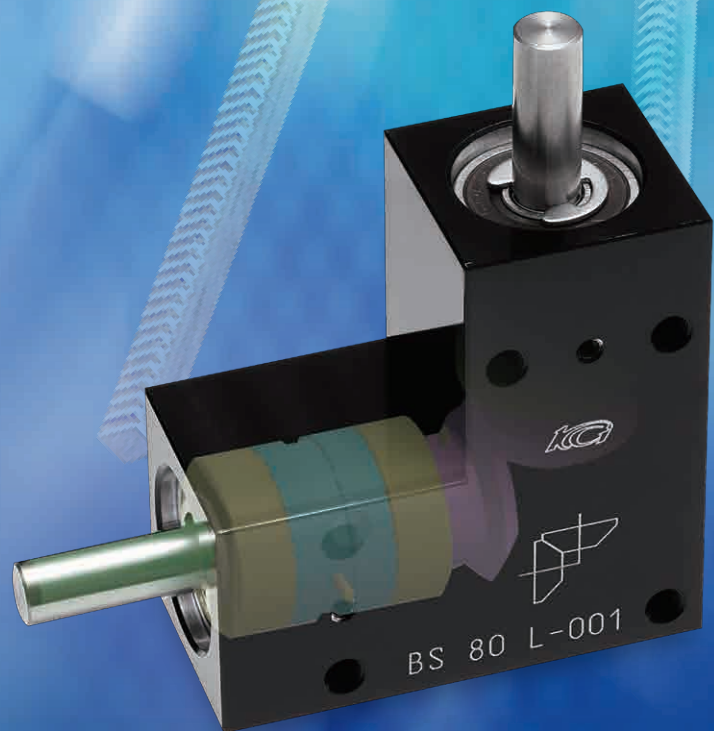


KG规格齿轮

KG STOCK GEARS

CATALOGUE No.
KG2002



RKG 系列 精密研磨齿条

RKG Precision Ground Racks

研磨齿条增加了新产品！

请参考第285页。



本产品目录中增加了对齿部进行高频感应淬火，并全方面进行研磨的高精度研磨齿条。
New Precision Ground Racks with induction hardening and all surfaces are ground.

用于配对RKG精密研磨齿条的齿轮，请在以下研磨直齿轮中选择。

Please select Mating Gears of RKG Ground Racks from the following ground spur gears.

研磨直齿轮 (SG、SGE)

Ground spur gears



研磨无侧隙齿轮

Antibacklash ground spur gears



研磨控制侧隙齿轮

Control backlash ground spur gears



	新系列产品 NEW PRODUCTS	以往系列产品 CONVENTIONAL PRODUCTS
模数 MODULE	m1.0 m1.5 m2.0 m2.5 m3.0	m0.5 m0.8 m1.0 m1.5
全长 OVERALL LENGTH	500mm 1000mm	200mm (m0.5 m0.8) 300mm (m1.0 m1.5)
热处理 Heat Treatment	齿部高频淬火 Induction Hardening	原料调质处理 Thermal Refining to the raw material

直齿轮系列产品的选择范围增加了！

KG spur gears are available in the wide range of selection.

SGE 系列

SGE Ground Spur Gears



S-H 系列

S-H Spur Gears



BF 系列

BF Spur Gears



	精度等级 System of accuracy	模数 Module	特征 Features
SGE 系列 SGE: Ground spur gears	JIS B 1702-1 N7	m0.5 ~ m3.0	只对齿部磨削的经济型研磨直齿轮。 Competitive-price ground spur gears
S-H 系列 S-H: Spur gears	JIS B 1702-1 N9		对齿部进行高频淬火，省去客户自己进行热处理工序的麻烦。 Spur gears with induction hardening
BF 系列 BF: Spur gears	JIS B 1702-1 N8		使孔径变小，轮毂变大。从而增加了可追加加工范围的最适合追加加工的直齿轮。 Suitable for additional machining with minimum bore diameter

KG 齿轮信息

KG Gear - Information

关于订制齿轮 (由客户设计的齿轮)
Customize making gears.

响应客户需求的**订制齿轮**，可从 1 个开始提供生产。



我们将灵活运用本公司生产精密小型规格齿轮的经验技术，接受订制齿轮 (由客户设计的齿轮) 的制作要求。

We make customized gears with our past experience and know-how of precise and small standard gears from 1pc.

可对应小模数的小型齿轮・直齿轮・锥齿轮。并具备良好的质量检测体系。
We make precise and small Spur and Bevel gears with full inspection systems.



我们也能生产模数0.3的直齿轮和锥齿轮。
We are able to make module 0.3 Spur and Bevel gears.



为了检测小模数・小型齿轮，备有NIKON公司制作的高精度非接触式传感器3D系统「HN-C303P」
We inspect precise and small gears with non-contact sensor 3D metrology system "HN-C303P" from Nikon.

订制齿轮时的各类因素确认表

When enquiries, please refer to and check the following table.

Dimenstions with ○ mark in your specification sheet or drawing help with our quick consideration.

	尺寸 Size	材料 Material	齿数 No. of teeth	形状 Shape	外径 Outsied diameter	螺旋角和方向 Herical angle and direction of thread	头数 Number of thread	配对齿轮齿数 No. of teeth of mating gears	装配距离 Locating distance	热处理 Heat treatment	表面处理 Surface treatment
直齿轮 Spur Gears	○	○	○	○						○	○
齿条 Rack Gears	○	○		○						○	○
斜齿轮 Herical Gears	○	○	○	○		○		○		○	○
蜗轮 Worm Gears	○	○	○	○	○	○	○	○	○	○	○
锥齿轮 Bevel Gears	○	○	○	○		○		○	○	○	○

请根据客户的图纸和规格说明书给KG公司发出指示和订单。

也有可能由于本公司的设备的原因而无法满足客户的需求。

We may not able to meet some requirements due to our capacity and equipments.

KG 齿轮信息

KG Gear - Information

关于追加工

Additional machining to KG standard gears

响应客户需求对规格齿轮进行**追加工**。可从一个开始加工。



KG STOCK GEARS (规格齿轮) 准备了各种齿数，齿宽，孔径等。因此，应该可以满足对应相当广范围的客户需求。另外为了满足客户的多样化的需求，我们同时接受对规格齿轮的追加工（二次加工）订单。

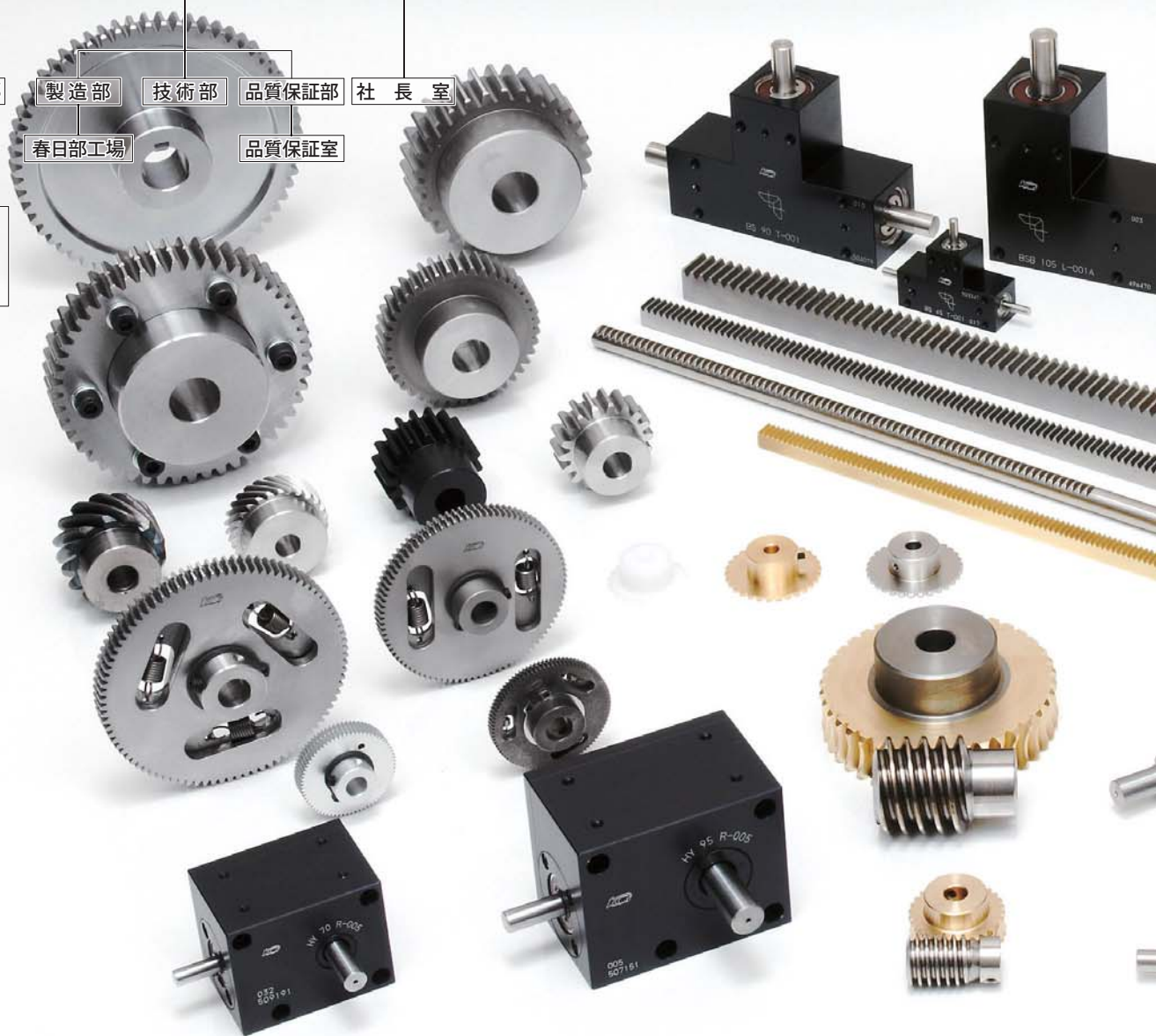
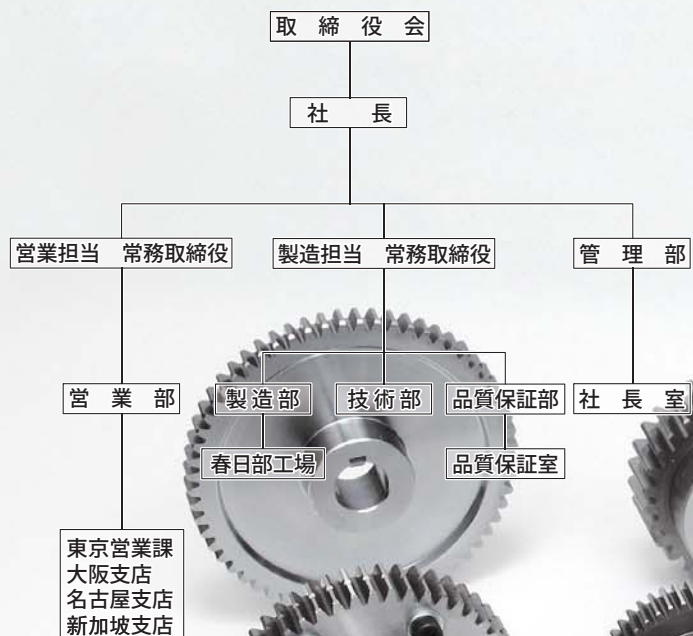
To meet customers' further demands, we make gears with additional machining to our standard products.

请根据客户的图纸发出加工指示和下订单。

When enquiries, please provide drawing with our standard product's catalogue No.

KG STOCK GEARS

Gears for Every Need.....



URL <http://www.kggear.co.jp/>

问候。

首先借此机会，非常感谢您使用本公司的产品目录。这次我们更新了产品目录的内容，发表了最新版本的[KG2000产品目录]。本公司的理念是当客户使用本公司产品时的[简单][方便][更上一层楼]。本产品目录刊载了各种可使客户省去追加加工麻烦的方便的产品，可直接使用。另外本公司也可以接受客户的特殊定制产品的要求，为您设计只属于您的全新的KG齿轮。

董事总经理 井田齐昭
Managing Director Tadaaki Ida

A letter of greeting

We are pleased to publish the updated comprehensive catalogue of KG2000 series. We always fabricate our products based on the point of our valued customers.

Our concept of products has Easy, Convenient and advantage edge products. Features of our new products save customer's expenses on the additional machining work to the gears, and can use as it stands. Please make the full use of our features KG STOCK GEARS on the designing and purchasing.



KG 齿轮综合目录的内容

KG 规格齿轮信息
KG STOCK GEARS KG 规格齿轮的详细内容

The Contents of KG-General Catalogue.

- 1) Information of KG STOCK GEARS.
- 2) Edition of Dimensions.

We design Gears to your requirements.

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KG 齿轮 - 信息

KG Gear - Information

对环境保护的投入

Our efforts to the environment

我们协育齿轮工业株式会社认为，在全球范围内的环境保护是目前全人类所面临的最主要的课题之一。我们正在进行对环保的持续性的投入，努力降低对环境的压力，为了实现可持续发展的经济社会而做出不懈的努力。

所谓RoHS的指令是，指不可使用所规定的6种物质。其6种不可使用的物质分别为[铅，水银，镉，六价铬，特定溴素阻燃剂 (PBB 和PBDE)]。

从2011年3月份开始协育齿轮株式会社的全部的库存产品已经对应RoHS指令。在产品目录上已经标出表示对应RoHS指令的标志。

从2006年11月份所生产的黄铜产品，开始采用降低铬含量的原材料，以对应欧盟RoHS指令。

但是这并不意味着包括流动库存在内的所有的本公司产品都能对应RoHS指令。

如果您需要对应欧盟RoHS指令的产品，烦请给我们明确的指示。

KYOUIKU GEAR MFG CO LTD thinks that the global environmental conservation is one of most important issue for all mankind and makes an effort for continuous reduction of the environmental load. Therefore, we contribute to realize of the economic society, which can be developed continuously.

In the RoHS compliance that must not use exceeded contents on the regulation of the six substances, the Lead, Mercury, Cadmium, Hexavalent chromium and Polybrominated biphenyls (PBB), Polybrominated diphenyl ether (PBDE)

We have been produced our products with RoHS compliance since March 2011. We indicate the marks of RoHS compliance on our product' s pages in KG catalogue.

Since November 2006, we are supplying the products with RoHS compliance as we had adopted the material of low cadmium for ISO CuZn39Pb3 and CuZn38Pb2 in our brass products.

However, the distribution inventories are not compliant to all products.

Please inform us clearly when require for the products with RoHS compliance before ordering.

KG产品目录中所有页面中所标的RoHS指令，指的是欧盟的RoHS指令。
All pages of the KG catalogue of the "RoHS Compliance" are correspond to "EU RoHS C ompliance".

关于 KG 齿轮产品的 制造编码

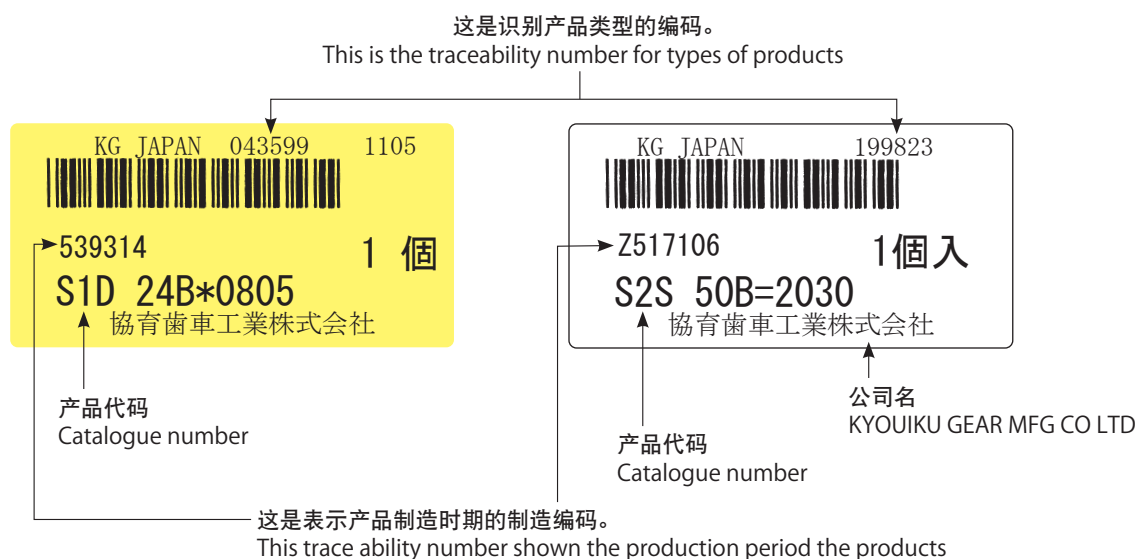
Regarding the production's number of KG products.

