

# TL系列

## 大型立式 三相同步电动机

TL SERIES LARGE VERTICAL  
THREE - PHASE SYNCHRONOUS MOTORS



上海电机厂有限公司  
SHANGHAI ELECTRIC MACHINERY CO., LTD.



## 一 概 述

TL 系列大型立式同步电动机是本公司生产的多种系列品种之一, 历史悠久, 结构合理, 性能良好。电动机主要传动各种立式水泵。随着水利事业的发展, 产量逐年增加。50 年来全国各地泵站运行情况证明产品质量可靠, 被评为一机部信得过产品, 上海市优质产品, 深受用户欢迎。

如: 安装在江苏省江水北调工程的大小泵站, 安徽省驷马山引水工程各泵站, 湖北省各地区大型排灌站以及广东省东深送水工程等泵站中的本公司立式电动机都在发挥作用, 保证了各地区的农业水利事业的顺利发展。

TL 系列为大型立式三相同步电动机, 传动各类立式水泵。按国家标准 GB755《电机基本技术要求》制造。

## INTRODUCTION

TL series large vertical synchronous motors are one of the varieties of our products. They have a long history, a reasonable construction and excellent performances and are mainly used for driving various types of vertical water pumps. With the development of water conservancy, the production for this type of motor increases year by year. Their operational experiences at various pumping stations throughout the country have proved them dependable in quality. They have been awarded as reliable products by the FMMB and products of high quality by Shanghai Municipality and are warmly received by the customers.

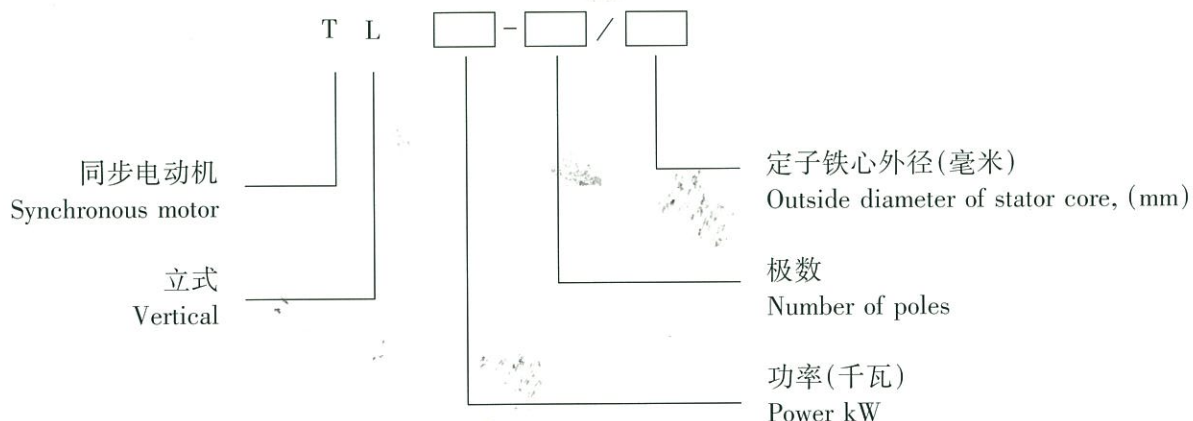
The motors of this type installed at various pumping stations, large or small, e. g., in Jiangsu province used for conveying water from the Yangtse River to the north; at the pumping stations of Simashan diversion project in Anhui province; at the large irrigation stations in various regions in Hubei province and at the pumping stations of the "Dongjiang - to - Shenzhen" diversion project in Guangdong province are playing an enormous role in ensuring the successful development of the agricultural water conservancy in these regions.

TL series large three - phase vertical motors used for driving various kinds of vertical water pumps are manufactured in conformity with the National Standard GB 755.



