	6	22.8	30
130	123.5	115	122	62	9.5	4.5	5	14.6	24.3	13.7	9	24	8	27.3	38
150	137.5	130	136	65	12	4.5	\	15.4	25	12.5	9	24	8	27.3	38
180	167.5	158	166	80	12	5.5	9.5	16	25	12	9	28	8	31.3	50
220	185	175	184	100	12.5	5.5	10	21.3	32.8	19.4	11.5	28	8	31.3	50

使用注意事项

Use Note

摩擦面

REB机型的制动器均为干式双面摩擦片制动器。应避免摩擦面上沾上油或者水等，会导致制动器的扭矩下滑，因此需要在干燥的状态下使用。

使用环境温度

REB的制动器使用环境温度为-10 °C~100°C。在超出此范围时，请向本公司咨询。

电源电压波动

电压过度波动将影响制动器的性能发挥，因此制动器的使用电压控制在额定电压的±10%的范围内，并要求平滑无干扰。

空隙调整

本类型的制动器在出厂时工作间隙已经调整好，使用时无需再进行调整，并请用户不要私自打开制动器。

关于长期存放

三个月未使用的制动器扭矩值会略有波动，使用前应适当磨合已保证扭矩达额定值（磨合参数请向本公司咨询）。

Friction Surface

The brake of type REB model is dry double-sided friction plate brake. If the oil or water is applied to the friction surface, the torque of the brake will drop, as a result, it is required to be used in a dry state.

Service Ambient Temperature

The service ambient temperature of brake REB ranges from -10 °C to 100 °C. Please contact us if beyond such range.

Voltage Fluctuation

Excessive voltage fluctuation will impair the performance of the brake, so the service voltage of the brake is to be controlled within ±10% of rated voltage, and the smoothness without interference is required.

Gap Adjustment

The brake has been adjusted upon before delivery, it is not required to adjust during service, and the user is not allowed to disassemble the brake without authorization.

About Long-term Stored

The torque of brake may be fluctuated slightly when stored more than three months, advise running-in properly to recover the torque (please contact us about the running-in parameter).

安装注意事项

Installation Note

转子毂固定

转子毂与轴的固定可采用螺钉或键的方式进行固定。也可以采用过盈配合固定。避免转子毂与衔铁接触，因此请遵守H尺寸。

螺栓/螺钉类

安装螺钉均要求采用螺纹专用胶进行固定。在对螺钉进行涂抹胶水时，请注意不要涂抹到转子表面及方轮表面。

Fixing of motor mulberry

The fixing of the rotor wheel and the shaft may be fixed by means of the screw or key. It may be also adopting interference fit. Avoid the contact between the rotor and the armature, so please follow Size H.

Bolt/screw

The mounting screw is required to be fixed with thread-specific glue. Be careful and avoid applying such glue to the rotor surface and the surface of square wheel while it is applied to the screw.

⊙ **轴的公差配和**

轴的公差推荐为h7精度，如果采用过盈配合安装转子毂时，应根据过盈配合推荐公差进行设计。

⊙ **制动器本体**

REB制动器多使用软质金属材料，在安装过程中应避免敲击，掉落或过于用力，否则可能导致制动器出现变形而影响使用，请在安装过程中加以注意。

⊙ **导线**

请注意不用用力拉伸制动器的引出线，过于弯折或用手提起引出线，这样有可能会引出线而导致制动器无法工作。

⊙ **制动器安装面的精度**

制动器安装精度不好，可能会造成制动器在运转时发出噪音。

安装时请确保同轴度 (X) 和垂直度 (Y) 不超出下表中的推荐值。

⊙ **Tolerance Matching of Axis**

The tolerance accuracy of the shaft is recommended to be in h7. The design should be made according to the tolerance fit tolerance if the rotor hub is installed with the interference fit.

⊙ **Main Body**

REB brakes are made of soft metal materials in most cases. It is required to avoid knocking, dropping or excessive forcing during installation. Otherwise, the brake may deform, and its service may be impaired. Be noted during the installation.

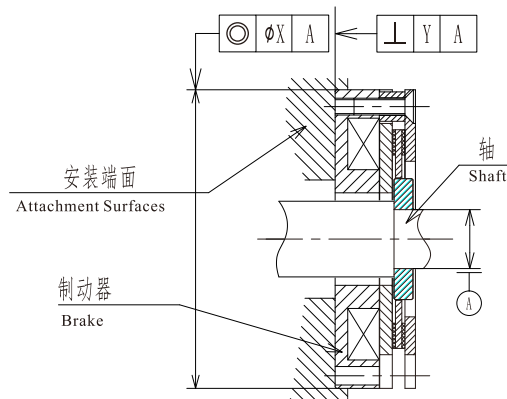
⊙ **Wire**

Be noted not to pull the lead wire of the brake excessively, excessive bending or lifting of lead wire by hands may damage the lead wire and cause the brake failing to work.

Accuracy of Mounting Surface of Brake

⊙ Poor installation accuracy of the brake may cause noise when the brake is in operation. Please be noted for controlling. Permissible values are shown in the table below.