您拿到的本公司产品的标签上会印有产品代码和制造编码。烦请您将这个制造编码进行保管。这样有利于我司对产品进行跟进调查服务，并可迅速而准确的答复您对各种产品的咨询。

Regarding the trace ability number, we printed the commodity and production's numbers on the label of KG- products . In order for customers to trace the enquiry of KG products conveniently after purchased.

产品标签样版

Label sample of KG products



如果您需要我们的跟进服务，请好好保管这个制造编码。对产品进行咨询时烦请准备制造。

In case, customer needs to know the trace ability of products, please check the production's number which printed on the label of KG products and inform to us.

在2010年10月份以后所发布的新产品的商品标签，已经都统一为上图左侧的黄色标签。

Regarding the new commodity number of our products, was indicated in yellow label at the top of left side on the packing box since October 2010.

KG 齿轮 - 信息

KG Gear - Information

特殊订制产品 (客户自定义产品)

Customize making gears.



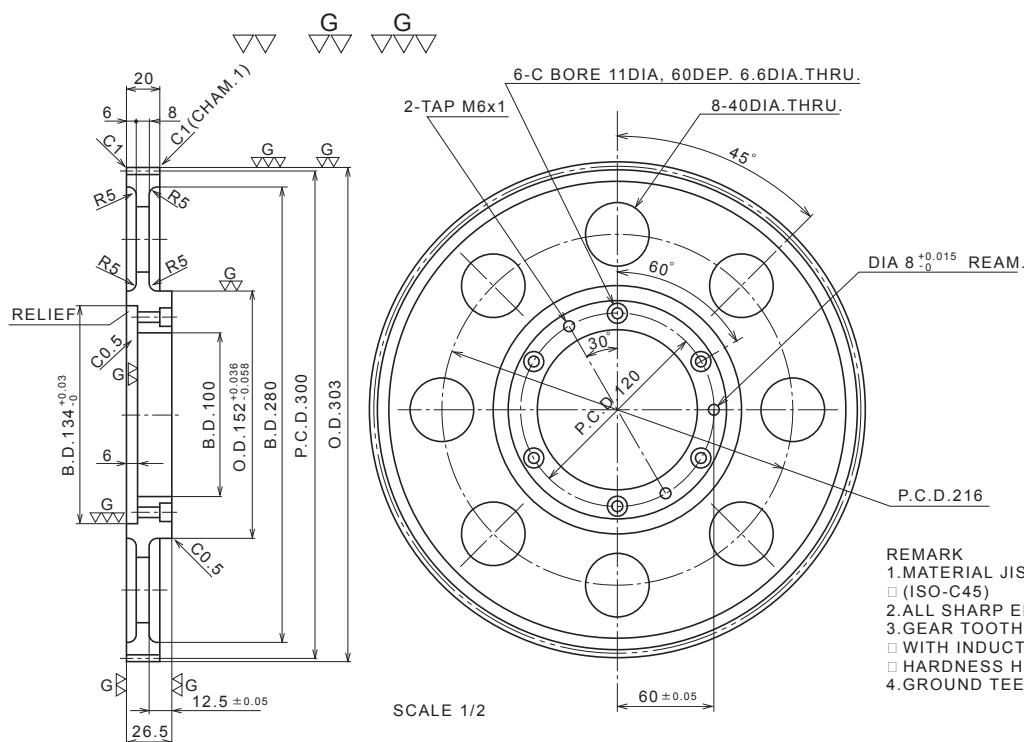
KG-STOCK GEARS (本公司常规齿轮产品) 在齿数, 齿宽, 轴孔直径, 轮毂直径等方面都准备了多种产品。我们认为这些产品种类应该可以满足大多数情况的客户需求。所以您在进行机械设计时请先确认KG-STOCK GEARS里有没有您所需的产品。如果KG-STOCK GEARS中的产品无法满足您的需求, 请给我们设计图纸。

本公司将发挥常年制作精密小规格齿轮的技术能力, 为您生产常规产品以外的客户自定义产品。关于价格和交货时间请与我们进一步协商。

如果在设计上有不明白的地方, 您可联系我们。我们除了技术部门之外, 在各地的分店也有经验丰富的技术服务人员, 他们会竭诚为您服务。

KG-STOCK GEARS has a wide selection of the variety with Number of Teeth, Face Width, Bore Diameters and Hub Diameter. Please select your suitable gear from our KG-catalogue when you work out a design.

With our professional engineers and our past experience, we are able to provide advice and accurate information to our customer for customizes make gears. Price and delivery lead time of the customize make gears are negotiable. Do not hesitate to call us for discussion.



KG 采用 JIS 规定符号

We have been adopting the symbol of JIS.

关于齿轮图纸各部位的尺寸符号有很多种。我们KG齿轮公司采用JIS规格、参考文献中所使用的符号。

The Vocabulary of each dimension for the gear's drawing in various usages includes many different fields. KG has been adopting the symbols as there is reference literature of JIS standard and gear.

齿轮的符号和术语

The Vocabulary of Gear and Gear terms.

用于齿轮计算的齿轮符号，由JIS B 0121-1999(齿轮符号)规定。

关于齿轮的术语由JIS B 0102（齿轮术语）规定。

With regard to the Vocabulary of gear for gear calculation, define JIS B 0121-1999(Gear vocabulary).

With regard to the Gear terms, define JIS B 0102(Gear terms)

关于直线和圆周方面的相关尺寸 The relative dimension of the Rectilinear and Circumference

齿轮术语 Gear Terms	符 号 Vocabularies
中心距离	center distance a
统称齿距时	when you call pitch P
分度圆齿距	reference pitch P
端面齿距	transverse pitch P_t
法向齿距	normal pitch P_n
轴向齿距	axial pitch P_s
法向齿距 (基圆齿距)	base pitch P_b
端面法向齿距	transverse base pitch P_{bt}
法向公法线齿距	normal base pitch P_{bn}
齿高	tooth depth h
齿顶高	addendum h_a
齿根高	dedendum h_f
固定弦齿高	chordal addendum h
啮合齿高	working tooth depth h'
统称齿厚时	when you call tooth thickness s
齿厚	tooth thickness s
基圆上的齿厚	base circle s_b
固定弦齿厚	chordal tooth thickness $\bar{s}$
公法线齿厚	sector span w
分度圆槽宽	spacewidth e
齿顶间隙	bottom clearance c
周向侧隙	circumferential backlash j_i
法向侧隙	normal backlash j_n
齿宽	facewidth b
有效齿宽	effective facewidth b' 和 b_w
蜗杆导程	lead P_z
啮合长度	length of path of contact g_a
渐近啮合长度	length of approach path g_f
渐远啮合长度	length of recess path g_a
重叠啮合长度	overlap length g_β
统称直径时	when you call diameter d
分度圆直径	reference diameter d
啮合圆 (节圆) 直径	working pitch diameter d' 和 d_w
齿顶圆直径	tip diameter d_a
基圆直径	base diameter d_b
齿根圆直径	root diameter d_f
齿根圆直径	when you call radius r
分度圆半径	reference radius r
啮合圆 (节圆) 半径	working pitch radius r' 和 r_w
齿顶圆半径	tip radius r_a
基圆半径	base radius r_b
齿根圆半径	root radius r_f
曲率半径	curvature radius ρ
统称锥距	when you call cone distance R
锥距	cone distance R_c
中点锥距	mean cone distance R_m
内锥距	inner cone distance R_i
背锥距	back cone distance R_v
装配距离	locating distance A

角度相关尺寸 The Angulars

齿轮术语 Gear Terms	符 号 Vocabularies
统称压力角时	when you call pressure angle α
分度圆压力角	reference pressure angle α
啮合压力角	working pressure angle α' 和 α_w
刀具压力角	cutter pressure angle α_o
端面压力角	transverse pressure angle α_t
法向压力角	normal pressure angle α_n
轴向压力角	axial pressure angle α_s
统称螺旋角时	when you call helix angle β
分度圆螺旋角	reference cylinder helix angle β
齿顶圆螺旋角	tip cylinder helix angle β_a
基圆螺旋角	base cylinder helix angle β_b
统称蜗杆中圆柱导程角时	when you call lead angle γ
中圆柱导程角	reference cylinder lead angle γ
齿顶圆导程角	tip cylinder lead angle γ_a
基圆导程角	base cylinder lead angle γ_b
轴交角	shaft angle Σ
统称圆锥角时	when you call angle δ
螺距角	pitch angle δ
顶锥角	tip angle δ_s
根锥角	root angle δ_f
齿顶角	addendum angle θ_a
齿根角	dedendum angle θ_f
端面作用角	transverse angle of transmission ϕ_a
重叠角	overlap angle ϕ_β
总作用角	total angle of transmission ϕ_γ
冕状齿轮的齿距角	angle pitch of crown gear τ
渐开线 α	involute α $\text{inv } \alpha$

齿数和齿轮比 The Number of teeth and Gear ratio

齿轮术语 Gear Terms	符 号 Vocabularies
齿数	number of teeth z
当量直齿轮齿数	equivalent number of teeth z_v
条数或小齿轮齿数	number of thread z_1
齿数比	gear ratio u
速度传送比	transmission ratio i
模数	module m
端面模数	transverse module m_t
法向模数	normal module m_n
轴向模数	axial module m_s
啮合率	contact ratio ε
端面啮合率	transverse contact ratio ε_a
重叠啮合率	overlap contact ratio ε_β
总啮合率	total contact ratio ε_γ
滑移率	specific sliding σ
角速度	angular velocity ω
线速度	linear velocity v
转速	revolution per minute n
变位系数	rack shift coefficient x
中心距离变位系数	center distance modification coefficient y

ISO 规格和 JIS 规格的统一化

Standardizing the coordination between ISO and JIS

引言

伴随JIS规格向ISO规格的统一，很多JIS规格 (包括Technical report)，正在不断地被改编或重新制订。关于齿轮方面的JIS规格和JGMA规格 (日本齿轮工业会规格) 正进行按次更改。编辑本商品产品目录时，JIS规格和JGMA规格还并没有完全改编完成，而且也有一些规格虽然已经被废止，但是编辑产品目录的[齿轮技术资料]时，还是需要旧的JIS规格和JGMA规格。

为此，我们在进行编辑时，尽力使用新的JIS规格和JGMA规格。但是在新规格里不存在的一些部分，或者如果不使用旧规格无法说明的部分，我们依然采用旧规格来解释。并在旧规格前标明了[旧]字。并在[齿轮的尺寸]篇也有新旧规格并列的部分。

本公司尽量密切注视ISO规格，JIS规格和JGMA规格等的修订情况而进行宣传册的改编，但是就算是这些规格被制定改编，本宣传册中所使用的内容不一定会马上跟着改编。

对此，敬请理解。

Firstly, as standardizing at the coordination of ISO standard from JIS standard, most of JIS-standard (included Technical report) has been making revision and replacement.

In due time JIS standard and JGMA standard (Japan Gear Manufacturers Association) for the gears shall be revised to a new edition as time to come. However JIS standard and JGMA standard are not complete and some standard was abolished when we started the new edition of KG catalogue. However an old JIS and JGMA standard are essential reference of gears for KG-new catalogue.

Therefore we had adopted the latest JIS and JGMA standard as latest as possible in our new edition KG-catalogue. However if we found inexplicability and nonexistence standard, we introduced the old and new standards to our new edition KG-catalogue.

With respect to the new edition of ISO, JIS and JGMA standards, new edition KG-catalogue is unable to adopt the latest revised ISO, JIS and JGMA standards. We seek your understanding for our latest edition of KG-catalogue.

关于 KG-STOCK GEARS (本公司规格齿轮产品) 的精度

Precision of KG STOCK GEARS.

到现在为止长期被使用的 JIS B 1702：1995确认 (直齿轮和斜齿轮的精度) 被废止，被分为JIS B 1702-1：1998 (圆桶齿轮—精度等级 第一部：关于齿轮的齿面的误差的定义和容许值) 以及JIS B 1702-2：1998 (圆筒齿轮—精度等级 第二部：两齿面啮合误差与齿沟的误差的定义与精度容许值) 的2个规定。

关于这些内容，如果与旧JIS B1702相比较，模数和基准圆直径的区分有所不同，所以如果问到旧JIS4级相当于新的JIS的几级时，无法进行详细的对应与说明。

但可以作为大概的指标来说

新的JIS精度等级＝旧JIS精度等级＋4；

但是齿数比较小或齿数过大时，会出现上述规律无法对应的问题。

The Two Regulations had enacted that JIS B 1702-1:1998 (Cylindrical gears - Precision and Classification Article 1: Definition of Error and Amount of Permissible for a Gear flank) and JIS B 1702-2:1998 (Cylindrical gears - Precision and Classification Article 2: Error of Tooth to Tooth Working, Definition of Run out and Amount of Precision) in place of JIS B 1702: 1995, confirmed (Precision for the Spur and Helical gears) was discontinued after so many years used.

When new JIS compared with old JIS B 1702, the new JIS is unable to be equivalent to the Old JIS class 4 detail, due to different classification of Module and Reference diameter (call Pitch Diameter of old JIS).

The rough outline of the theory is New JIS precision class = Old JIS precision class plus(+) 4, however comparatively range of small or big number of teeth are unable to cover the above classification.

新旧齿轮用语比较例 (可以看到同一指标的英语表现方法有所不同)

Comparison of new and old gear's terms

JIS B0102：1999	JIS B0102：1993
reference diameter	pitch diameter
tooth depth	whole depth
working tooth depth	working depth
pitch angle	pitch cone angle
tip angle	tip cone angle
root angle	root cone angle
spiral angle	helix angel
locating distance	mounting distance

本产品目录中的[齿轮的尺寸]编中，有一些部分没有被更换成新JIS规格。

Some of the old standard still remain unchanged in our new KG-catalogue for the Dimensions of the Gears.

KG STOCK GEARS 的精度等级

Regarding the system of accuracy for KG STOCK GEARS.

KG 研磨直齿轮的精度等级相当于新 JIS (JIS B 1702) 5 级

System of accuracy of KG-Ground Spur Gear is equivalent to JIS B1702-1 class 5.

ISO C45材料的KG直齿轮的精度相当于新JIS8 (JIS B 1702) 8 - 9级

System of accuracy of KG- Spur Gear with ISO C45 is equivalent to JIS B1702-1 class 8-9.

JIS B 1702-1 中所规定的对齿轮测定项目中，KG齿轮的精度等级如下

System of accuracy of KG-STOCK GEARS based on JIS B 1702-1 standards are as follows.

单齿距误差 Single pitch deviation	JIS B 1702-1 7级 JIS B1702-1 class 7
齿距累积误差 Total cumulative deviation	JIS B 1702-1 8级 JIS B1702-1 class 8
齿形误差 Tooth profile deviation	JIS B 1702-1 8级 JIS B1702-1 class 8
齿圈径向跳动 Run out	JIS B 1702-1 8级 JIS B1702-1 class 8

注：本公司的齿轮在新JIS规格的等级分类中是属于[相当于新JIS8级]的程度。

用[相当于]这一词的原因是，如果齿形误差，齿圈径向跳动等持续性的保持在新JIS8级以上，那么也就可以说本公司的齿轮达到了新JIS规格8级。但是现实是如果那么做，会大大的提高常规齿轮的制造成本。所以KG齿轮现在的状态是[相当于新JIS8级]。

Although we are able to provide the gear with JIS B1702-1 class 8 for tooth profile deviation and runout. In order to maintain the demand so that economically price to be as competitive as possible. Therefore, we manufacturing by equivalent at the JIS B1702-1 class 8 gear.

C45之外的，黄铜，不锈钢，聚缩醛树脂的直齿轮，斜齿轮的精度等级

Regarding the system of accuracy of Spur and Helical gears with materials of SUS 304, Brass and Poly Acetal.