## 二 型号说明

### Symbol descriptions



## 三 结构特点

本系列电动机一般为一端轴伸,通常用法兰轴伸结构与水泵刚性联接。通风方式有开启式自冷却通风,半管道通风式或封闭自循环通风。电动机一般为悬挂式结构,根据产品结构的需要也可制成半伞式结构。在悬挂式结构中,上机架装有推力轴承和上导轴承,下机架仅装设下导轴承。推力轴承除承受电动机转子重量外,并能承受水泵工作时的轴向力。上、下机架,机座等构件均为钢板焊接结构。

电动机的励磁装置一般为静止可控硅励磁装置或静止硅整流励磁装置。对某些大功率的立式电动机,通过协商按用户需要可装设定子测温元件及其他附属装置。

定子铁心用优质硅钢片冲制扇形片经过叠压成为整圆。定子绕组采用双层绕组,定子绕组的绝缘采用 B 级或 F 级 VPI 真空压力无溶剂浸渍绝

## BRIEF IN CONSTRUCTION

Motors of this series are generally provided with shaft extension at only one end and rigidly coupled to water pumps through shaft extension flange. They are constructed with open type self-ventilation or semiduct ventilation or enclosed type self-circulating ventilation. The motors are generally of the overhang type construction, but construction of semi-umbrella type is also available according to customer's request. In the overhang type construction, the upper stand is provided with both thrust bearing and upper guiding bearing while the lower stand with lower guiding bearing only. Apart from sustaining the weight of the motor shaft, the thrust bearing is capable of sustaining the axial force of the pump during operation. Components, such as the the upper and lower stands as well as the frame are welded and fabricated with steel plates.

The motors are generally excited with static SCR devices or static silicon rectifier devices. For some large-output vertical motors, temperature detecting elements can be embedded in the stator and other auxiliaries can be attached according to customer's requirements.

The stator core is a circular construction, built up

缘。

定子线圈有支架端箍支撑,用涤纶玻璃丝带绑扎,经过特殊绝缘处理,以保证定子线圈电气性能良好。线圈在铁心槽内及槽外都牢固固定,使线圈能承受长期运行及起动电流的冲击,而不致磨损和变形。同步电动机定子嵌线及绝缘处理期间还需经过绝缘质量的检查。

同步电动机的转子,在装配磁极及其线圈后,还须经过绝缘处理,以提高其防潮性能,确保在停机期间绝缘电阻不致有过大的变化。

TL 系列 7000 千瓦立式同步电动机,安装于江苏省江水北调工程皂河抽水站。6 米混流泵单机排水能力为 100 吨/秒。

在江苏省江都排灌站的电机,装有 800 千瓦、1000 千瓦和 3000 千瓦电机,共计 33 台。经过多年来的使用,运行稳定,性能良好,对苏北地区农业排灌起了重要作用。

本公司生产制造了近千台大型立式同步电动机,广泛在广东、山东、江苏、湖北、湖南、安徽、江西、内蒙古、黑龙江等地区的农业排灌站中运行。在为我国的水利工程建设中取得了显著的成绩和发挥了巨大的作用。

with segments punched from high-quality sheet steel. The stator winding adopts the two-layer construction and its insulation is of class B or F, vacuum pressure impregnated with solventless varnish.

The stator end winding is binded with dacron glass cord and kept in place by the end bracing rings and the end winding overhang supports, and then undergoes a special insulation treatment so as to guarantee its excellent electrical properties. Coils are rigidly braced both inside and outside the stator slots so that they may be able to sustain the vibration during long-term operation and the impulse due to the starting current without wearing and deformation.

Quality inspection of the insulation is carried out during the stator is winded and insulation treatment is made.

After the poles along with their coils are assembled, the rotor should be put into an insulation treatment in order to raise its resistance to moisture and prevent the variation of the insulation resistance from being too great during shut-down period of the motor.

The TL series large 7000kW vertical synchronous motor is to be installed in Zaohe water pumping station in Jiangsu province to drive a 6 m mixed flow pump for conveying water from the Yangtse River to the north. The unit is capable of pumping water at the rate of 100ton/sec.

In the Jiangdu irrigation station, Jiangsu province there are installed 800 kW、1000kW、1600kW and 3000kW units of this series, accumulating to a total of 33 units. They have been proved reliable in operation and excellent in performance through several years' operation and have played an important role in the agricultural irrigation in north Jiangsu province.

Our company has manufactured nearly 1000 large-sized vertical synchronous motors, widely applied at agricultural irrigations in Shandong, Guangdong, Jiangsu, Hubei, Hunan, Anhui, Jiangxi, Heilongjiang, Inner Mongolia etc. province or regions. All of these motors have played or been playing great role in ensuring the successful development of the agricultural water conservancy in China.

