

永远领先一“档”
Always One Gear Ahead



同步器齿环 •
汽车工业中的精密部件

Synchronizer Rings • Precision Parts for the Automotive Industry



代傲集团

代傲同步技术是代傲集团的下属子公司，代傲集团是一个家族企业，成立于1902年。

代傲集团的同步环事业部于1956年在德国开始生产。作为全球市场上的领先者，每年，代傲金属从四大生产基地- 德国，巴西，中国，印度 - 将超过一亿个不同种类的同步环，发往全球客户的手中。

Diehl Group

Diehl SynchroTec is a company of the Diehl Group, a family-run enterprise founded in 1902.

Its synchronizer ring division started production in Germany in 1956. As the global market leader with an annual production of 100 million rings, Diehl Metall ensures supply to the international automotive industry from production bases in Germany, China, Brazil and India.





Today

未来展望

得益于代傲集团内部之间的创新型技术共享，我们能够从其他技术领域汲取动力，在动力总成领域不断获得新发展。

Ideas for the Future

The innovative technology know-how of the entire Diehl Group enables us to draw on ideas generated in other technical areas for use in our developments in the powertrain.

DIEHL Metall

提供金属加工领域成熟的解决方案
Sophisticated solutions in metal processing

DIEHL Controls

开发并生产控制和调节系统
Developer and manufacturer of control and regulation systems

DIEHL Defence

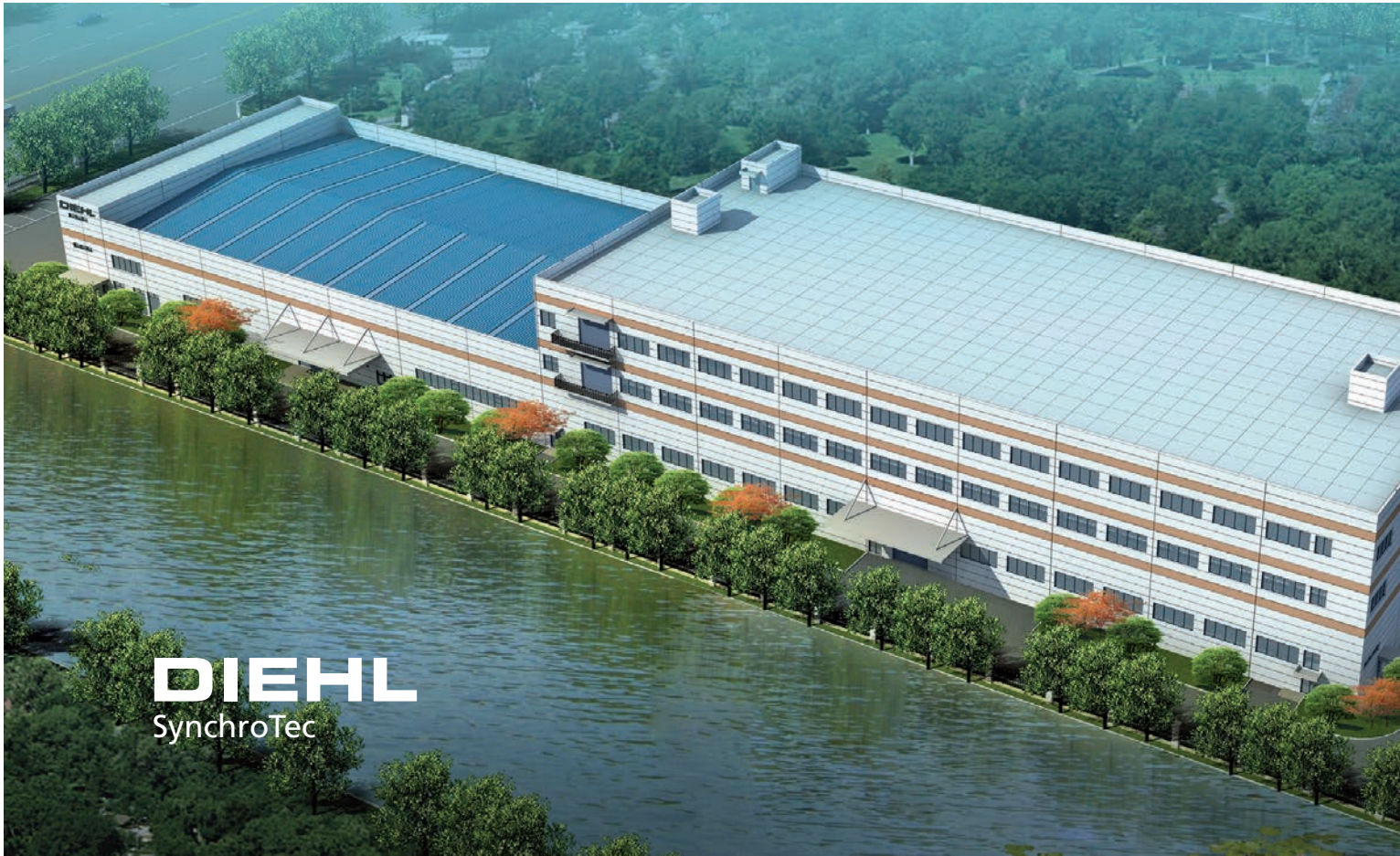
国防及安全行业的专家
Specialist for defence and security industries