SUS (不锈钢) 材料的直齿轮，斜齿轮	JIS B1702-1 9级
Spur and Helical gears with SUS-stainless steel	JIS B1702-1 class 9
黄铜材料的直齿轮 (铆接类除外)	JIS B1702-1 9级
Spur gears with Brass except riveted type.	JIS B1702-1 class 9
聚缩醛树脂材料的直齿轮，斜齿轮 (射出成型类除外)	JIS B1702-1。9-10 级
Spur and Helical gears with Poly Acetal except Injection molded type.	JIS B1702-1 class 9 - 10

KG的等径锥齿轮和锥齿轮的精度等级

System of accuracy of KG-Miter and Bevel gears.

ISO 34CrMo4, 42CrMo4合金结构钢材料的精密锥齿轮	JIS B 1704 2级
Fine Cut Miter Gear with ISO 34CrMo4, 42CrMo4 steel	JIS B 1704 class 2
C45碳钢材料的等径锥齿轮 / 锥齿轮	JIS B 1704 3级
Miter and Bevel gears with C45-carbon steel.	JIS B 1704 class 3
C45碳钢材料的等径锥齿轮 / 锥齿轮的高周波淬火品	JIS B 1704 4级
Miter and Bevel gears completed Induction harden.	JIS B 1704 class 4
SUS304 (不锈钢) 材料的等径锥齿轮 / 锥齿轮	JIS B 1704 4级
Miter and Bevel gears with SUS-stainless steel.	JIS B 1704 class 4
黄铜材料的等径锥齿轮 / 锥齿轮	JIS B 1704 4级
Miter and Bevel gears with Brass.	JIS B 1704 class 4
聚缩醛树脂材料的等径锥齿轮 / 锥齿轮 (射出成型类除外)	JIS B 1704 5 和 6级
Miter and Bevel gears with Poly Acetal except Injection molded type.	JIS B 1704 class 5 or 6

聚缩醛树脂材料产品的孔径的精度

Fitting tolerance of bore dimensions for KG products with Poly Acetal.

聚缩醛树脂材料的切削加工产品 (除了射出成型品) 的孔径尺寸公差，加工管理公差为H9。聚缩醛树脂材料因为其特性，经过年月时间的推移老化，温度变化而发生尺寸的变化。尽管管理公差是H9，但因为KG STOCK GEARS 的生产运输的需要，生产后要库存一段时间。所以本产品到达客户手中时，可能已经发生了尺寸变化。

Fitting tolerance of bore dimensions for KG Miter and Bevel gears with Poly Acetal except Injection molded types are by the working control's tolerance of H9. The working control H9 for the gears with Poly Acetal maybe affected to change the dimension's tolerance due to the characteristic of secular change and fluctuation of temperature that may occur after our production in a period of storage time.

关于精度方面的更多的详细资料和数据，请参考本公司技术资料。

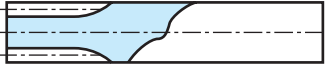
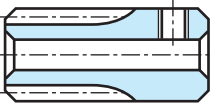
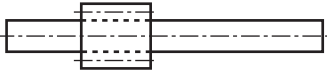
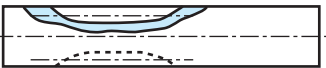
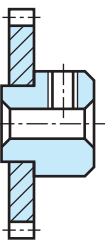
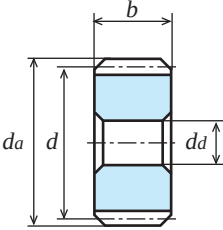
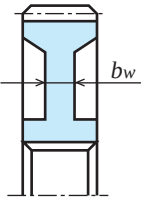
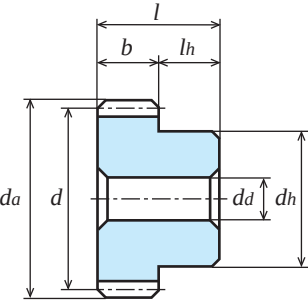
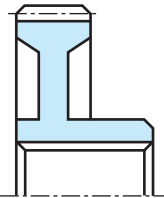
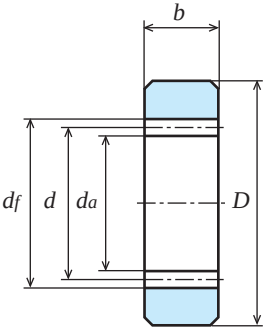
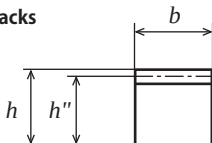
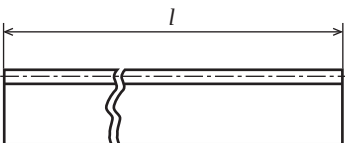
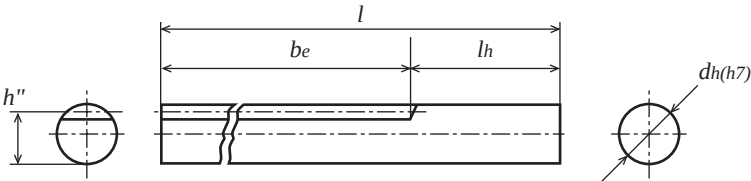
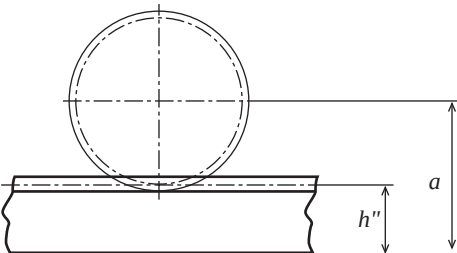
For more details of system of accuracy, refer to KG-Technical Data.

KG 齿轮 - 信息

KG Gear - Information

KG 齿轮的尺寸符号

KG齿轮的符号和术语 - 表(1) The vocabulary and terms of KG-gear (1)

KG 齿轮的类型和简单图纸 Simple drawings and Types of KG STOCK GEARS.		齿轮术语 Gear terms.	符 号 Vocabularies
直齿轮和斜齿轮 Spur and Helical gears.  型 K1 TYPE K1  型 K2 TYPE K2  型 L1 TYPE L1  型 L2 TYPE L2  型 B2 TYPE B2  型 A1 TYPE A1  型 A2 TYPE A2  型 B1 TYPE B1  型 B3 TYPE B3		齿顶圆直径 Tip diameter d_a 分度圆直径 Reference diameter d 轮毂直径 Hub diameter d_h 内径 Bore diameter d_i 全长 Overall length l 齿宽 Face width b 轮毂长度 Hub projection l_h	
内齿轮 Internal gears. 		齿顶圆直径 Tip diameter d_a 分度圆直径 Reference diameter d 齿根圆直径 Root diameter d_f 齿顶圆直径 Outside diameter of Ring D 齿宽 Face width b	
齿条 Racks   		全长 Overall length l 啮合高 Datum line h'' 齿宽 Face width b 全齿高 Overall Thickness h 轴径 Shaft diameter d_h 有效啮合长度 Effective Datum length b_e 柄长度 Length of stem l_h	
齿条和小齿轮 Racks and Pinions 		装配距离 Locating distance a	

KG 齿轮的符号和术语 - 表(2) The vocabulary and terms of KG-gear (2)

KG 齿轮的类型和简单图纸 Simple drawings and Types of KG STOCK GEARS.		齿轮术语 Gear terms.	符 号 Vocabularies
蜗杆齿轮 Worms gears		齿顶圆直径 Tip diameter d_a 分度圆直径 Reference diameter d 轮毂直径 Hub diameter d_h 内径 Bore diameter d_i 全长 Overall length l 齿宽 Face width b 轮毂长度 Hub projection l_h	
蜗轮 Worm wheels		齿顶圆直径 Tip diameter d_a 蜗轮的喉部圆直径 Throat diameter d_r 节圆直径 Pitch diameter d 轮毂直径 Hub diameter d_h 内径 Bore diameter d_i 全长 Overall length l 齿宽 Face width b 轮毂长度 Hub projection l_h 轮辋内径 Dimension of Rim d_i 腹板厚度 Thickness of Web b_w 啮合中心距 Center distance A	
等径锥齿轮 / 锥齿轮 Miter and Bevel gears		装配距离 Locating distance A 齿顶圆直径 Tip diameter d_a 分度圆直径 Reference diameter d 轮毂直径 Hub diameter d_h 内径 Bore diameter d_i 齿顶角 Tip angle δ_a 分锥角 Pitch angle δ 齿宽 Face width b 轮毂长度 Hub projection l_h 全长 Overall length l_w 全长 Overall length l_a	

KG 齿轮 - 信息

KG Gear - Information

Interpretation of Allowable capability torque table.

关于容许传达动力表的说明

Interpretation of Allowable capability torque table.

本产品目录中记载的容许传达动力表中的〔弯曲强度〕〔齿面强度〕〔蜗轮容许扭矩齿面强度〕的表采用JGMA式(日本齿轮工业会规格)(树脂齿轮除外)。由于齿轮的种类, 模数大小等原因, 会出现JGMA式的适用范围外的情况。所以本书的数据仅供参考。

The Bending Strength, Surface Durability and Allowable Transfer Capability Torque of Worm Wheel are introduced by using JGMA (Japan Gear Manufacturers Association) formula except Poly Acetal material. This JGMA formula does not apply to every gear, or some is reference only. Therefore refer to the below classification of reference 1 for Kind of the gear and Module size.

JGMA式的适用范围节选 (表1)

Applicable range for JGMA formula (Reference 1)

齿轮的种类 Kind of Gears	JGMA 规格号码 JGMA standard	模数尺寸 Range of Module	分度圆直径 Pitch Diameter
直齿轮 Spur gear	JGMA401 - 01	1.5 ~ 25mm	分度圆直径 25 ~ 3200mm Pitch diameter
斜齿轮 Helical gear	JGMA402 - 01		
锥齿轮 Bevel gear	JGMA403 - 01	外端正面模数 1.5 ~ 25mm Outertransverse module	外端分度圆直径 1600mm 以下 Below 1600mm of Outer pitch diameter
螺旋锥齿轮 Spiral bevel gear	JGMA404 - 01		外端分度圆直径 1000mm 以下 Below 1000mm of Outer pitch diameter
蜗轮齿轮 Worm gear pair	JGMA405 - 01	轴向模数 1.0 ~ 25mm Metric axial module	蜗轮齿轮分度圆直径 900mm 以下 Below 900mm Pitch diameter of Worm wheel

(1) 直齿轮及斜齿轮的弯曲强度, 齿面强度

Bending Strength and Surface Durability for Spur and Helical gears.

项目 Descriptions	材料 Material	SCM435 [ISO34CrMo4]	S45C (ISO C45)		(1) SUS304	(1) C3604B	聚缩醛树脂 Poly Acetal
	高频淬火 Induction hardening	—	高频淬火 Induction hardening				
所适用计算式 Calculation	直齿轮和斜齿轮的弯曲强度计算式 JGMA 401 - 01 Calculation for Bending strength of Spur and Helical gears as JGMA 401-01.						Louis 的式 Louis formula
	直齿轮和斜齿轮的弯曲强度计算式 JGMA 402 - 01 Calculation for Surface durability of Spur and Helical gears as JGMA 402-01.						
配对齿轮 Matching gear	同一齿数及同一材料 The same number of teeth and same material						—
容许弯曲应力 Stress of Allowable Bending	: σF_{lim}	36.5kgf/mm ²	21.0kgf/mm ²	25.0kgf/mm ²	10.5kgf/mm ²	4.2kgf/mm ²	3.4kgf/mm ²
容许赫兹应力 Stress of Allowable Hertz	: σH_{lim}	121kgf/mm ²	—	106.5kgf/mm ²	—	—	—
寿命中的齿啮合次数 The number of times of engagement between two gears during life span	10 ⁷ 次以上 Above 10 to the power of 7. ($K_L=1.0$)						—
来自原动机的冲击 Impact from motor side.	均一负荷 Flat load						—
来自从动机械的冲击 Impact from load	中程度的冲击 Average impact ($K_O=1.25$)						—
润滑方式及油的粘着度 Lubricating system and Oil viscosity	润滑油润滑 100cSt (50℃) Oil Lubrication. ($Z_L=1.0$)						—
齿轮的支承方法 Method of supporting gear	两轴承对称支承两侧 Double supporting with plane symmetry to both bearing						—
对齿根弯曲破坏的安全率 Safety Factor of Tooth Breakage	: S_F	1.2					—
对齿面强度的安全率 Factor of safety at Surface strength	: S_H	1.15					—
负荷方向 Load direction	负荷方向为恒定 One-way direction						

负荷的作用方向为正负变化(包括齿轮齿条结构), 或中间齿轮机构的时候, 容许传达能力是所标值的2/3。

容许传达能力表的齿面强度不适用于空转齿轮, 或与大齿轮在两处啮合的小齿轮(二档齿轮)。

注(1) 如果在JGMA401-01和JGMA402-01中没有相应的规格, 请以JGMA6101-01和JGMA6102-01为准。

在本产品目录中记载的容许传达能力表中的弯曲强度, 本书用转速 $n=100[\text{min}^{-1}]$ 时的容许传达扭矩值 $[N \cdot m]$ 表示在各表。(表示范围: 模数1-5, 材料C45)

Regarding the amount of allowable transfer capability, load direction is the reversible and the middle gear become 2/3 (including rack pinion).

Surface Durability in Allowable transfer capability table that the formula does not apply to Idler gear or mid gear engaged with 2 gears.

Note (1) Sub standard JGMA401-01 and JGMA402-01 equivalent to JGMA 6101-01 and JGMA6102-01.

The Amount of Allowable transfer torque $[N.m]$ at the number of revolution per minute $n=100 [N.m]$ to each reference compare with Bending strength of Allowable transfer capability table (Range: Module 1.0 to 5.0 with ISO C45 carbon steel) in KG-catalogue.

(2) 锥齿轮的弯曲强度，齿面强度

Bending strength and Surface durability for Bevel gears.

项目 Descriptions	材料 Material	SCM435 (ISO34CrMo4)	S45C (ISO C45)		(?) SUS304
	高频淬火 Induction hardening	—	高频淬火 Induction hardening		
使用计算式 Calculation	锥齿轮的弯曲强度计算式 JGMA 403-01 Calculation for Bending strength of Bevel gears as JGMA 403-01.				
	锥齿轮的齿面强度计算式 JGMA 404-01 Calculation for Surface durability of Bevel gears as JGMA 404-01.				
配对齿轮 Matching gear	所选定产品的配对齿轮 Nominative Matching gear.				
容许弯曲应力 Stress of Allowable Bending	: σF_{lim}	31.0kgf/mm ²	19.0kgf/mm ²	22.0kgf/mm ²	10.5kgf/mm ²
容许赫兹应力 Stress of Allowable Hertz	: σH_{lim}	109.0kgf/mm ²	54.0kgf/mm ²	85.0kgf/mm ²	—
寿命中的齿啮合次数 The number of times of engagement between two gears during life span	10 ⁷ 次以上 Above 10 to the power of 7. (K _L =1.0)				
来自原动机的冲击 Impact from motor side.	均一负荷 Flat load				
来自从动机械的冲击 Impact from load	中程度的冲击 Average impact (K _H =1.25)				
润滑方式及油的粘着度 Lubricating system and Oil viscosity	润滑油润滑 100cSt (50℃) Oil Lubrication. (Z _L =1.0)				
轴，齿轮箱等的刚性 Stiffness of gear shaft and gearbox.	普通 Standard				
齿轮的支撑方法 Supporting condition of the gear	两个齿轮各单侧支撑 Overhang condition				
	(K _{Mβ} =1.8)		(K _{Mβ} =2.1)		
对齿根弯曲破损的可靠度系数 : K _R Coefficient of reliability of Tooth Breakage	1.2				
对齿面强度的可靠度系数 : C _R Coefficient of reliability at Surface strength	1.15				
负荷方向 Load direction	负荷方向为恒定 One-way direction				

负荷方向为正逆转时各种齿轮的容许传达表中的数据的数据的2/3。

注 (?) 如果在JGMA403-01和JGMA404-01中没有相应的规格，请以JGMA6101-01和JGMA6102-01为准。

Regarding the amount of allowable transfer capability, load direction is the reversible and the middle gear become 2/3.

Note (?) Sub standard JGMA403-01 and JGMA404-01 equivalent to JGMA 6101-01 and JGMA6102-01.

(3) 圆柱形蜗轮蜗杆齿面强度

Surface durability of Cylindrical worm gear pair.