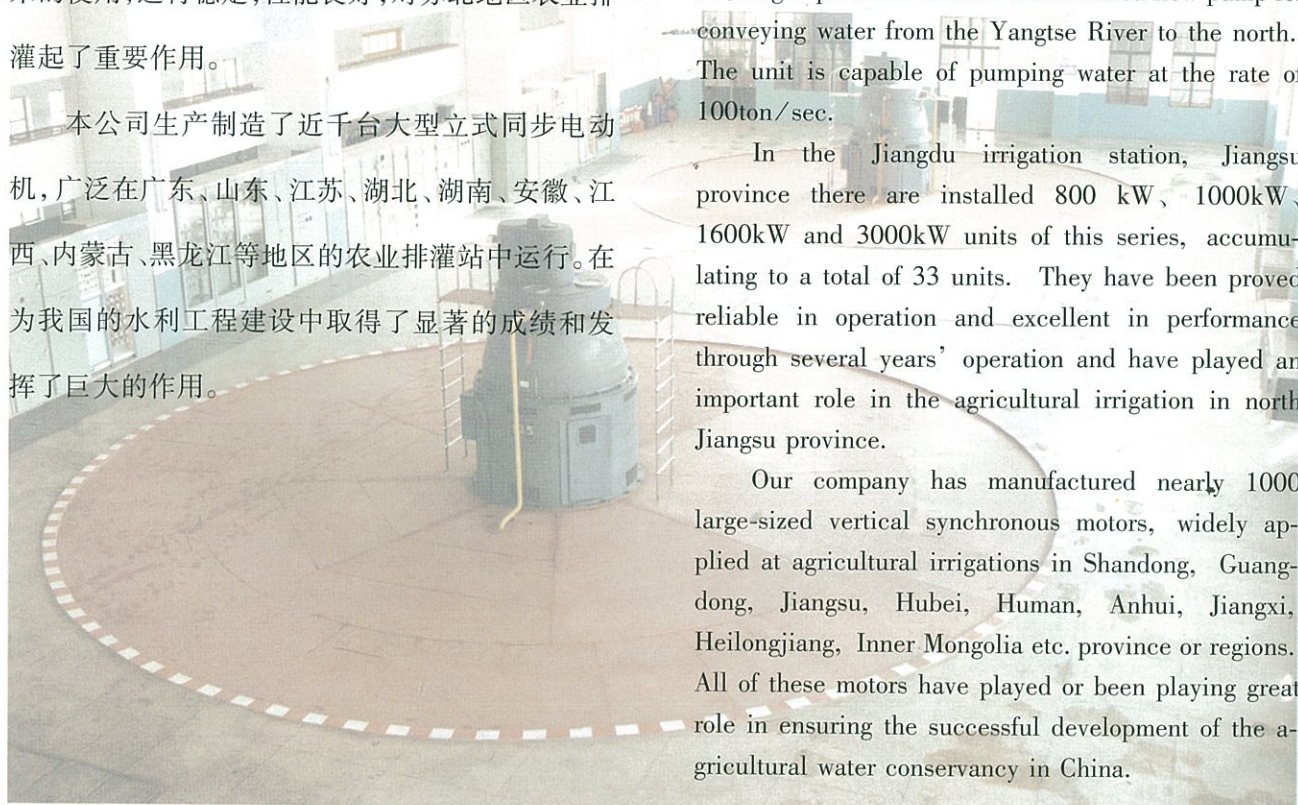






图 1: 安装在江苏省江都排灌站的 TL 系列 3000 千瓦 40 极同步电动机。

Fig. 1 The TL 3000kW 40P synchronous motor installed in the Jiangdu irrigation station, Jiangsu province.



图 2. 图为改造后的安装在江苏省江都排灌站的 TL 系列 1000 千瓦 24 极同步电动机

Fig. 2 The TL1000kW 20P synchronous motor installed in the rebuilt Jiangdu irrigation station, Jiangsu province.



图 3 安装在江苏省皂河泵站的最大功率的 TL 系列 7000 千瓦 80 极同步电动机  
Fig.3 The largest TL 7000kW 80P synchronous motor installed in the Zaohe pump station, Jiangsu province.



图 4. TL 系列 1600 千瓦 20 极立式同步电动机  
Fig. 4 The TL 1600kW 20P vertical synchronous motor.