DIEHL Aerosystems

航天和客舱领域的合作伙伴
Partner in the fields of avionics and cabin technology

DIEHL Metering

开发和生产高精度测量仪器
Developer and manufacturer of high-precision measuring instruments



代傲同步技术

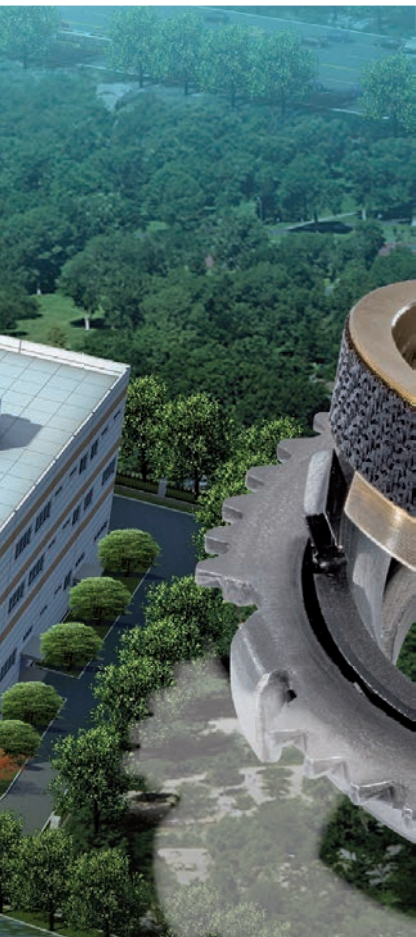
代傲同步技术是德国代傲的全资子公司，德国代傲在同步环技术领域内拥有逾60年的从业经验。在此背景下，我们能够为客户提供从产品设计和产品开发开始的整套服务。

我们在产品开发、生产技术和产品服务方面拥有广泛的优势。在产品尺寸、耐磨性和抗粗暴能力方面，我们的产品都达到了很高的技术和质量要求。我们可以为客户提供精准可靠的服务以及具有竞争力的价格。

Diehl SynchroTec

Diehl SynchroTec is a wholly owned subsidiary of the German Diehl Group. Diehl has over 60 years of experience in synchronizer technology. Against this backdrop, we provide complete support to our customers right from the stage of product design and development.

We have competitive advantages in all aspects of product development, production technology and product service. Our components fulfill the highest requirements with respect to accurate geometry, high wear resistance and strength. We guarantee precision, reliability and a competitive price.



变速器的核心

The Heart of Every Transmission

以客户目标为导向开展活动是我们工作的重中之重。我们能够用我们的专业知识，以小体积、高性能、低油耗以及整车减重为目标，为新项目提供全方位的支持。

Directing our activities to the goals of our customers is of utmost importance to us. We support new projects with our expertise, focusing on the required objective, namely achieving smaller units with higher performance and lower consumption as well as weight reduction in the entire vehicle.