项目 Descriptions	蜗轮的材料 Material of Wheel	C3604B 黄铜 Brass	FC200 普通铸铁 Cast iron	CAC702 铝青铜 Aluminum Bronze
使用计算式 Calculation	圆柱形蜗轮蜗杆强度计算式 Calculation for Surface strength of Cylindrical worm gear pair.			
对齿面强度的容许应力系数 Coefficient of Allowable Stress at Surface strength : σF_{lim}	0.42	0.63	0.56	
预期寿命 Effective life period	26, 000 小时 26,000 hours			
润滑油润滑 Oil Lubrication.	使用添加齿轮用极压添加剂的，有适当粘度的润滑油 Provided extreme additive lubricant oil with proper viscosity. (Z _L =1.0)			
润滑方式 Lubricating system	油池润滑法 Oil bath Lubrication (Z _M =1.0)			
轮齿接触 Surface contact	相当于 JIS B 1741 (轮齿接触) 的区分 A 的轮齿接触 This Surface contact is equivalent to classification A of JIS B1741 (Surface contact) (K _C =1.0)			
启动状况 Starting condition	启动时的扭矩为额定扭矩的 200% 以下。1 小时中的启动次数 2 次以下 Starting torque should below 200 % from rating torque and the number of starting time should less than 2 times. (K _S =1.0)			
来自原动机的冲击 Impact from motor side.	均匀负载 Flat load			
来自从动机械的冲击 Impact from load	均匀负载 Flat load (K _H =1.0)			

Regarding the amount of allowable transfer capability, load direction is the reversible and the middle gear become 2/3.

Note (!) Sub standard JGMA403-01 and JGMA404-01 equivalent to JGMA 6101-01 and JGMA6102-01.

KG 齿轮 - 信息

KG Gear - Information

容许传达动力表中的弯曲强度的使用方法

需同时确认齿面强度

While examination of Bending strength from the Allowable transfer capability table, Surface strength check are necessary too.

求常规直齿轮的容许传达扭矩

To calculate Allowable transfer torque of KG STOCK GEARS.

根据规格直齿轮的条件选择齿轮

To select KG-STOCK GEARS from usage condition of Spur gear.

计算例：求规格齿轮的容许传达扭矩 T [N.m]

For example 1. To calculate Allowable transfer torque: T[N.m]

(1) 当所使用规格直齿轮 S2S40B-2016F 时。

- 1) 模数 $m=2$ 3) 齿宽 20[mm]
- 2) 齿数 $z=40$ 4) 孔径 16[mm]

(2) 齿轮的使用条件

- 1) 直齿轮的齿数比 $u=1:1$
- 2) 直齿轮的旋转速 $n=100[\text{min}^{-1}]$
- 3) 关系到直齿轮的强度计算的诸条件 (参考JGMA401-01)
 - a) 齿轮在齿轮箱内进行油池润滑法润滑。
 - b) 齿轮轴的轴承在齿轮的两侧进行支撑。
 - c) 从原动机侧给齿轮均匀负载。
 - d) 被动机械给齿轮中程度的冲击。
 - e) 齿轮在寿命中所受的啮合次数为 10^7 以下。

(3) 在本产品目录的容许传达动力表 (KW) 的弯曲强度中, 求得容许传达扭矩

1) 根据上述条件 (1) (2) 确认本宣传册的容许传达动力表 (kW) 的数据。

$KW=1.61[\text{单位kW}]$

2) 将动力kW[单位kW]换算成扭矩。

根据 $T=9549.7 \frac{\text{kW}}{n}$ $n=100$

$T=9549.7 \times \frac{1.61}{100}=153.75[\text{N.m}]$

从上述计算式中可以得出, 规格齿轮S2S40B-2016F的容许传达扭矩为

$T=153.75[\text{N.m}]$

结论：这个齿轮在上述的条件下, 可以在输入扭矩 $T=153.75[\text{N.m}]$ 以下使用。

(1) For example, calculating KG — STOCK GEAR S2S 40B-2016F

- 1) Module $M2.0$ 3) Face width 20mm
- 2) No. of teeth $z=40$ 4) Bore 16mm

(2) Usage condition of Spur gear.

- 1) Gear ratio of Spur gear $u=1:1$
- 2) The number of revolution $n=100 / \text{min}$
- 3) Providing conditions with usage of gear for strength calculation. Please refer to Calculation for Bending strength of Spur and Helical gears as JGMA401-01.
 - a) The gear is in gearbox with lubricant oil.
 - b) Bearing in gearbox should position on both sides. Bearings are plane symmetry.
 - c) Receiving load from a motor side is a flat load or less.
 - d) Receiving impact from a load side is an Average or less.
 - e) During gear life period, the number of times for set of gear engagement is below 10^7 times.

(3) To calculate Allowable torque from Allowable transfer capability table (kW) with Bending strength in KG-catalogue.

1) Base on Usage Candition of Spur Gear stated above (1) and (2) that obtain a numerical value from Allowable transfer capability table in KG-catalogue.

$KW=1.61[\text{kW}]$

2) Convert to Torque [N.m] from power kW[kW]

Gained $T=9549.7 \frac{\text{kW}}{n} = 9549.7 \times \frac{1.61}{100}=153.75[\text{N.m}]$

Therefore selected S2S 38B-2016F as Allowable transfer torque $T=153.75[\text{N.m}]$

This gear can be used unless exceed range of Input torque $T=153.75[\text{N.m}]$

计算例 2. 根据使用条件，选择规格直齿轮

For example 2. To select KG STOCK GEARS from conditions of Spur gear.

(1) 齿轮的使用条件 (客户的实际使用参数)

- 1) 作用于直齿轮的最大标称扭矩 $T=142[\text{N.m}]$ (包含安全系数)
- 2) 直齿轮的转速 $n=100[\text{min}^{-1}]$
- 3) 直齿轮的齿宽 $b=10-30[\text{mm}]$
- 4) 直齿轮的轴间距离 $a=70-100[\text{mm}]$
- 5) 齿数比 $u=1:1$
- 6) 关于直齿轮的强度计算的条件 (参考JGMA401-01)
 - a) 齿轮是在齿轮箱内进行油池润滑法润滑。
 - b) 齿轮轴的轴承在齿轮的两边进行支撑。
 - c) 原动机输入均匀负载。
 - d) 从被动机械受到中程度冲击。
 - e) 在齿轮的寿命中的啮合次数为 10^7 。

(2) 将作用于直齿轮的轴扭矩：T (N.m)，换算成容许传达动力表 (kW) 的弯曲强度动力: kW[kW]。

$$kW = \frac{T \cdot n}{9549.7} = \frac{142 \times 100}{9549.7} 1.487[\text{kW}]$$

(3) 在规格齿轮中选择

1) 直齿轮的选定条件

- a) 模数选为 $m2$ (例)
- b) 齿数 中心距离： $a=70-100 [\text{mm}]$
齿数比 $u=1:1$
因此齿数在 35-50 (个) 之间
- c) 齿宽 $b=10-30[\text{mm}]$
- d) 转数 $n=100[\text{min}^{-1}]$
- e) 动力 $kW=1.487[\text{kW}]$

2) 直齿轮的选择。

- a) 在本宣传册，寻找直齿轮 模数 $M=2.0$ 齿数 $Z=35-50$ (个) 的页面。
- b) 确认容许传达动力表 (kW) 弯曲强度表。
转速 确认 $n=100 [\text{min}^{-1}]$ 的栏。
动力 寻找数据在 $kW=1.487[\text{kW}]$ 以上的齿数和齿宽。

根据以上条件。

齿数： $Z=38$ [个]；齿宽： $b=20[\text{mm}]$ 材料 ISO C45为条件

在容许传达动力表中确认到： $kW=1.51[\text{kW}]$

根据标称动力的计算结果： $kW=1.487[\text{kW}]$ 。

在相互对比中可以取得结论

容许传达能力 $\geq$ 标称动力

c) 相对应规格齿轮产品编号

推崇使用尺寸大于S2S38B-2016F的齿轮。

英文请确认下一页。

Please refer to the English translation that continued on the next following page.

KG 齿轮 - 信息

KG Gear - Information

(1) Usage condition of Spur gear. (Give us the specification by customer)

(1) Action to Spur gear with maximum normal torque is $T=142$ [N.m] included factor of safety.

(2) The number of revolution $n=100$ / min

(3) Face width of Spur gear $b=10-30$ [mm]

(4) Center distance of Spur gear $a=70-100$ [mm]

(5) Gear ratio of Spur gear $u=1:1$

(6) Providing conditions with usage of gear for strength calculation. Please refer to Calculation for Bending strength of Spur and Helical gears as JGMA401-01.

a) The gear is in gearbox with lubricant oil.

d) Bearing in gearbox should position on both sides. Bearings are plane symmetry.

c) Receiving load from a motor side is a flat load or less.

d) Receiving impact from a load side is an Average or less.

e) During gear life period, the number of times for set of gear engagement is below 10^7 times.

(2) Convert to Power kW [kW] of Allowable transfer capability table with Bending strength from axial torque T [N.m] with action to Spur gear.

$$kW = \frac{T \cdot n}{9549.7} = \frac{142 \times 100}{9549.7} 1.487 [kW]$$

(3) To select KG-STOCK GEARS

1) Selected condition of Spur gear.

a) Module $M=2.0$ (eg)

b) No. of teeth Center distance $a=70-100$ [mm]

Gear ratio $u=1:1$

Therefore we verify the No. of teeth of 35-50z.

c) Face width $b=10-30$ [mm]

d) The number of revolution $n=110$ [min⁻¹]

e) Power $kW=1.487$ [kW]

2) Selection of KG STOCK GEARS

a) Please refer the page for Module 2.0 and Number of teeth 35 to 50 from the catalogue of KG-Spur gear.

b) Refer to Allowable transfer capability table (kW) of Bending strength.

The number of revolution

Observing the column of $n=100$ [min⁻¹] for your selection.

Power

Look up numerical value of $kW=1.487$ [kW] or more

Concluded,

On condition that Number of teeth: $z=38$ [z], Face width: $b=20$ [mm] and material: S45C

Obtained $kW=1.51$ [kW] from Allowable transfer capability table.

Compared with action to Spur gear with maximum normal torque is $T=142$ [N.m] included factor of safety.

Can be judged (Allowable transfer capability) $\geq$ (Normal power).

c) Can be searched your suitable S2S 38B-2016F as our recommendation only.

动力换算公式 The Conversion formula of Power

1) 计算方式 Calculate Torque from

T : 扭矩 (Torque) [N · m]

$$T = 9549.7 \frac{kW}{n} \Leftrightarrow kW = \frac{T \cdot n}{9549.7}$$

T : 扭矩 (Torque) [kgf · m]

$$T = 973.8 \frac{kW}{n} \Leftrightarrow kW = \frac{T \cdot n}{973.8}$$

T : 扭矩 (Torque) [kgf · m]

$$T = \frac{F_t \cdot r}{1000} \Leftrightarrow F_t = \frac{1000 \cdot T}{r}$$

2) 转换到 SI 单位 Convert to Standard Integer

1[kgf · m]=9.80665[N · m]

1[W]=1[N · m/s]

在此 n : 转速 [min⁻¹] Revolution per minute [min⁻¹]

Hereby r : 分度圆半径 [毫米] Reference radius [mm]

(变位齿轮时是啮合圆半径)

(In case of Shifted gears as working Radius)

T : 扭矩 Torque [N · m]

kW : 动力 Power [kW]

F_t : 正面啮合圆的切向力 [N]

Tangential Force of pitch circle [N]

KG STOCK GEARS的追加工的注意点

Additional machining to the KG STOCK GEARS.

KG的每一个齿轮系列里都准备了不同的轴孔直径。为了避免降低KG齿轮的使用精度和性能，请尽量避免对轴孔的追加工。如果一定需要进行轴孔的追加工，请使用F类型(有-号的)。

KG STOCK GEARS have variety of bore size in each number of teeth. We make the best use of the precision and quality performance of KG STOCK GEARS to customers. Please install KG STOCK GEARS without any additional machining because KG STOCK GEARS are complete finished gears.

However if additional machining on the KG STOCK GEARS are necessary, please select F-type of KG STOCK GEARS that indicate a minus (-) sign in our KG Gears Catalogue Part Number.

为了防止产生刮痕和齿轮的损坏，请用软爪三爪卡盘进行定心。

In order to prevent scratches and damage to the gear, provide scroll chuck without mechanical hardening and ternary scroll chuck to F-type of KG STOCK GEARS as without Tread hole / without Setscrew.

追加工时的最大加工直径，请控制在轮毂直径的60-70%左右。

The tentative maximum bore dimension can be 60-70% from hub diameter for additional machining job.

KG齿部研磨直齿轮追加工的注意点

Precaution to prevent additional machining for KG-Ground Spur gears.

追加工工艺的注意点

Precaution for additional process.

请尽量避免对KG公司研磨齿轮的轴孔进行追加工。齿轮的精度会因为这些追加工而降低。另外如果进行键槽的追加工，节距误差会出现有微小增加的倾向。而且齿根圆和键槽的距离越近，其误差增加倾向就越显著。追加工后的齿轮精度会降低(大约1-2等级)。

We provide the best use of the precision and quality performance of KG Ground Spur Gears to customer. Please install KG Ground Spur Gears without any additional machining in order to prevent deterioration of KG Ground Spur Gears.

Any Additional machining of Keyway to KG Ground Spur Gears will deteriorate the KG Ground Spur Gears due to increasing pitch error compared with before processed. However dimension of Keyway close to root diameter of KG Ground Spur Gears will result in deterioration of 1-2 classes.

轴孔内径的追加工

Precaution for additional machining to bore.

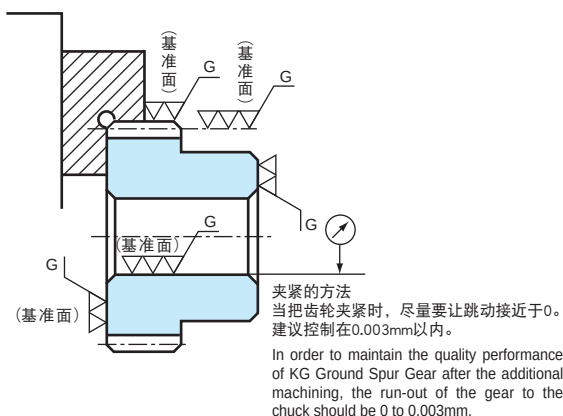
一定要使用软爪三爪卡盘，进行对产品的卡紧。要从轴孔的孔面开始进行定心(因为齿轮切割研磨时，是以轴孔孔面和侧面为最初的基准面。)，使产品的芯的误差尽量缩小。如图进行卡紧，外围和侧面由于和轴孔孔面一样切削后进行过研磨，并且是基准面，所以定心的时候误差会比较少，比较容易定心。

外径较小的齿轮，由于轴孔孔面也可能受淬火的影响而硬化，因此切削性不太好。请注意。

We recommend that provide scroll chuck without mechanical hardening to obtain locating of center.

The right drawing example shown is highly recommended to obtain the locating of center easily due to dimensions of outer and side grinding processed.

Note that normally a small size of gear (Pinion) is low machinability after heat treatment.



KG 齿轮 - 信息

KG Gear - Information

注：追加工的注意点

注：关于对KG齿轮的轴孔内径的追加工

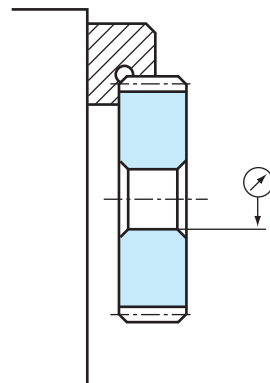
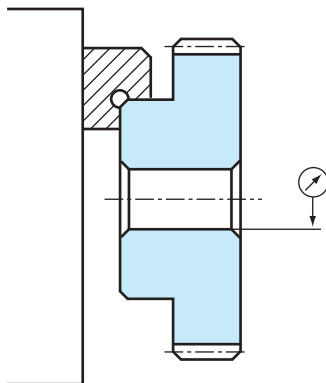
Precaution for additional machining to bore diameter of KG STOCK GEARS.

关于直齿轮，斜齿轮的追加工

Precaution for additional machining to Spur, Helical gears and Ratchet.

当对齿的外围进行卡紧时，请注意齿的变形。

Beware deformation of the gears when chucking at outer diameter.