大型立式三相同步电动机

表 2-1 Table 2-1:  
技术数据 Technical data:

型号 Type	额定值 Rated Value		效率 Efficiency %	功率因数 Cos $\theta$	额定电流 $\frac{I_{st}}{I_n}$	堵转转矩 额定转距 $\frac{M_{st}}{M_n}$	牵入转距 额定转距 $\frac{M_{pi}}{M_n}$	失步转距 额定转距 $\frac{M_{ms}}{M_n}$	能承受的轴 向负重(吨) Axial force-able to sustain(t)	转动惯量 吨米 <sup>2</sup> J t.m <sup>2</sup>	额定负荷时 At rated load		通风方式 Ventilation type	结构方式 Type of construc- tion	重量(吨) Weight(t)		
	功率(kW) Output(kW)	电压(V) Voltage(V)									电流(A) Current(A)	转速(转/分) Speed(r/min)				励磁电压(V) Excitation voltage(V)	励磁电流(A) Excitation current(A)
TL1000-12/1730	1000	6000	114	500	92	0.9	6	0.45	1	1.5	20	0.7	96	178	半管道 semiduct	悬挂式 overhang	13.06
TL2300-12/2150	2300	6000	258	375	94	0.9	6	0.58	1.05	1.7	35	2.48	85	257	半管道 semiduct	悬挂式 overhang	19.8
TL500-16/1730	500	6000	58.5	375	90.5	0.9	6	0.45	1	1.8	18	0.5	64	236	开启式 open	悬挂式 overhang	11
TL800-20/2150	800	6000	92.3	300	92	0.9	5.5	0.45	1	1.6	25	1.7	94	180	半管道 semiduct	悬挂式 overhang	15
TL1600-20/2150	1600	6000	181	300	94	0.9	6	0.55	1	1.5	25	2.6	94	254	半管道 semiduct	悬挂式 overhang	17.3
TL800-24/2150	800	6000	92	250	92	0.9	5.5	0.4	1.1	1.5	25	1.8	91	165	开启式 open	悬挂式 overhang	14
TL1000-24/2150	1000	6000	115	250	93	0.9	5.5	0.5	1	1.6	25	2.1	94	192	半管道 semiduct	悬挂式 overhang	15.5
TL1600-24/2600	1600	6000	181	250	94.4	0.9	5.3	0.55	1	1.7	57	4.9	88	264	半管道 semiduct	悬挂式 overhang	30
电动机/发电机 motor/generator	1600/600	6000/6300	186/68.8	250/125	92/89	0.9/0.8	7	0.4	0.8	1.5	70	12.5	168.5/148	197/173	半管道 semiduct	悬挂式 overhang	45
TL1000-28/2150	1000	6000	115	214	92	0.9	6	0.45	1	1.6	20	2.5	92	236	半管道 semiduct	悬挂式 overhang	17.3
TL1250-28/2600	1250	6000	142	214	94	0.9	5.3	0.55	1	1.7	50	4.9	81	248	半管道 semiduct	悬挂式 overhang	30.5
TL800-32/2150	800	6000	91.7	187.5	91	0.9	6	0.45	1	1.6	23	2.85	100	184	半管道 semiduct	悬挂式 overhang	17.4
TL1250-40/3250	1250	10000	87	150	92	0.9	5.5	0.6	1	1.8	80	12.5	119	244	半管道 semiduct	悬挂式 overhang	41.5
TL1600-40/3250	1600	6000	183	150	92.5	0.9	6	0.45	1	1.8	70	16.3	61	212	开启式 open	悬挂式 overhang	42

注: \*  
note:



表 2-2 Table 2-2:  
技术数据 Technical data:

型号 Type	额定值 Rated Value			效率 Efficiency %	功率因数 Cos $\theta$	堵转电流 额定电流 $\frac{I_{st}}{I_n}$	堵转转矩 额定转矩 $\frac{M_{st}}{M_n}$	牵入转矩 额定转矩 $\frac{M_{pi}}{M_n}$	失步转矩 额定转矩 $\frac{M_m}{M_n}$	能承受的轴 向负重(吨) Axial force able to sustain(t)	转动惯量 吨米 <sup>2</sup> J t. m <sup>2</sup>	额定负荷时 At rated load		通风方式 Ventila- tion type	结构方式 Type of construc- tion	重量(吨) Weight(t)
	功率(千瓦) Output (kW)	电压(伏) Voltage (V)	电流(安) Current(A)									转速(转/分) Speed (r/min)	励磁电压(V) Excitation voltage (V)			
TL1900-40/3250	1900	6000	214	94.5	0.9	5.5	0.55	1.0	1.6	80	16.9	73	251	半管道 semiduct	悬挂式 overhang	46.5
TL2000-40/3250	2000	10000	136	94.5	0.9	6	0.55	1.1	1.6	80	17.7	99	248	半管道 semiduct	悬挂式 overhang	50
TL2200-40/3250	2200	6000	248	94	0.9	6	0.50	1.0	1.5	80	18.1	139	255	半管道 semiduct	悬挂式 overhang	49
TL3000-40/3250	3000	6000	338	94	0.9	5.5	0.45	1.0	1.5	80	19	140	275	半管道 semiduct	悬挂式 overhang	48
TL7000-80/7400	7000	10000	475	95	0.9	6	0.40	0.8	1.5	280	475	243	495	封闭式 enclosed	悬挂式 overhang	250