同步器齿环

Synchronizer Rings

铜合金同步环 Brass Synchronizer Rings

由于无可比拟的性价比，无摩擦材料的铜合金螺纹同步环是所有乘用车变速器最基础的解决方案。运用创新型摩擦材料，铜环也可以在高负载的变速器中得以应用。

Due to an unrivaled performance ratio, uncoated brass synchronizer rings with friction thread are the standard solution for all passenger car transmissions. Combined with innovative friction layers, brass synchronizer rings may even be used in highly loaded transmissions.

优势 Advantages

- 可小批量生产
- 高性能合金结合各种摩擦材料
- 模具变更费用低
- Low volumes possible
- Substituting coatings with high-performance alloys
- Low tool modification costs

冲压钢环 Steel Synchronizer Rings

冲压钢环可以满足对于性能要求较高的变速器。目前，我们拥有8,000 kN的多工位连续冲压设备，用于冲压钢环的生产。

For high-performance transmissions, we recommend our synchronizer rings made of steel. We have a progressive stamping and forming machine with a pressing force of up to 8,000 kN.

优势 Advantages

- 产品精度高，省去机加工环节
- 产品重量轻
- 大批量的情况下经济性较好
- 表面适合粘贴摩擦材料
- High precision without machining
- Low weight
- Cost-effective at high volumes
- Suitable as a counter friction face



摩擦材料

Friction Layers



现代化、高负载量的变速器越来越多地在使用覆碳的同步环，以达到优化摩擦性能、提高耐磨性的目的。

Modern, highly loaded transmissions are increasingly using synchronizer rings with tribo-layers made of carbon to improve friction and wear performance.

摩擦属性 Tribological Properties

- 整个生命周期稳定性良好的高动摩擦系数
- 低静摩擦系数
- 高耐磨性
- 优秀的油品相容性
- 优秀的负载表现
不易变形 / 高同步容量
- Dynamic friction coefficient at high level with good consistency over lifetime
- Static friction coefficient at low level
- High wear resistance
- Good oil compatibility
- Excellent overload behavior
No scuffing tendency and high energy capacity

摩擦层种类: 硬化树脂碳纤维

Layer type: Carbon-fiber-reinforced resin (phenolic resin)