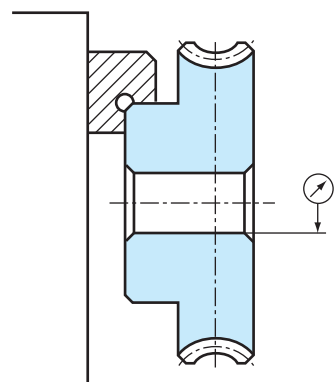
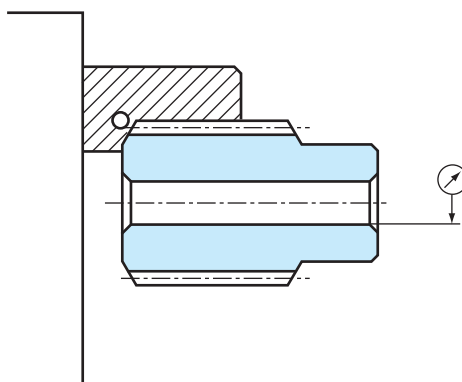
关于对KG蜗杆和蜗轮的追加工

Precaution for additional machining to Worm gear and Worm wheel.

当对精密冷轧的蜗杆进行追加工时，要注意卡紧的深度越深越好，如果卡紧的部位是齿的外围，请注意齿的变形。

Make the best use of the precision and quality performance of KG-Worm gear and Worm wheel to the best of machining ability that deep chucking to the gear is best result. Beware of deformation of the gears.

We provide the best use of the precision and quality performance of KG-Worm and Worm wheel after additional machining. Deep chucking to the gear is highly recommended but beware of deformation.

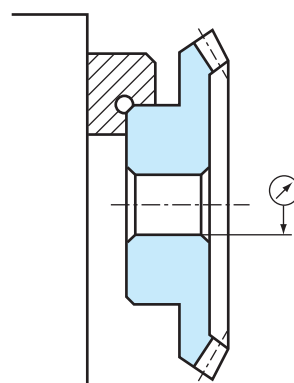
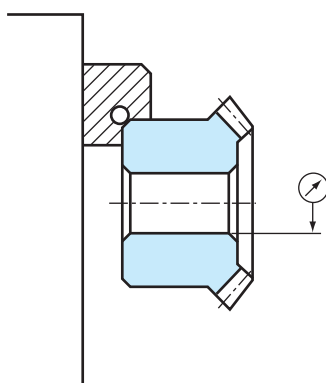


关于锥齿轮，等径锥齿轮的追加工

Precaution for additional machining to Miter and Bevel gears.

模数M2.0以上时，齿的外围部分以轴心平衡的方向进行了切角，所以可以进行卡紧。但是这样时一定要注意齿的变形。

Module 2.0 and above has been machined flat as respected shaft center to parallel. Tip diameter can be chucked. Beware deformation of the gears.



注意，进行卡紧时不要对有刻印的部位进行卡紧。（刻印面的起伏变化，会影响定心的准确度。）

Caution! do not chuck at area of KG-mark when performing additional machining.

对进行过高频淬火的齿轮进行追加工时，靠近齿部的部位会由于淬火而硬化。另外外径较小的（小齿数）齿轮，很有可能齿孔面也受淬火的影响而硬化。因而切削性变差。

Due to induction hardening, take note that surface near to the gear tooth area may be low machinability due to the heat treatment processed.

Also, the bore diameter of small size gears (Pinion) may not be easily machined.

当使用无侧隙齿轮时的注意点

Summarize Information of Anti Backlash Spur gears.

如果您考虑降低直齿轮的侧隙，请参考以下内容。

In compliance with the wish to obtain small backlash

项目 Description		齿轮的性能 Gear performance				材料，表面处理 Material and Surface treatment		
产品型号 Catalogue number		齿轮加工精度 Gear finishing	侧隙的调整 Adjustment of backlash	动力传达 Transmissibility	类型 Type	材料 Material	表面处理 Surface treatment	耐腐蚀性 Anticorrosion
NS - 系列 NS series	NSG - 系列 NSG series (无齿隙齿轮) Anti backlash gear	◎ 齿面研磨处理 Ground teeth	不需要 Not necessary	○	圆弧弹簧型 Circular Arc Spring	SCM435	—	—
					线圈弹簧型 Coiled Spring			
	NS - 系列 NS series (无齿隙齿轮) Anti backlash gear	○	不需要 Not necessary	○	圆弧弹簧型 Circular Arc Spring	铝 Aluminum	铝阳极氧化处理 Anodized	—
					线圈弹簧型 Coiled Spring	S45C	盐浴软氮化处理 Isonite	△
	NSU - 系列 NSU series (无齿隙齿轮) Anti backlash gear	○	不需要 Not necessary	○	线圈弹簧型 Coiled Spring	SUS304	特氟纶表面处理 Applied treatment of Teflon	◎
ASG	ASG - 系列 ASG series (可控侧隙研磨直齿轮)	◎ 齿面研磨处理 Ground teeth	需要 Necessary	◎	固定螺栓 Fixed Bolt	SCM435	—	—

如需更详细的情报，请查阅本产品目录的相应部分。

Please refer more details inside KG catalogue

当使用HY-BOX, B-BOX, B-SET时的注意点

Summarize Information of HY-BOX, B-BOX and B-SET.

为了节约成本，减少工作时间

For cost saving and reduce working time.

项目 Description	齿轮的性能 Gear performance	侧 隙 Backlash	动力传达 Transmissibility	类型 Type	轴 承 Bearing	润 滑 Lubrication	功 能 Function
产品型号 Catalogue number							
HY - 系列 HY series (HY-BOX)	◎ 使用精密齿轮 Precision gear used	◎ 20' 以下 Below 20'	◎	密封型 Sealed type	球轴承 Ball bearing	封入润滑脂 Grease sealed	高减速比 High gear ratio 高效率 High Efficiency 高精度 High precision
BSH - 系列 BSH series (B-BOX)	◎ 使用精密齿轮 Precision gear used	◎ 15' 以下 Below 15'	◎	密封型 Sealed type	球轴承 Ball bearing	封入润滑脂 Grease sealed	高强度 High performance 高精度 High precision 紧凑设计 Compact
BS - 系列 BS series (B-BOX)	◎ 研磨齿轮 Lapping gear used	◎ 20' 以下 Below 20'	◎	密封型 Sealed type	球轴承 Ball bearing	封入润滑脂 Grease sealed	高精度 High precision 紧凑设计 Compact
BE - 系列 BE series (B-SET)	○	○	○	开放型 Opened type	无油轴承 Oil Free bearing	要定期给齿面涂 上润滑脂 Necessary to apply grease to teeth regularly.	低成本 Competitive price
WS 系列 WS series (W-BOX)	◎ 使用精密冷轧蜗杆 Precision Cold Rolled processed Worm used	◎ 25' 以下	◎	密封型 Sealed type	球轴承 Ball bearing	润滑油润滑	高速规格 High Speed 高减速比 High gear ratio 紧凑设计 Compact

如需更详细的情报，请查阅本产品目录的相应部分。

Please refer more details inside KG catalogue

KG 齿轮 - 信息

KG Gear - Information

关于 KG 规格齿轮的侧隙

KG STOCK GEARS 的侧隙

Amount of backlash for KG STOCK GEARS.

什么是侧隙：当两个齿轮啮合时的齿面间的缝隙和空间。

用以下表格，表示把本公司齿轮，用所定的装配距离（中心距离）组装后的侧隙。

What is the Backlash? There are PLY or CLEARANCE when matching the gears. Please refer to the pair of backlash amount for KG STOCK GEARS when setting appointed center distance as follows.

直齿轮的侧隙量 (条件：使用同一种材料的一对齿轮之间的啮合)

Backlash amount of Spur gear (the same material and one pair of gear engagement)

模数 (m) Module	材料 Material	侧隙 (mm) Backlash
模数0.9以下的产品的侧隙为0.02到0.06 Range from below M=0.9 is 0.02-0.06		
模数范围超过 0.9 在 3.0 以下时 Range from M=0.9 to M=3.0	D、SU、BS	$0.06 \times m \sim 0.12 \times m$
	S	$0.04 \times m \sim 0.10 \times m$
	SCM	$0.04 \times m \sim 0.08 \times m$
模数范围超过 3.0 在 5.0 以下时 Range from M= 3 to M=5	S	$0.06 \times m \sim 0.12 \times m$

D：聚缩醛树脂；SU：SUS304；S：S45C；SCM：SCM435,440(研磨品)；BS：黄铜

D：Acetal, SU：SUS304, S：S45C, SCM：SCM435,440, BS：Brass

蜗轮的侧隙 (一对蜗轮蜗杆啮合时)

Backlash of Worm gear pair(One pair of gear engagement)

装配距离 Center distance	侧隙 Backlash
模数0.8以下产品的侧隙为，0.06到0.15 Range from below M=0.8 is 0.06-0.15	
50 以下 Below 50	0.08 ~ 0.20
装配距离超过 50 在 150 以下时 Range from 50 to 150.	0.15 ~ 0.30
装配距离超过 150 在 300 以下时 Range from 150 to 300.	0.30 ~ 0.50

锥齿轮的齿隙 (一对锥齿轮的啮合)

Backlash of Bevel gear (one pair of gear engagement)

模数 (m) Module	侧隙 Backlash	
	SCM435, S45C, SUS304, 黄铜 SCM435, S45C, SUS304, Brass	聚缩醛树脂 Acetal
模数 0.9 以下 Range below M=0.9	0.02 ~ 0.08	0.03 ~ 0.10
模数超过 0.9 在 2 以下 Range from M=0.9 to M=2.0	0.05 ~ 0.12	0.05 ~ 0.16
模数超过 2 在 4 以下 Range from M=2 to M=4	0.06 ~ 0.15	—
模数超过 4 在 6 以下 Range from M=4 to M=6	0.08 ~ 0.20	—
模数超过 6 在 7 以下 Range from M=6 to M=7	0.10 ~ 0.22	—

KG 齿轮的教育套件 KG-Gear's Educational Kit.



适合教育实践的工具
Suitable instrument tool
for education practice!

可以很容易理解齿轮的基础知识和齿轮的组成。
可以通过触摸等十分直观的方式了解齿轮的功能。

Can be understood the basic knowledge of gears easily
Can be verified with touched the function of gears easily

尺 寸 Size 335×272×130 (W×D×H)
重 量 Weight 6.7kg

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齒輪情報 INFORMATION
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齒輪齒面 GROUND SPUR GEARS
齒輪 SPUR GEARS
齒輪 INTERNAL GEARS
齒輪齒面 GROUND RACKS
齒輪 RACKS
螺旋齒輪・螺旋齒輪 HELICAL GEARS AND SCREW GEARS
齒輪・齒輪 WORMS AND WORM WHEELS
齒輪齒面 BEVEL GEARS
技術資料 REFERENCE DATA

Memo



齿轮系统 GEAR SYSTEMS

HY-BOX B-BOX® W-BOX B-SET

图案设计注册完毕
Registered of TRADE MARK

产品型号的解读方法 Reference of Catalogue Number

WS 75 R – 040
HY 70 R – 005
BS 45 L – 001
BS 80 T – 002
BSH 140 L – 001
BE 40 L – 001
BE 70 L – 002 B

齿轮的种类 Kind of Product	从背面到轴端的距离 Distance from back face to shaft end	轴的位置与整体形状类型 Direction of Shaft Type of Body	齿数比 Gear Ratio	轴的粗细类型 Identification of Shaft diameter
HY : Hypoid Gearbox (准双曲面齿轮箱) BS : Bevel Gearbox (锥齿轮箱) BSH : Bevel Gearbox (锥齿轮箱) BE : Bevel Gear Set (锥齿轮组) WS : Worm Gearbox (蜗杆齿轮箱)	单位 : mm Dimension : millimeter	R : R型 (HY齿轮箱或WS齿轮箱时) 输出轴的所在位置 R : Pinion shaft is shown on the front, and gear shaft is shown on the right side. L : L型 (指齿轮箱形状) L : Type L T : T型 (指齿轮箱形状) T : Type T	001 : (齿数比 1 : 1) 001 : (ratio 1 : 1) 002 : (齿数比 2 : 1) 002 : (ratio 2 : 1) 005 : (齿数比 5 : 1) 005 : (ratio 5 : 1) 010 : (齿数比10 : 1) 010 : (ratio 10 : 1)	A : 轴的直径较细 A : Shaft diameter is small. B : 轴的直径较粗 B : Shaft diameter is large.

KG Gear - 齿轮的信息

KG Gear - Information

Gear Systems

齿轮箱系统的特征

The Feature of Gear Systems

- 1) 采用了紧凑而简单的设计。
 - 2) 因为齿轮箱完全封闭，不仅有防尘作用，而且有保障操作与运转安全的功能。
 - 3) 内藏高精度KG齿轮，在主装时进行了精准的嵌入和固定。在侧隙方面BS类型在15' ~ 20'以下。BSH类型在10' ~ 15'以下。HY-BOX类型在20'以下。(齿数比在2以上时，所述侧隙是齿轮轴方向的侧隙。)
 - 4) 此类产品带有固定用螺纹孔，可以简单的进行固定安装。
 - 5) 大部分产品的润滑方式为齿轮箱内封润滑脂。(BS类型产品没有进行封油措施。W-BOX产品使用润滑油润滑。)
- 1) Compact and Simple design.
 - 2) Completely sealed casing provide safety and dust free during operation.
 - 3) With built in accuracy of KG-Bevel Gear, when assembled gearbox, backlash of assembly provided 15' to 20' and less for BS type. 10' to 15' and less for BSH type, and 20' for HY-BOX, 25' for W-BOX. (The above values shown a gear axes side backlash, if gearbox with ratio for 2 or more.)
 - 4) Come with pre tap holes for easy mounting.
 - 5) Lubricated with high quality grease before sealed.(The oilseal of BS type is not provided.) (W-BOX is oil lubrication.)

安装时的注意事项与基准面

Precaution of Mounting base and Installation.

- 1) B-BOX, HY-BOX, W-BOX的任何一面都可以作为安装基准面。B-SET则只能以两侧为安装基准面。
 - 2) 当把齿轮箱和齿轮组安装到基准面时，需确保齿轮轴与对方轴之间的平衡，同时轴芯要对上。建议其同轴度 (Coaxiality) 的误差在0.05mm。
 - 3) 连接齿轮轴和对方轴时。请使用拥有良好柔软性的联轴器，才能减少平衡度误差，并更加容易装配。
 - 4) 需要选择耐震，稳定的安装基座。需要提高安装基座的刚性。
 - 5) 请安装于通风良好的环境。建议使用环境：B-BOX在摄氏-20度~ 50度；HY-BOX, W-BOX在-10度~ 40度。
- 1) All of surface on the body for B-BOX and HY-BOX, W-BOX can be used as mounting base. The mounting base of B-SET is both sides of body.
 - 2) When assembly of Gear Systems to the match base, provide accurate parallelism and shaft center between gear shaft and match shaft. Accuracy of alignment 0.05 millimeters and less recommended.
 - 3) When connecting B-BOX to match shaft with the coupling. The flexible coupling will reduce misalignment and easy installation.
 - 4) Prevent vibration and provide stable mounting base.
 - 5) The surrounding of well ventilated area, temperature of -20°C to 50°C for B-BOX, and -10°C to 40°C for HY-BOX, W-BOX are recommended.

使用中的注意事项

Precaution of the Usage

- 1) 运行过程中绝对不要触摸箱体。并要注意防止加工在轴部的键槽和露出在外的弧形扣环吸卷异物。
 - 2) 使用时如果出现异常音或齿轮箱体温度异常上升等情况，请立即停止运行，并加以确认和改善出现异常的原因之后再次运行。
 - 3) B-SET如果处于可以运行或要开始运行的状态时，请务必把所附属的简易塑料壳装到B-SET上。如果因运行中的振动或者其他原因，导致塑料壳脱离时，建议用螺丝将塑料壳固定，以避免发生事故。如果所附属的塑料壳出现老化，请购买新的塑料壳。(另有销售)
 - 4) 我们建议在正式运行B-BOX, HY-BOX, W-BOX之前，先进行跑合运转。具体方法是用正常符合的1/2 ~ 1/3负荷运行6个小时以上。
 - 5) 用于增速 (传动) 时，比用于等速和减速时温度和噪音更容易上升。另外所传达的动力也会相应变少。
- 1) Do not touch the gearbox, shaft and key during operation.
 - 2) Stop operation and check fault if there is any problems such as unusual noise and high temperature occur from the gearbox. Do not start the machine until the fault has been clarified.
 - 3) Make sure that body of B-SET properly covered by plastic, we recommend mounting holes to be tightened with screws on the plastic cover to prevent vibrations and other causes to occur during operation. Plastic cover is available for purchase as spare parts for maintenance used when time to be replaced and the aged deterioration.
 - 4) To warm up B-BOX and HY BOX, W-BOX we recommend to apply 1/2 to 1/3 of normal loads for over six hours.
 - 5) Power to output shaft, noise level and temperature will increase when gear is rotating at high speed and the power transfer will also be decreased. The opposite is true at low speed.