注: \* 该电机作立式同步电动机运行时,出力可达 1600 千瓦,250 转/分,它也可作发电机运行,出力为 600 千瓦,125 转/分,转向与电动机方向相反。

Note: When the machine is operated as a vertical synchronous motor, its output may reach 1600 kW with a rotating speed of 250 r/min. It can also operate as a generator with an output of 600 kW. rotating speed 125 r/min and the rotating direction being adverse to that of the motor.

\*\* 通风方式根据用户需要制作开启式或半管道强迫通风方式。

According to user's requirement the ventilation type may be opeat or semiduct type.

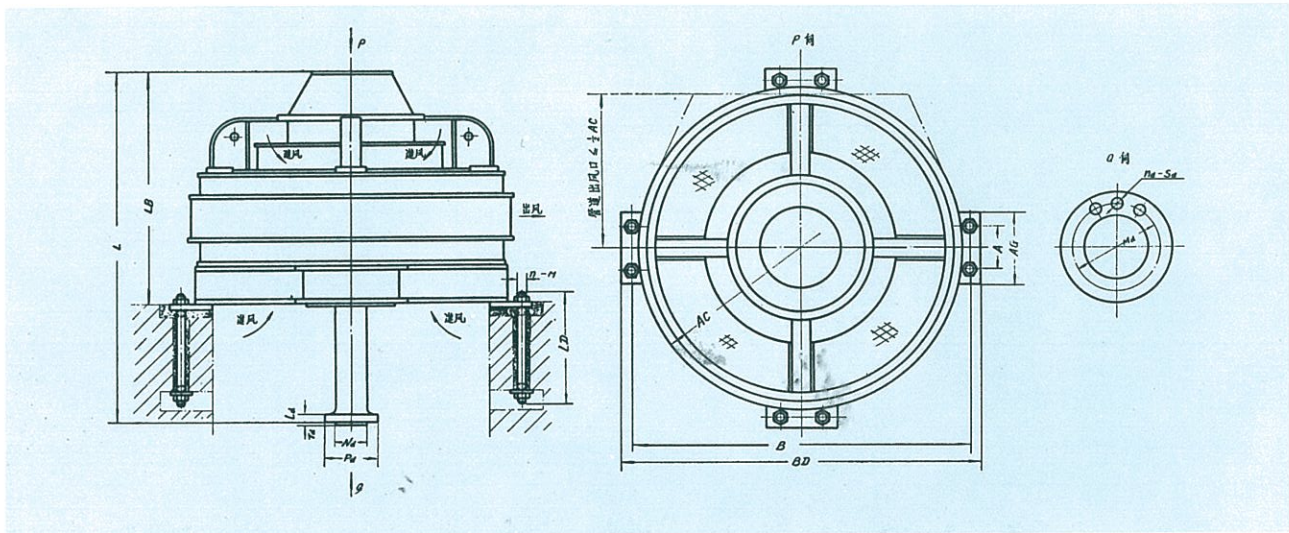


图 8: TL 系列外形尺寸图

Fig. 8: Outline dimension drawing of TL series

表 3: Table 3:

型号 Type	外形配合尺寸 Outside Dimensions For Fitting (mm)														
	A	AC	AG	B	BD	L	LB	LD	M <sub>a</sub>	N <sub>a</sub>	P <sub>a</sub>	L <sub>a</sub>	T <sub>a</sub>	N-M	n <sub>a-s</sub> d
TL1000-12/1730	350	2400	550	2520	2680	3375	2425	1300	420	340	500	60	9	8-M42	8-45
TL2300-12/2150	350	2800	550	2900	3100	3450	2500	1300	420	340	500	60	8	8-M42	8-45
TL500-16/1730	350	2300	550	2520	2680	3380	2100	1180	280	200	500	60	9	8-M42	12-32
TL800-20/2150	350	2800	550	2900	3100	3380	2100	1300	420	340	500	60	9	8-M42	8-45
TL1600-20/2150	350	2800	550	2900	3100	3610	2330	1300	460	350	540	75	8	8-M42	8-45
TL800-24/2150	350	2700	550	2900	3100	3380	2100	1300	420	340	500	60	9	8-M42	8-45
TL1000-24/2150	350	2800	550	2900	3100	3410	2130	1300	420	340	500	60	9	8-M42	8-45
TL1600-24/2600	500	3300	840	3540	3780	4320	2970	1300	500	400	620	80	12	8-M42	12-50
电动机/发电机 motor/generator	450	4500	800	4140	4360	4360	2510	1400	500	400	620	95	19	8-M48	12-50
TL1000-28/2150	350	2800	550	2900	3100	3500	2220	1300	460	350	540	75	8	8-M42	8-45
TL1250-28/2600	500	3300	840	3540	3780	4880	2970	1300	460	350	540	80	8	8-M42	8-45
TL800-32/2150	350	2800	550	2900	3100	3500	2220	1300	460	350	540	75	8	8-M42	8-45
TL1250-40/3250	600	4500	1000	4700	5000	4791	3076	1500	510	360	635	100	12	8-M48	12-55
TL1600-40/3250	600	4100	1000	4300	4600	4890	2990	1800	510	360	635	90	12	8-M48	12-55
TL1900-40/3250	600	4300	1000	4700	5000	4836	3176	1500	510	360	635	100	12	8-M48	12-55
TL2000-40/3250	600	4500	1200	4900	5200	5055	3395	1500	510	360	635	100	12	8-M48	12-55
TL2200-40/3250	600	4500	1200	4900	5200	4906	3246	1500	510	360	635	100	12	8-M48	12-55
TL3000-40/3250	600	4500	1000	4700	5000	4920	3260	1500	600	450	740	110	15	8-M483	12-70
TL7000-80/7400	450	8600	760	8800	8960	6902	5557	1600	920	640	1180	200	18		16-85

## 驻 外 销 售 网 点 通 讯 录

地区	地 址	电话及传真	邮 编
北京	北京方庄小区芳城园一区金都公寓 A 座 707 房	TEL: 010 - 67620390 FAX: 010 - 67620391	100078
沈阳	沈阳西顺城街 179 号 2 楼	TEL: 024 - 24855369 FAX: 024 - 24865572	110011
西安	西安市劳动南路 19 号	TEL: 029 - 8483247 FAX: 029 - 8484615	710068
武汉	武汉市三阳北路 15 号三阳宾馆 501 室	TEL: 027 - 82423268 × 3051 TEL, FAX: 027 - 82423259	430016
南京	南京市建宁路 2 号信力大酒店写字楼 2520 室	TEL: 025 - 5639893 FAX: 025 - 5504621	210037
广州	广州市天河区体育西路 131 号之 1 天英阁 804, 805 室	TEL: 020 - 87553766 FAX: 020 - 87553765	510620
云南	昆明北京路 32 号联贸大厦 20 楼 1 号	TEL: 0871 - 3536023, 3537981 FAX: 0871 - 3510778	650233
杭州	杭州莫干山路 511 号梅苑宾馆 319 房	TEL: 0571 - 8075524 × 1319 TEL, FAX: 0571 - 8065729	310005
上海	上海市海岱路 471 号 4 楼	TEL: 021 - 65405411 FAX: 021 - 65405309	200080
四川	成都市南巷子天仁商住中心 C1 幢一单元 4 楼 4 号	TEL: 028 - 7778252 FAX: 028 - 7778252	610031
安徽	合肥金寨路 128 号省纺织进出口公司大楼三楼	TEL: 0551 - 3665003 FAX: 0551 - 3665003	230022
新疆	乌鲁木齐西虹东路 10 号 3 楼	TEL: 0991 - 4616650 FAX: 0991 - 4616650	830063
上海 浦东	上海浦东大道 580 号	TEL: 58405393, 58873527 × 28 FAX: 59405394	200120

### 上海电机厂有限公司

地址: 中国上海闵行江川路 555 号 200240

电话: 64638221

电挂: 8304

传真: (021)64632422

Shanghai Electric Machinery Co., Ltd.

Add: 555 Jiangchuan Rd. Minhang, Shanghai P. C. 200240

Tel: 64638221

Cable: 8304

Fax: (021)64632422