摩擦层结构: 专利设计的编织状结构, 并配有优化的油槽

Layer structure: Patented weaving structure for optimized oil flow

摩擦层厚度: 根据客户要求设计

Layer thickness: Layer thickness designed according to customer requirements

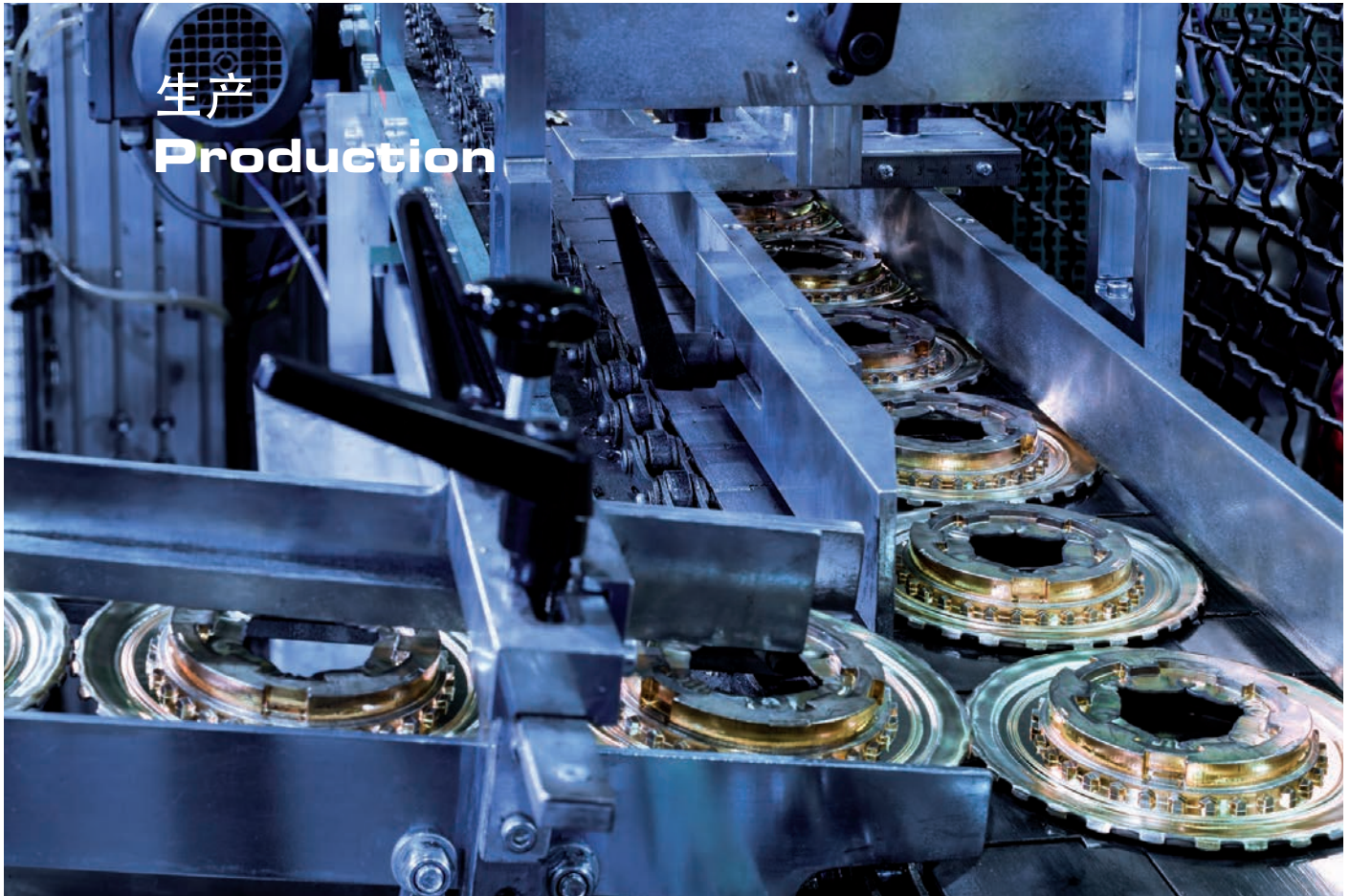
压缩系数: 10 牛/平方毫米的负载情况下小于 0.01 毫米

Compressibility: < 0.01 mm at 10 N/mm² load

固定方式: 特种胶水粘结

Fixing on carrier ring: Bonding



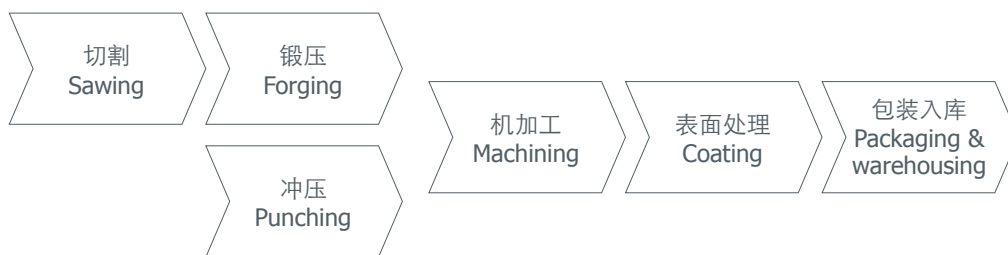


生产 Production

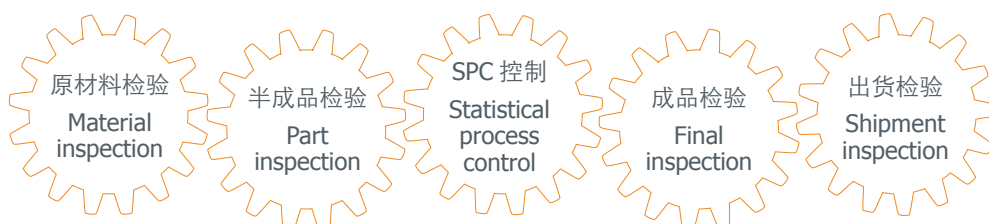
作为德国代傲金属事业部的亚太地区生产基地，代傲同步技术从2004年开始批量生产铜合金同步环；冲压钢环的生产始于2015年。