追加工时的注意事项

Precaution of Additional Works.

- 1) 为了防止追加工时金属屑等掉入轴承部，请先做好防尘措施，然后再进行加工。
- 2) 当对齿轮轴进行追加工时，请注意不要使齿轮轴和其他部分变形。要注意保护好封油圈。另外对外壳进行追加工时，为了避免产生意外损害，在加工前请与我司联系。
- 1) Before machining, ensure that the bearing portion is covered, so that waste objects will not be inserted into.
- 2) Beware of shaft deformation and other parts when additional machining works on the body and tap hole. To avoid damage of the gearbox, please contact us before machining job.

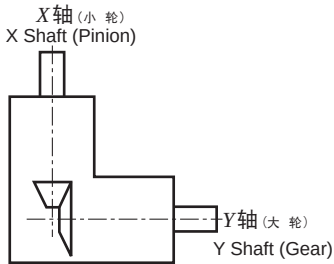
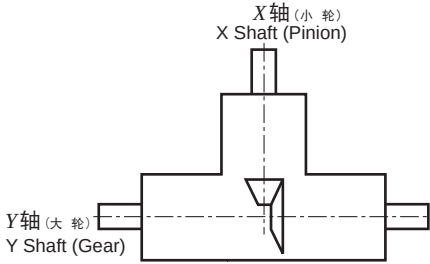
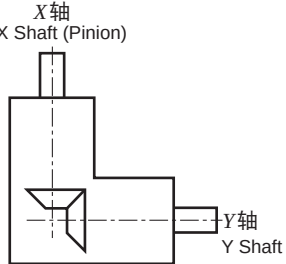
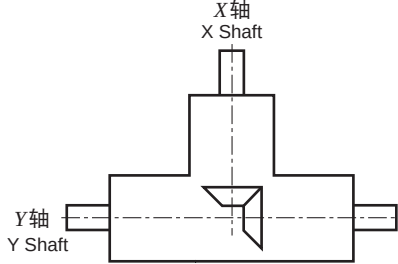
关于动力传输

Reading the Power Transfer.

- 1) 为了让B-BOX (BS和BSH)，B-SET，HY-BOX发挥最大的性能，以及达到理想的使用寿命。事先请确认容许传达能力扭矩表。并在表格中所表示的转速和扭矩以下进行实际运行。
 - 2) 使用中请注意不要让B-BOX (BS) B-SET，HY-BOX，W-BOX的小齿轮轴受到径向力或轴向力。这些轴如果受到径向力，请考虑另设可承受其负荷的机构。
- 关于B-BOX (BSH)，HY-BOX，W-BOX的齿轮轴的径向力负荷，请确认别图的径向力负荷容许值以及其负荷作用位置。
- 1) For best performance and lifespan of the B-BOX (BS and BSH), B-SET, HY-BOX and W-BOX, please refer to the Allowable transfer capability torque table. Regarding the range of Input torque (N.cm) and Input revolution/min for B-BOX (BS and BSH), B-SET, HY-BOX and W-BOX should not exceed the figures indicated inside the Allowable transfer capability torque table.
 - 2) Avoid overhang load and thrust load to axes of B-BOX(BS), B-SET, HY-BOX and W-BOX following installation method. For allowable amount of overhang load and location of load on the gear axes, please refer to the catalogue. In case there are overhang and thrust load, it is necessary to design an extra preventable equipment.

齿轮的输入输出速度比和齿轮的平面图

Gear layout (Input, Output and Ratio)

齿数比 Ratio	L 形状 Type L	T 形状 Type T
X 轴为输入轴 X shaft as input shaft 2 : 1 旋转方向不定，正反均可 Reversible Rotation	 X 轴 (小 轮) X Shaft (Pinion) Y 轴 (大 轮) Y Shaft (Gear)	 X 轴 (小 轮) X Shaft (Pinion) Y 轴 (大 轮) Y Shaft (Gear)
1 : 1 旋转方向不定，正反均可 Reversible Rotation	 X 轴 X Shaft (Pinion) Y 轴 Y Shaft	 X 轴 X Shaft Y 轴 Y Shaft

准双曲面齿轮箱 (准双曲面齿轮型) HY-BOXES



齿轮箱外壳材料 : (ISO AlMg2.5, AlMg5) 铝表面阳极氧化处理。轴材料 : P小齿轮 : SCM435 ; G大齿轮 : S45C
Material : Body-Aluminium (ISO AlMg2.5, AlMg5) with Anodize treated Shaft (P=Pinion, G=Gear)

单位 : mm
Dimensions : mm

产 品 型 号 Catalogue Number	齿数比 Gear Ratio	A	B	C	D	E	F	G	轴直径 Shaft		J	K	L	M
									$\phi H(h7)$	$\phi I(h7)$				
HY 70R — 005	5	70	58	45	55	40	15	18	$\phi 6$	$\phi 8$	20	17.5	36	22.5
HY 90R — 010	10	90	68	60	75	50	15	18	$\phi 6$	$\phi 8$	25	20	47	30
HY 95R — 005	5	95	75	60	75	50	20	25	$\phi 8$	$\phi 12$	25	20	49	30
HY 120R — 010	10	120	80	80	100	55	20	25	$\phi 8$	$\phi 12$	27.5	25	62	40
HY 125R — 005	5	125	85	80	100	55	25	30	$\phi 12$	$\phi 15$	27.5	30	65	40
HY 150R — 010	10	150	90	95	125	60	25	30	$\phi 12$	$\phi 15$	30	32.5	77	47.5

容许传达能力扭矩表

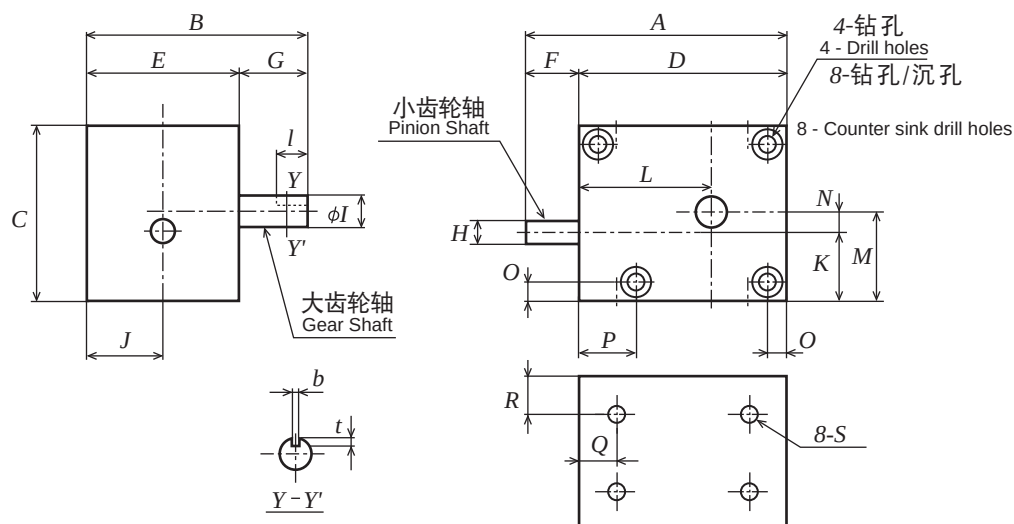
Allowable transfer capability torque table

输入转动速度min ⁻¹ (rpm) Input Revolution/min 齿轮 Gear 产 品 型 号 Catalogue Numbers		输入扭矩 (N · cm) Input Torque (N · cm)							
		100	250	500	800	1,000	1,500	2,000	2,500
HY 70R — 005	m 0.75 × 8/40	76.0	71.8	66.0	59.0	53.9	44.2	36.6	28.4
HY 90R — 010	m 0.71 × 7/70	75.8	70.8	63.8	56.0	50.7	41.3	34.3	27.3
HY 95R — 005	m 1.1 × 8/40	247.4	232.1	211.8	187.7	170.3	137.7	112.6	86.0
HY 120R — 010	m 1.0 × 7/70	186.3	172.7	155.7	136.6	123.5	100.0	82.7	65.0
HY 125R — 005	m 1.5 × 8/40	414.8	400.6	377.6	345.4	319.8	266.9	223.0	173.9
HY 150R — 010	m 1.45 × 6/60	357.2	336.1	307.3	272.1	246.5	197.5	159.2	118.1

上述列表中所标的的数据是对小齿轮轴的输入转速和扭矩。Table shown input revolution and torque on the pinion shaft.

容许传达能力扭矩表中的实验数据是本公司自行进行耐力测试的结果值。

An experimental value in Allowable transfer capabilities table are our endurance test.

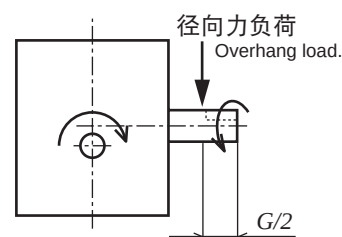


齿轮箱外壳材料：铝 (ISO AIMg2.5, AIMg5) 铝表面阳极氧化处理。轴材料：P小齿轮：SCM435；G大齿轮：S45C
Material : Body-Aluminium (ISO AIMg2.5, AIMg5) with Anodize treated Shaft (P=Pinion, G=Gear)

单位：mm
Dimensions : mm

偏移 offset					螺纹孔 Set Screw	Counter Sinks & Drill Holes				键 槽 Key Way			侧 隙 Backlash	径向力负荷容量 Maximum overhang load	重 量 Weight	产 品 型 号 Catalogue Number
N	O	P	Q	R	8-S	深度 Depth	钻孔径 Drill Hole Diameter	沉孔径 Counter Sink Diameter	沉孔深度 Counter Sink Depth	b	t	l	(')	(N)	W(kg)	
5	5	14	10	10	8-M3	5	φ3.2	φ6.5	3.2	-	-	-	20	19	0.3	HY 70R — 005
10	7	26	12	12	8-M4	6	φ4.2	φ8.0	4.3	-	-	-	20	19	0.6	HY 90R — 010
10	7	28	12	12	8-M4	6	φ4.2	φ8.0	4.3	-	-	-	20	39	0.7	HY 95R — 005
15	10	27	15	12	8-M5	8	φ5.2	φ9.5	5.3	-	-	-	20	39	1.3	HY 120R — 010
10	10	27	18	12	8-M5	8	φ5.2	φ9.5	5.3	5	3	20	20	54	1.4	HY 125R — 005
15	10	27	20	12	8-M5	8	φ5.2	φ9.5	5.3	5	3	20	20	54	2.2	HY 150R — 010

这里所指的侧隙为大齿轮轴的侧隙。
Backlash : Measured at gear shaft



径向力负荷位置和旋转方向
Load position of overhang and direction of the rotation.

锥齿轮箱®(锥齿轮型)

B-BOXES (BS)



齿轮箱外壳材料：铝 (ISO AlMg5, ISO AlMg0.7Si, AlMg1SiCu) 铝表面阳极氧化处理。轴材料：不锈钢SUS303
Material : Body-Aluminium (ISO AlMg5, ISO AlMg0.7Si, AlMg1SiCu) with Anodize treated Shaft-Stainless steel

单位：mm
Dimensions：mm

产品型号 Catalogue Number	形状 Type	齿数比 Gear Ratio	Z	Y	C	A	B	轴直径 Shaft $\phi D(h7)$	E
BS 35 L - 001	L	1	-	-	14	35	27	$\phi 3$	8
BS 45 L - 001	L	1	-	-	18	45	33	$\phi 4$	12
BS 65 L - 001	L	1	-	-	25	65	50	$\phi 6$	15
BS 80 L - 001	L	1	-	-	30	80	60	$\phi 8$	20
BS 90 L - 001	L	1	-	-	35	90	70	$\phi 10$	20
BS 105 L - 001	L	1	-	-	40	105	80	$\phi 12$	25
BS 65 L - 002	L	2	-	-	25	65	50	$\phi 6$	15
BS 80 L - 002	L	2	-	-	30	80	60	$\phi 8$	20
BS 90 L - 002	L	2	-	-	35	90	70	$\phi 10$	20
BS 105 L - 002	L	2	-	-	40	105	80	$\phi 12$	25
BS 45 T - 001	T	1	72	48	18	45	33	$\phi 4$	12
BS 65 T - 001	T	1	105	75	25	65	50	$\phi 6$	15
BS 80 T - 001	T	1	130	90	30	80	60	$\phi 8$	20
BS 90 T - 001	T	1	145	105	35	90	70	$\phi 10$	20
BS 105 T - 001	T	1	170	120	40	105	80	$\phi 12$	25
BS 65 T - 002	T	2	105	75	25	65	50	$\phi 6$	15
BS 80 T - 002	T	2	130	90	30	80	60	$\phi 8$	20
BS 90 T - 002	T	2	145	105	35	90	70	$\phi 10$	20
BS 105 T - 002	T	2	170	120	40	105	80	$\phi 12$	25

半圆形切割加工的相位是不固定的。

Directions of the D-cut shaft face are not fixed.

关于特殊规格订制或追加工(特殊的使用环境, 漏油问题, 轴径追加工, 安装方法等)的问题请与我们联系磋商。

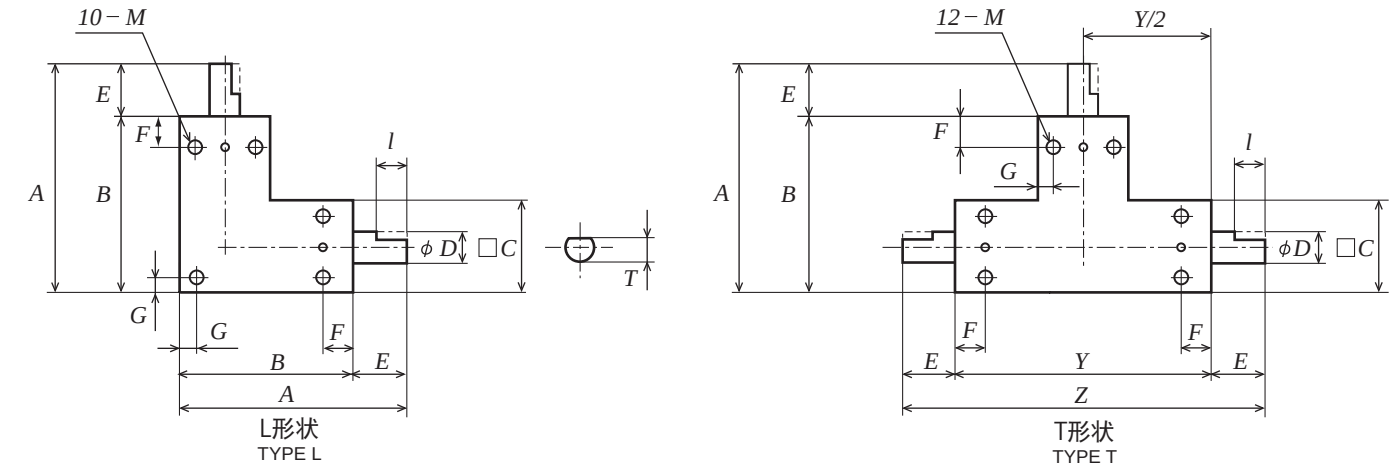
Please do not hesitate to contact us for special method of installation, checking on the usage environment and work out of oil leaks.