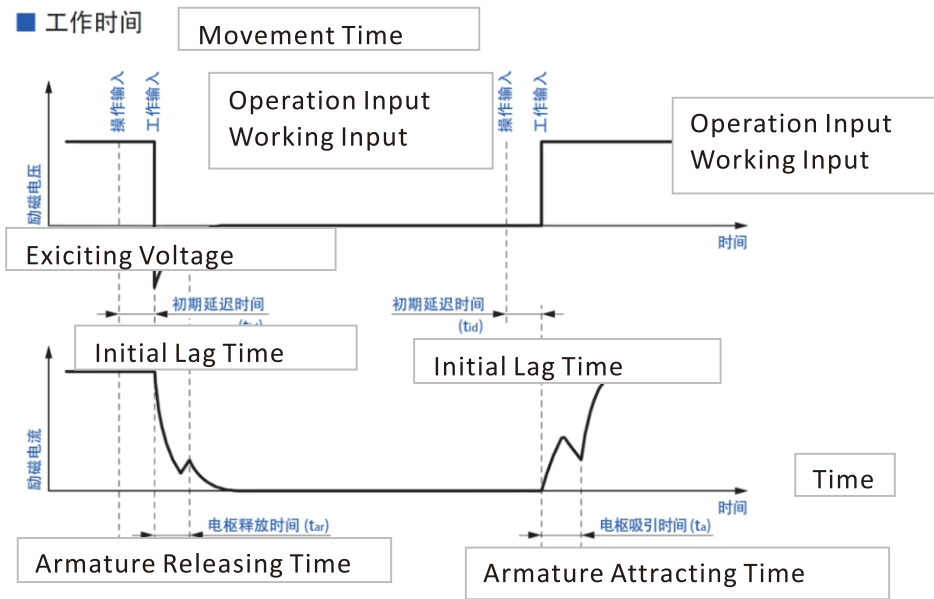
Make sure that the coaxiality (X) and perpendicularity (Y) do not exceed recommended values in the table below.



型号 Model									机座号 BaseNo.								
容许值 Recommended value	15LE	20LE	25LE	35LE	40LE	45LE	50LE	100LE	40	60	80	100	110	130	150	180	220
X	0.05	0.05	0.05	0.05	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.3	0.3	0.4	0.4	0.6	0.6
Y	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.04	0.05	0.05	0.06	0.06	0.07

动作特性

Movement Characteristics



产品选型

Model Selection

保持负载所需的转矩分析

Analysis Of The Required Torque For Keeping The Load

$$T = T_{lmax} \times K \text{ [N} \cdot \text{m]}$$

- ⊙ T_{lmax} : 最大负载转矩 [N·m]
- ⊙ K: 安全系数 (参阅下表)

- ⊙ T_{lmax} : Max load torque [N·m]
- ⊙ K: Security coefficient (see table below)

负载状态 Load status	系数 Coefficient
低惯量·负载变动小 Low inertia. Low load change	1
普通惯量的一般使用 Normal inertia for normal use	1.2
大惯量·负载变动大 High inertia. High load change	1.5

暂定尺寸

- 需要选择能使由上述算式计算出的转矩 T 满足以下算式的制动器尺寸。

$$TS > T \text{ [N} \cdot \text{m]}$$

- Ts: 制动器静摩擦转矩 [N·m]

做功分析

- 考虑以保持为目的的制动器时，制动仅限于紧急情况下。
- 通过以下算式计算紧急制动 1 次的制动做功 Eb，并确认该计算结果充分小
- 于所选制动器的允许制动做功 Ebaℓ。

$$E_b = \frac{J \times n^2}{182} \times \frac{T_b}{T_b \pm T_{\ell\max}} \text{ [J]}$$

- J: 负载侧的转动惯量合计 [kg·m²]
- n: 转速 [min⁻¹]
- Tb: 制动器转矩 [N·m]
- Tℓmax: 最大负载转矩 [N·m]
- 最大负载转矩 Tℓmax 的符号在负载朝帮助制动的方向动作时为 + (正)，朝妨碍的方向动作时为 - (负)。

$$E_b \ll E_{ba\ell} \text{ [J]}$$

动作次数分析

- 进行紧急制动时的总制动次数（寿命）L 通过以下算式计算，需要确认是否满足要求的规格。

$$L = \frac{E_T}{E_b} \text{ [次]}$$

- ET: 总制动做功 [J]
- 虽然根据使用环境会有所不同，但紧急制动频率请控制在 1 分钟 1 次左右。1 次制动做功 Eb 超过允许制动做功 Ebaℓ 的 70% 以上时，紧急制动后，请等待制动器充分冷却再使用。

Provisional Measurements

- Use the Torque T which is calculated based on above equation to meet the brake measurement in below equation.

- Ts: the brake's static friction torque [N·m]

Power Output Analysis

- To consider the brake for keeping purpose, the brake is limited only to emergency conditions.
- Use below equation to calculate the brake power output Eb for one time emergency brake, and to check if the calculation result is sufficiently small
- The allowable brake power output for the selected brake Ebaℓ.

- J: Rotation inertia sum on the load side [kg·m²]

- n: Rotation speed [min⁻¹]

- Tb: Brake torque [N·m]

- Tℓmax: Max. load torque [N·m]

- The symbol of the max. load torque Tℓmax is + when the load is aiding the brake, - when the load is hindering the brake.

Brake Frequency Analysis

- The total brake times(life) L can be calculated using below equation, need to check if the type can meet requirements.

- ET: Total brake power output [J]

- Though operation conditions may vary, the emergency brake should be less than about once per minute. if the one time brake power output Eb is bigger than 70% of Ebaℓ, then after emergency brake, the brake has to be fully cooling down before operation again.



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