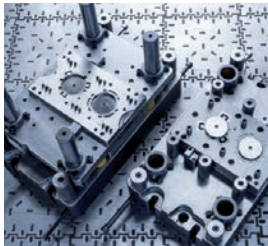
Diehl SynchroTec is the Asia-Pacific base of the German company Diehl Metall. Serial production of brass synchronizer rings commenced in 2004; synchronizer rings made of steel were taken up into the product portfolio in 2015.

生产流程 Production Flow



制造过程中的质量控制 In-Process Quality Control





模具和工装

所有用于锻压、机加工和非机加工工序的模具、检具和工装的设计都是德国和本地紧密协作的技术成果。

Dies and Tools

Diehl Metall in Röthenbach, Germany, and Diehl SynchroTec in Wuxi, China, work together to design tools for forging, cutting and non-cutting operations as well as gauges and fixtures.

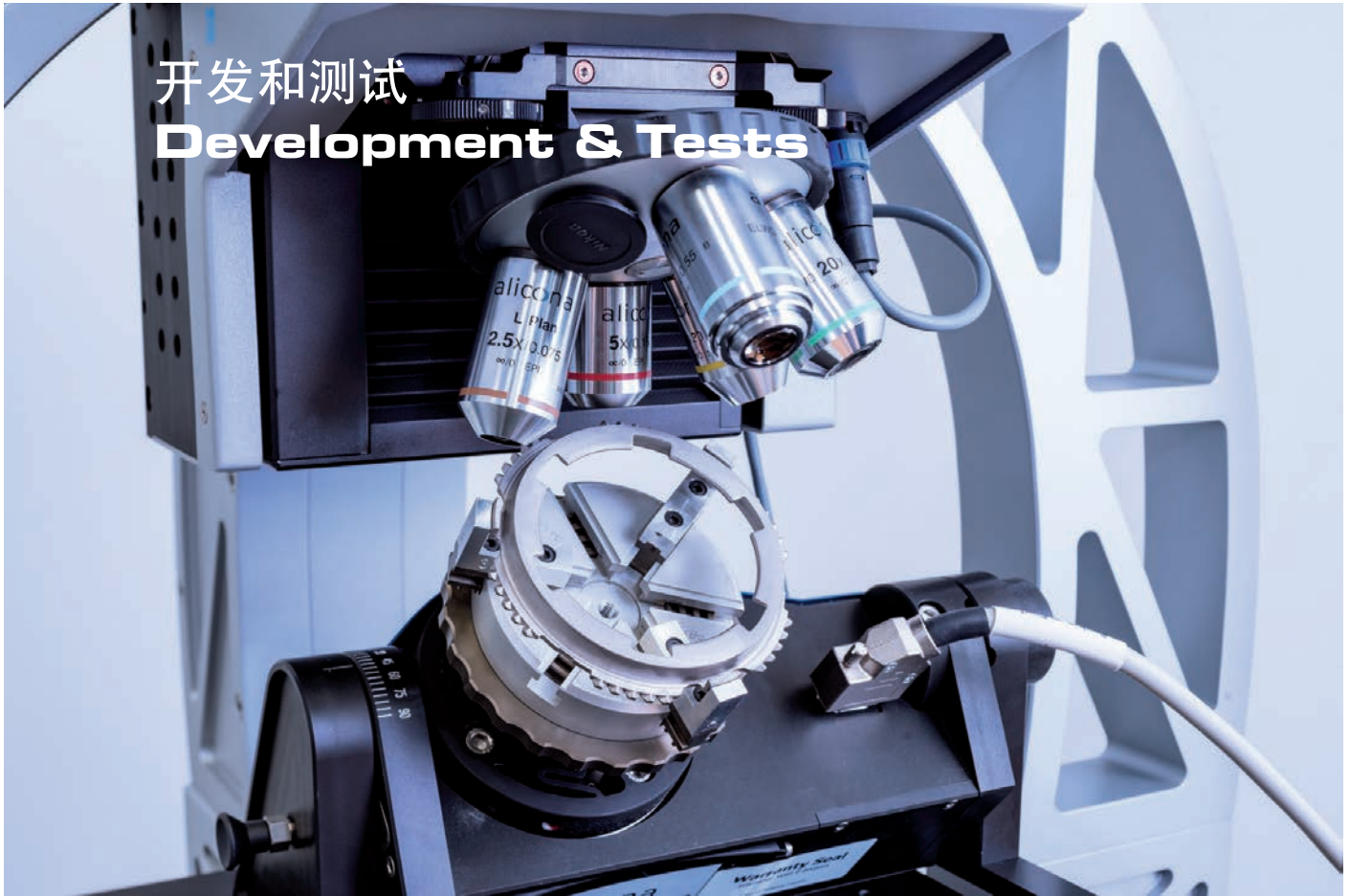
管理体系

基于ISO TS 16949和ISO 14001的证书要求，我们在整个生产工序中推行零缺陷战略，组织可持续的发展管理。

Management Systems

With ISO TS 16949 and ISO 14001 certifications, we have an obligation to fulfill our zero-defect strategy across the entire production process and practice sustainable management.

开发和测试 Development & Tests



开发能力

我们的开发队伍与德国研发中心有着紧密的协作，在中国无锡和德国研发中心均设有材料实验室，用于为客户提供材料相关的服务和咨询。在设计方面，我们拥有丰富的经验，也能够以快速的响应速度，为客户提供样品和技术支持。

Development Capability

Our development team works closely together with the Research and Development department at Diehl Metall in Germany. At Diehl SynchroTec we have an in-house material laboratory. This allows us to provide support and consultation on all issues relating to materials. Our wealth of experience in part design and our rapid response times give us the leading edge.