GOOD DESIGN AWARD 2010

**LONG LIFE
DESIGN AWARD**

锥齿轮箱®(锥齿轮型)
B-BOXES (BS)



齿轮箱外壳材料: 铝 (ISO AlMg5, ISO AlMg0.7Si, AlMg1SiCu) 铝表面阳极氧化处理。轴材料: 不锈钢SUS303
Material : Body-Aluminium (ISO AlMg5, ISO AlMg0.7Si, AlMg1SiCu) with Anodize treated Shaft-Stainless steel

单位 : mm
Dimensions : mm

F	G	轴端的形状 Shape of Shaft end			螺纹孔 Set Screw		侧 隙 Backlash (')	重 量 Weight W(g)	产 品 型 号 Catalogue Number
		ϕD	T	l	M	深度 Depth			
4	2	D	2.7	5	10-M2	4	20	27	BS 35 L - 001
5	3	D	3.3	8	10-M3	4	15	55	BS 45 L - 001
12	3.5	ϕ	-	-	10-M4	6	15	175	BS 65 L - 001
15	5	ϕ	-	-	10-M5	6	15	290	BS 80 L - 001
15	5	ϕ	-	-	10-M5	7	15	496	BS 90 L - 001
20	5	ϕ	-	-	10-M6	7	15	725	BS 105 L - 001
12	3.5	ϕ	-	-	10-M4	6	15	175	BS 65 L - 002
15	5	ϕ	-	-	10-M5	6	15	290	BS 80 L - 002
15	5	ϕ	-	-	10-M5	7	15	496	BS 90 L - 002
20	5	ϕ	-	-	10-M6	7	15	725	BS 105 L - 002
5	3	D	3.3	8	12-M3	4	15	75	BS 45 T - 001
12	3.5	ϕ	-	-	12-M4	6	15	246	BS 65 T - 001
15	5	ϕ	-	-	12-M5	6	15	410	BS 80 T - 001
15	5	ϕ	-	-	12-M5	7	15	679	BS 90 T - 001
20	5	ϕ	-	-	12-M6	7	15	991	BS 105 T - 001
12	3.5	ϕ	-	-	12-M4	6	15	246	BS 65 T - 002
15	5	ϕ	-	-	12-M5	6	15	410	BS 80 T - 002
15	5	ϕ	-	-	12-M5	7	15	679	BS 90 T - 002
20	5	ϕ	-	-	12-M6	7	15	991	BS 105 T - 002

容许传达能力扭矩表 Allowable transfer capability torque table

输入转动速度min ⁻¹ (rpm) Input Revolution/min 齿轮 Gear			输入扭矩 (N · cm) Input Torque (N · cm)										
			50	100	250	500	800	1,000	1,500	2,000			
产 品 型 号 Catalogue Numbers			BS 35 L — 001	BS 45 T — 001	m0.4 × 20	7.1	7.0	6.8	6.5	6.2	6.0	5.5	5.3
			BS 45 L — 001	BS 45 T — 001	m0.5 × 20	18.7	18.6	18.1	17.3	16.5	16.0	15.0	14.0
			BS 65 L — 001	BS 65 T — 001	m0.8 × 20	73.7	72.6	69.8	65.6	61.0	58.4	52.6	47.9
			BS 80 L — 001	BS 80 T — 001	m1.0 × 20	137.9	135.6	129.1	119.5	109.7	104.0	92.0	82.6
			BS 90 L — 001	BS 90 T — 001	m1.25 × 20	271.8	266.1	250.4	228.0	205.8	193.3	167.8	148.2
			BS 105 L — 001	BS 105 T — 001	m1.5 × 20	442.6	431.6	401.6	360.0	320.1	298.1	254.3	221.9
			BS 65 L — 002	BS 65 T — 002	m0.6 × 14/28	20.2	20.1	19.7	19.0	18.3	17.8	16.7	15.7
			BS 80 L — 002	BS 80 T — 002	m0.8 × 13/26	39.8	39.5	38.4	36.8	35.1	34.0	31.5	29.5
			BS 90 L — 002	BS 90 T — 002	m1.0 × 13/26	77.6	76.7	74.3	70.5	66.4	64.0	58.6	54.0
			BS 105 L — 002	BS 105 T — 002	m1.25 × 13/26	141.5	139.6	134.0	125.7	116.9	111.7	100.7	91.5

上述列表中齿数比1:2时, 所标的数据是对小齿轮轴的输入转速和扭矩。The gear ratio 1:2, table shown input revolution and torque on the pinion shaft.

容许传达能力扭矩表中的数据, 出自我司的耐力测试实验。

An experimental value in Allowable transfer capabilities table are our endurance test.

锥齿轮箱® (BSB中空轴型)

B-BOXES (BSB)



齿轮箱外壳材料 : 铝 (ISO AlMg0.7Si, AlMg1SiCu) 铝表面阳极氧化处理。轴材料 : 不锈钢SUS303
Material : Body-Aluminium (ISO AlMg0.7Si, AlMg1SiCu) with Anodize treated Shaft-Stainless steel

单位 : mm
Dimensions : mm

产 品 型 号 Catalogue Number	形 状 Type	齿数比 Gear Ratio	□ C	A	B	轴直径 Shaft φD(h7)	孔 径 Bore		E	I
							φH(H7)	深度 Depth		
BSB 65L — 001A	LB	1	25	65	50	φ 6	φ 5	15	15	5
BSB 65L — 001B	LB	1	25	65	50	φ 6	φ 6	15	15	5
BSB 80L — 001A	LB	1	30	80	60	φ 8	φ 6	19	20	5
BSB 80L — 001B	LB	1	30	80	60	φ 8	φ 8	19	20	5
BSB 90L — 001A	LB	1	35	90	70	φ10	φ 8	19	20	6
BSB 90L — 001B	LB	1	35	90	70	φ10	φ10	19	20	6
BSB 105L — 001A	LB	1	40	105	80	φ12	φ10	23	25	6
BSB 105L — 001B	LB	1	40	105	80	φ12	φ12	23	25	6

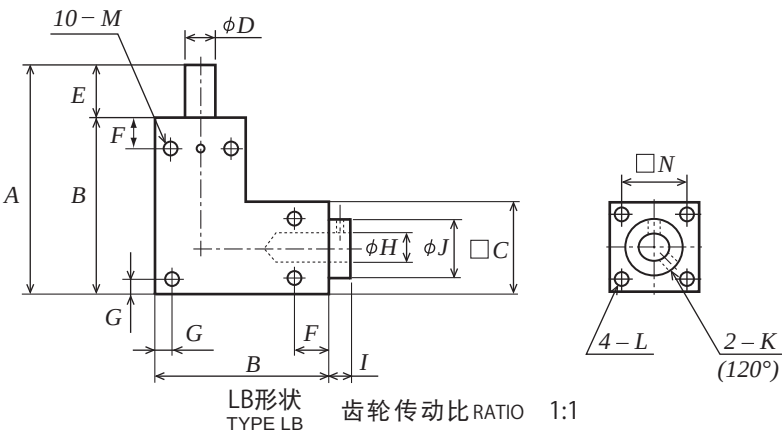
如果与LB型齿轮箱的中空部分相连接的轴是圆形轴时, 请在两处定位并加工平表面(把轴表面的一部分削平, 以增加轴与螺丝顶的接触面的加工工艺)。相配120度角。
When mating round axis connects with LB type, please fabricate mating round axis with 2 flat surfaces at 120° apart.
When use axis with step, make large R to corner of axis to avoid stress concentration.

关于特殊规格订制或追加工(特殊的使用环境, 漏油问题, 轴径追加工, 安装方法等)的问题请与我们联系磋商。
Please do not hesitate to contact us for special method of installation, checking on the usage environment and work out of oil leaks.



安装B-BOX和电机动的例子。
Example of installing B-BOX and motor.

锥齿轮箱® (BSB中空轴型)
B-BOXES (BSB)



齿轮箱外壳材料：铝 (ISO AlMg0.7Si, AlMg1SiCu) 铝表面阳极氧化处理。轴材料：不锈钢SUS303
Material : Body-Aluminium (ISO AlMg0.7Si, AlMg1SiCu) with Anodize treated Shaft-Stainless steel

单位：mm
Dimensions : mm

ϕJ	$2-K(120^\circ)$	F	G	螺纹孔 Set Screw		螺纹孔 Set Screw			侧 隙 Backlash (')	重 量 Weight $W(g)$	产 品 型 号 Catalogue Number
				$10-M$	深度 Depth	$4-L$	$\square N$	深度 Depth			
16	2-M3	12	3.5	10-M4	6	4-M3	19	6	15	169	BSB 65L — 001A
16	2-M3	12	3.5	10-M4	6	4-M3	19	6	15	167	BSB 65L — 001B
19	2-M3	15	5	10-M5	6	4-M3	23	8	15	293	BSB 80L — 001A
19	2-M3	15	5	10-M5	6	4-M3	23	8	15	289	BSB 80L — 001B
21	2-M4	15	5	10-M5	7	4-M4	25	8	15	465	BSB 90L — 001A
21	2-M4	15	5	10-M5	7	4-M4	25	8	15	460	BSB 90L — 001B
26	2-M4	20	5	10-M6	7	4-M4	30	10	15	722	BSB 105L — 001A
26	2-M4	20	5	10-M6	7	4-M4	30	10	15	713	BSB 105L — 001B

容许传达能力扭矩表 Allowable transfer capability torque table

输入转动速度 min^{-1} (rpm) Input Revolution/min 齿轮 Gear 产品 型 号 Catalogue Numbers		输入扭矩 (N · cm) Input Torque (N · cm)							
		50	100	250	500	800	1,000	1,500	2,000
BSB 65L — 001A/B	m0.8 × 20	73.7	72.6	69.8	65.6	61.0	58.4	52.6	47.9
BSB 80L — 001A/B	m1.0 × 20	137.9	135.6	129.1	119.5	109.7	104.0	92.0	82.6
BSB 90L — 001A/B	m1.25 × 20	271.8	266.1	250.4	228.0	205.8	193.3	167.8	148.2
BSB 105L — 001A/B	m1.5 × 20	442.6	431.6	401.6	360.0	320.1	298.1	254.3	221.9

上述列表中齿数比1：2时，所标的数据是对小齿轮轴的输入转速和扭矩。The gear ratio 1：2, table shown input revolution and torque on the pinion shaft.
容许传达能力扭矩表中的数据出自我司的耐力测试实验。
An experimental value in Allowable transfer capabilities table are our endurance test.

目次	CONTENTS
齿轮信息	GEAR INFORMATION
行星齿轮箱	PLANETARY GEAR BOXES
无背隙齿轮	ANTI BACKLASH SPUR GEARS
研磨直齿轮	GROUND SPUR GEARS
直齿轮	SPUR GEARS
内齿轮	INTERNAL GEARS
研磨齿条	GROUND RACKS
齿条	RACKS
斜齿轮・螺旋齿轮	HELICAL GEARS AND SCREW GEARS
蜗轮・蜗杆	WORMS AND WORM WHEELS
锥齿轮	BEVEL GEARS
技术资料	REFERENCE DATA

锥齿轮箱® (BSH 强化型)

B-BOXES (BSH)



齿轮箱外壳材料: 铝 (ISO AlMg0.7Si, AlMg1SiCu) 和灰铁 (G5501, FC200, FC250); 轴材料: 不锈钢 (SUS303) 和碳钢 (C45)
Material : Body-Aluminium (ISO AlMg0.7Si,AlMg1SiCu) and Grey Iron Castings (JIS G5501 FC200,FC250) Shaft-Stainless and Carbon steels

单位 : mm
Dimensions : mm

产 品 型 号 Catalogue Number	材 料 Material			形 状 Type	齿 数 比 Gear Ratio	Z	Y	□ C	A	B	轴直径 Shaft φD(h7)	E
	箱 Body	箱的表面处理 Surface treatment of body	轴 Shaft									
BSH 70L — 001	AL	铝阳极化处理	SUS303	L	1	-	-	27	70	54	φ 6	16
BSH 85L — 001	AL	铝阳极化处理	SUS303	L	1	-	-	32	85	64	φ 8	21
BSH 95L — 001	AL	铝阳极化处理	SUS303	L	1	-	-	36	95	72	φ10	23
BSH 115L — 001	FC	发黑处理	S45C	L	1	-	-	45	115	90	φ12	25
BSH 120L — 001	FC	发黑处理	S45C	L	1	-	-	45	120	90	φ15	30
BSH 140L — 001	FC	发黑处理	S45C	L	1	-	-	55	140	110	φ15	30
BSH 145L — 001	FC	发黑处理	S45C	L	1	-	-	55	145	110	φ20	35
BSH 165L — 001	FC	发黑处理	S45C	L	1	-	-	65	165	130	φ20	35
BSH 170L — 001	FC	发黑处理	S45C	L	1	-	-	65	170	130	φ25	40
BSH 70T — 001	AL	铝阳极化处理	SUS303	T	1	113	81	27	70	54	φ 6	16
BSH 85T — 001	AL	铝阳极化处理	SUS303	T	1	138	96	32	85	64	φ 8	21
BSH 95T — 001	AL	铝阳极化处理	SUS303	T	1	154	108	36	95	72	φ10	23
BSH 115T — 001	FC	发黑处理	S45C	T	1	143	93	45	115	90	φ12	25
BSH 120T — 001	FC	发黑处理	S45C	T	1	153	93	45	120	90	φ15	30
BSH 140T — 001	FC	发黑处理	S45C	T	1	175	115	55	140	110	φ15	30
BSH 145T — 001	FC	发黑处理	S45C	T	1	185	115	55	145	110	φ20	35

键槽的相位是不固定的。

Directions of the Key Way position are not fix.

外壳材料与表面处理 AL : A6063, A6061 : 铝阳极化处理 AL : A6063 , A6061 with Anodize treated

Surface treatments FC : FC200, FC250 : 发黑处理 FC : FC200 , FC250 with Black oxide coating
and material of body

容许传达能力扭矩表

Allowable transfer capability torque table

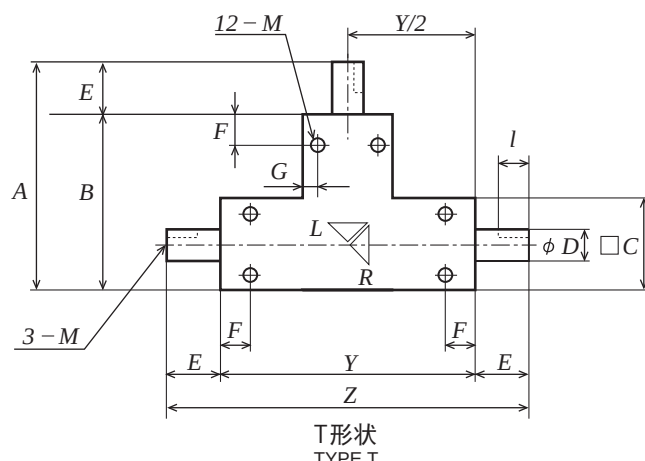
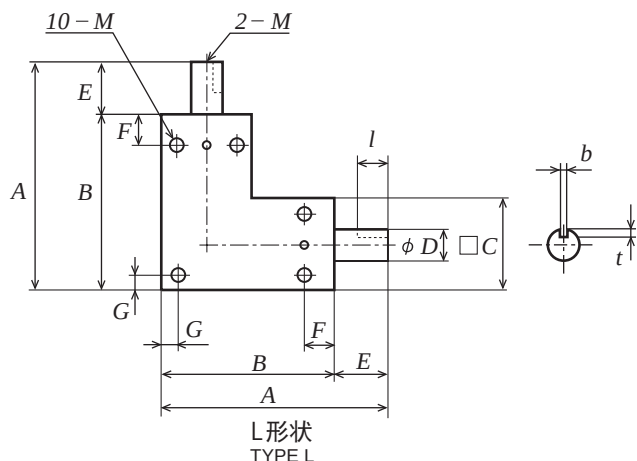
输入转动速度min ⁻¹ (rpm) Input Revolution/min			输入扭矩 (N · m) Input Torque (N · m)							
齿 轮 Gear										
产 品 型 号 Catalogue Numbers			250	500	800	1000	1500	2000	2500	3000
BSH 70L — 001	BSH 70T — 001	m 0.8 × 19	0.89	0.89	0.89	0.89	0.86	0.81	0.77	0.73
BSH 85L — 001	BSH 85T — 001	m 1.0 × 19	1.95	1.95	1.95	1.95	1.81	1.69	1.59	1.50
BSH 95L — 001	BSH 95T — 001	m 1.25 × 18	3.68	3.68	3.68	3.58	3.30	3.04	2.85	2.77
BSH 115L — 001	BSH 115T — 001	m 1.5 × 19	5.23	5.23	5.15	5.01	4.69	4.40	4.25	4.13
BSH 120L — 001	BSH 120T — 001	m 1.5 × 19	5.23	5.23	5.15	5.01	4.69	4.40	4.25	4.13
BSH 140L — 001	BSH 140T — 001	m 2.0 × 19	13.30	13.30	12.62	12.17	11.18	10.70	10.30	-
BSH 145L — 001	BSH 145T — 001	m 2.0 × 19	13.30	13.30	12.62	12.17	11.18	10.70	10.30	-
BSH 165L — 001		m 2.5 × 19	26.15	25.63	23.93	22.86	21.25	20.26	-	-
BSH 170L — 001		m 2.5 × 19	26.15	25.63	23.93	22.86	21.25	20.26	-	-

容许传达能力扭矩表中的数据出自我司的耐力测试实验。

An experimental value in Allowable transfer capabilities table are our endurance test.