测试设备

我们提供所有阶段的测试服务，包括材料测试，单体测试，变速器内的耐久性测试以及功能性测试。在德国，我们拥有：

- 材料磨损试验台架
- 同步环花键齿磨损试验台架
- 同步器性能及磨损单体试验台架
- 采埃孚标准同步器试验台架SSP180
- 变速器试验台架

Testing Facilities

We offer all stages of testing, including material, component and service life tests as well as the final functional test in the transmission. At Diehl Metall in Germany, test benches are available for:

- Material wear
- Obstructing tooth wear
- Component friction value and wear
- Synchronization (SSP180) according to the ZF/FZG-standard
- Transmissions

客户 Customers

我们为客户提供定制化服务。我们的客户包含国内外知名汽车生产商以及变速器生产企业。

We offer customized solutions for every vehicle. For this reason, virtually all renowned automotive and transmission manufacturers are represented in our customer base – not only in China, but worldwide.



全球客户 Global Customers

大众 VW	标致 Peugeot	格特拉克 Getrag	斯柯达 Skoda
菲亚特 FIAT	雷诺 Renault	通用 GM	戴姆勒 Daimler
福特 Ford	采埃孚 ZF	现代起亚 Hyundai-Kia	奥迪 AUDI
雪铁龙 Citroën	依维柯 IVECO	伊顿 Eaton	保时捷 PORSCHE

国内客户 Domestic Customers

上海大众变速器 VWTS	北汽银翔 BAIC Yinxiang	比速汽车 Bi Su
大连大众 VWATD	杭州依维柯 Haveco	万里扬 Wan Li Yang
一汽大众 FAW-VW	广汽集团 GAC	比亚迪汽车 BYD Auto
天津大众 VWATJ	上汽变速器 SAGW	菲亚特 FIAT
奥迪 Audi	上汽汽车乘用车 SAIC Passenger Car	众泰汽车 Zotye
江淮汽车 JAC	上汽通用 SAIC GM	采埃孚 ZF
长安汽车 CHANGAN	格特拉克(江西) GJT	华晨汽车 Brilliance
青山工业 TSINGSHAN	东风格特拉克 DGT	长城汽车 Great Wall
北京汽车 BAIC Motor	吉利汽车 Geely	

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