锥齿轮箱® (BSH 强化型)

B-BOXES (BSH)



齿轮箱外壳材料: 铝 (ISO AlMg0.7Si, AlMg1SiCu) (铝表面阳极氧化处理) 和灰铁 (G5501, FC200, FC250); 轴材料: 铝不锈钢 (SUS303) 和碳钢 (C45)

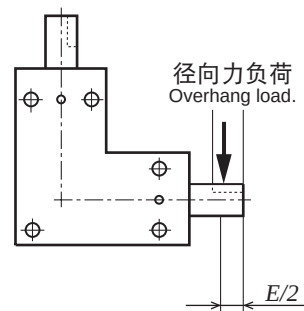
Material: Body-Aluminium (ISO AlMg0.7Si, AlMg1SiCu) and Grey Iron Castings (JIS G5501 FC200, FC250)

Shaft-Stainless and Carbon steels

单位: mm
Dimensions: mm

F	G	键 槽 Key Way			螺纹孔 Set Screw		轴端内的螺纹 Set Screw of shaft end		侧 隙 Backlash (')	径向力负 荷容许量 Maximum overhang load (N)	重 量 Weight W(kg)	产 品 型 号 Catalogue Number
		b	t	l	M	深度 Depth	2-M	深度 Depth				
9	4	-	-	-	10-M4	6	-	-	15	25	0.2	BSH 70L - 001
10	5	3	1.8	14	10-M5	7	-	-	15	36	0.4	BSH 85L - 001
13	5	3	1.8	15	10-M5	8	-	-	15	58	0.5	BSH 95L - 001
20	5	4	2.5	20	10-M5	12	2-M4	8	10	83	1.8	BSH 115L - 001
20	5	5	3.0	25	10-M5	12	2-M4	8	10	83	1.8	BSH 120L - 001
25	6	5	3.0	25	10-M6	13	2-M5	10	10	166	3.1	BSH 140L - 001
25	6	6	3.5	30	10-M6	13	2-M5	10	10	166	3.2	BSH 145L - 001
25	7	6	3.5	30	10-M6	14	2-M5	12	10	245	5.4	BSH 165L - 001
25	7	8	4.0	35	10-M6	14	2-M5	12	10	245	5.5	BSH 170L - 001
9	4	-	-	-	12-M4	6	-	-	15	25	0.3	BSH 70T - 001
10	5	3	1.8	14	12-M5	7	-	-	15	36	0.5	BSH 85T - 001
13	5	3	1.8	15	12-M5	8	-	-	15	58	0.7	BSH 95T - 001
20	5	4	2.5	20	12-M5	12	2-M4	8	10	83	2.0	BSH 115T - 001
20	5	5	3.0	25	12-M5	12	2-M4	8	10	83	2.0	BSH 120T - 001
25	6	5	3.0	25	12-M6	13	2-M5	10	10	166	3.4	BSH 140T - 001
25	6	6	3.5	30	12-M6	13	2-M5	10	10	166	3.5	BSH 145T - 001

关于特殊规格订制或追加工(特殊的使用环境, 漏油问题, 轴径追加工, 安装方法等)的问题请与我们联系磋商。
Please do not hesitate to contact us for special method of installation, checking on the usage environment and work out of oil leaks.



径向力负荷位置和旋转方向
Load position of overhang.

锥齿轮组

B-SETS



齿轮组机身材料：铝 (ISO AlMg5, AlMg0.7Si) (铝表面阳极氧化处理)；轴材料：不锈钢 (SUS303)
Material : Body-Aluminium (ISO AlMg5, AlMg0.7Si) with Anodize treated Shaft-Stainless steel

单位：mm
Dimensions：mm

产 品 型 号 Catalogue Number	齿数比 Gear Ratio	A	B	C	轴直径 Shaft $\phi D(h8)$	E	F	G	H	I
BE40 L — 001	1	40	30	10	$\phi 4$	10	5	4.5	20.5	15
BE55 L — 001	1	55	40	13	$\phi 5$	15	6.5	5	28.5	21.5
BE70 L — 001A	1	70	50	16	$\phi 6$	20	8	6	36	27
BE70 L — 001B	1	70	50	16	$\phi 8$	20	8	6	36	27
BE88 L — 001A	1	88	63	20	$\phi 10$	25	10	7	46	33
BE88 L — 001B	1	88	63	20	$\phi 12$	25	10	7	46	33
BE55 L — 002	2	55	40	13	$\phi 5$	15	6.5	5	28.5	21.5
BE70 L — 002A	2	70	50	16	$\phi 6$	20	8	6	36	27
BE70 L — 002B	2	70	50	16	$\phi 8$	20	8	6	36	27
BE88 L — 002A	2	88	63	20	$\phi 10$	25	10	7	46	33
BE88 L — 002B	2	88	63	20	$\phi 12$	25	10	7	46	33

固定用螺栓孔也可以作为六角头螺栓的螺纹加工孔来使用。固定用螺栓孔可参考表1来修改成适合的螺纹孔的尺寸。请参阅右表1。

Drilled holes provided on B-SET can be used with hexagon bolt.
Drilled holes can modify according to table 1 for suitable size of screw thread.
Refer to table 1 for drill holes and counter sinks.

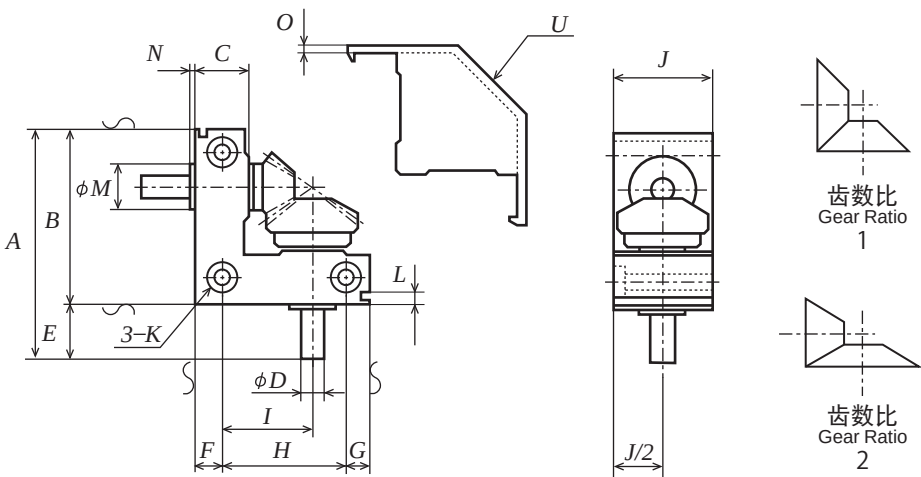
容许传达能力扭矩表

Allowable transfer capability torque table

输入转动速度min ⁻¹ (rpm) Input Revolution/min		输入扭矩 (N · cm) Input Torque (N · cm)				
齿轮 Gear	产 品 型 号 Catalogue Numbers					
		50	100	250	500	
直 齿 轮 箱 SPUR GEARS	BE40 L — 001	m 0.5 × 20	9.8	9.7	9.4	9.0
	BE55 L — 001	m 0.8 × 20	38.6	38.0	36.5	34.3
	BE70 L — 001A	m 1.0 × 20	72.3	71.0	67.6	62.6
	BE70 L — 001B	m 1.0 × 20	72.3	71.0	67.6	62.6
	BE88 L — 001A	m 1.5 × 20	232.3	226.5	210.8	188.9
	BE88 L — 001B	m 1.5 × 20	232.3	226.5	210.8	188.9
斜 齿 轮 箱 BEVEL GEARS	BE55 L — 002	m 0.6 × 14/28	10.5	10.4	10.2	9.9
	BE70 L — 002A	m 0.8 × 13/26	20.7	20.6	20.1	19.3
	BE70 L — 002B	m 0.8 × 13/26	20.7	20.6	20.1	19.3
	BE88 L — 002A	m 1.25 × 13/26	74.2	73.2	70.3	65.9
	BE88 L — 002B	m 1.25 × 13/26	74.2	73.2	70.3	65.9

上述列表中齿数比1：2时，所标的数据是对小齿轮轴的输入转速和扭矩。
The gear ratio 1：2, table shown input revolution and torque on the pinion shaft
容许传达能力扭矩表中的实验值是本公司自行进行耐力测试的结果值。
An experimental value in Allowable transfer capabilities table are our endurance test.

锥齿轮组
B-SETS



齿轮组机身材料：铝 (ISO AlMg5, AlMg0.7Si) (铝表面阳极氧化处理)；轴材料：不锈钢 (SUS303)
Material : Body-Aluminium (ISO AlMg5, AlMg0.7Si) with Anodize treated Shaft-Stainless steel

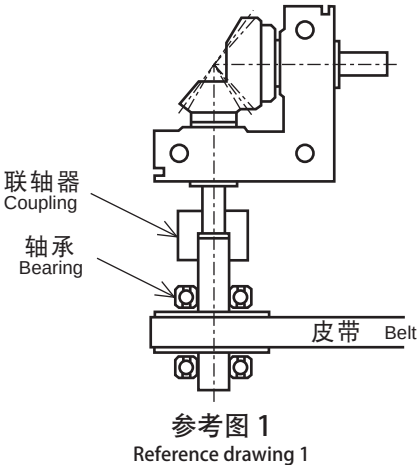
单位：mm
Dimensions : mm

J	沉孔 / 钻孔 Counter Sinks & Drill Holes 3-K			L	M	N	O	U	重量 Weight W(g)	产品型号 Catalogue Number
	钻孔径 Drill Hole Diameter	沉孔径 Counter Sink Diameter	沉孔深度 Counter Sink Depth							
18	φ3.4	φ6.5	3.5	2.5	φ 7	2.1	1.7	C13	30	BE40 L - 001
25	φ3.4	φ6.5	3.5	4	φ 9	1.8	1.9	C16	85	BE55 L - 001
30	φ4.3	φ8	4.5	4.5	φ11	1.8	2.1	C20	155	BE70 L - 001A
30	φ4.3	φ8	4.5	4.5	φ14	2	2.1	C20	170	BE70 L - 001B
40	φ5.2	φ9.5	5.5	5	φ18	2	2.1	C27	375	BE88 L - 001A
40	φ5.2	φ9.5	5.5	5	φ19	2.2	2.1	C27	380	BE88 L - 001B
25	φ3.4	φ6.5	3.5	4	φ 9	1.8	1.9	C16	80	BE55 L - 002
30	φ4.3	φ8	4.5	4.5	φ11	1.8	2.1	C20	140	BE70 L - 002A
30	φ4.3	φ8	4.5	4.5	φ14	2	2.1	C20	165	BE70 L - 002B
40	φ5.2	φ9.5	5.5	5	φ18	2	2.1	C27	345	BE88 L - 002A
40	φ5.2	φ9.5	5.5	5	φ19	2.2	2.1	C27	375	BE88 L - 002B

附有塑料壳。
There is a B-SET with plastic cover.

表1
Table 1

产品型号 Catalogue Numbers	钻孔径 Drill hole diameter	适配六角螺栓 Acceptable hexagon head bolt	进行螺纹孔追加加工时 Modification of screw thread	钻孔的最大容许加工径 Limitation of drill holes
BE 40 L	φ3.4	M3	M4	不可追加加工 Not advisable
BE 55 L	φ3.4	M3	M4	φ5
BE 70 L	φ4.3	M4	M5	φ6
BE 88 L	φ5.2	M5	M6	φ8



目录表 CONTENTS	齿轮信息 GEAR INFORMATION	齿箱 GEAR BOXES	无 backlash 齿轮 ANTI BACKLASH SPUR GEARS	研磨直齿轮 GROUND SPUR GEARS	直齿轮 SPUR GEARS	内齿轮 INTERNAL GEARS	研磨齿条 GROUND RACKS	齿条 RACKS	斜齿轮・螺旋齿轮 HELICAL GEARS AND SCREW GEARS	蜗轮・蜗杆 WORMS AND WORM WHEELS	锥齿轮 BEVEL GEARS	技术资料 REFERENCE DATA
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W-BOX 蜗轮蜗杆齿轮箱

WORM-BOXES



齿轮箱外壳材料：铝 (ISO AlMg2.5, AlMg5) 铝表面阳极氧化处理。轴材料：碳钢C45
Material : Body-Aluminium (ISO AlMg2.5, AlMg5) with Anodize treated Shaft Carbon steel

单位：mm
Dimensions : mm

产 品 型 号 Catalogue Number	齿 数 比 Gear Ratio	A	B	箱 Body Size			轴 长 Shaft Length		轴 直 径 Shaft		中 心 距 Center Distance J
				C	D	E	F	G	$\phi H(h7)$	$\phi I(h7)$	
WS 55R — 020	20	55	45	45	45	35	10	10	$\phi 5$	$\phi 8$	9.5
WS 55R — 030	30	55	45	45	45	35	10	10	$\phi 5$	$\phi 8$	12
WS 60R — 040	40	60	50	55	50	40	10	10	$\phi 5$	$\phi 8$	14.5
WS 60R — 050	50	60	50	55	50	40	10	10	$\phi 5$	$\phi 8$	17
WS 65R — 020	20	65	55	55	50	40	15	15	$\phi 6$	$\phi 8$	13.2
WS 65R — 030	30	65	55	55	50	40	15	15	$\phi 6$	$\phi 8$	17.2
WS 75R — 040	40	75	60	70	60	45	15	15	$\phi 6$	$\phi 10$	21.2
WS 75R — 050	50	75	60	70	60	45	15	15	$\phi 6$	$\phi 10$	25.2
WS 80R — 010	10	80	65	70	60	45	20	20	$\phi 8$	$\phi 10$	18
WS 80R — 020	20	80	65	70	60	45	20	20	$\phi 8$	$\phi 10$	18
WS 80R — 030	30	80	65	70	60	45	20	20	$\phi 8$	$\phi 12$	23
WS 90R — 040	40	90	75	85	70	50	20	25	$\phi 8$	$\phi 15$	28
WS 90R — 050	50	90	75	85	70	50	20	25	$\phi 8$	$\phi 15$	33

容许传达能力输入扭矩表

Allowable transfer capability input torque table

输入转动速度min ⁻¹ (rpm) Input Revolution/min 齿 轮 Gear 产 品 型 号 Catalogue Numbers		输入扭矩 (N · cm) Input Torque (N · cm)							
		50	100	500	1,000	1,500	2,000	2,500	3,000
WS 55R — 020	m 0.5 × 1/20	4.0	3.5	2.0	1.5	1.2	1.0	0.9	0.9
WS 55R — 030	m 0.5 × 1/30	5.7	4.9	3.0	2.2	1.8	1.6	1.4	1.3
WS 60R — 040	m 0.5 × 1/40	7.3	6.3	4.0	3.0	2.5	2.1	1.9	1.8
WS 60R — 050	m 0.5 × 1/50	8.9	7.7	4.9	3.7	3.0	2.7	2.2	2.2
WS 65R — 020	m 0.8 × 1/20	9.9	8.5	5.1	3.9	3.1	2.7	2.5	2.3
WS 65R — 030	m 0.8 × 1/30	14.1	12.3	7.6	5.7	4.8	4.2	3.7	3.5
WS 75R — 040	m 0.8 × 1/40	18.0	15.8	9.9	7.5	6.3	5.5	5.0	4.6
WS 75R — 050	m 0.8 × 1/50	21.9	18.9	12.3	9.3	7.9	6.9	6.3	5.8
WS 80R — 010	m 1.0 × 2/20	34.5	29.7	16.9	12.7	10.4	9.1	8.1	7.3
WS 80R — 020	m 1.0 × 1/20	24.9	21.4	12.0	8.9	7.2	6.3	5.6	5.1
WS 80R — 030	m 1.0 × 1/30	35.2	30.6	17.8	13.1	10.8	9.5	8.5	7.8
WS 90R — 040	m 1.0 × 1/40	45.1	39.0	23.3	17.2	14.3	12.6	11.3	10.4
WS 90R — 050	m 1.0 × 1/50	54.7	47.4	28.6	21.4	17.7	15.6	14.1	12.9

注意：尽量设置为输入轴 ϕH 在输出轴 ϕI 之下。如果采取其他设置方法，请务必在[容许传达能力输入扭矩表]和[容许传达能力输出扭矩表]值的75%以下的扭矩来运行。

An experimental value in Allowable transfer capabilities table are our endurance test.

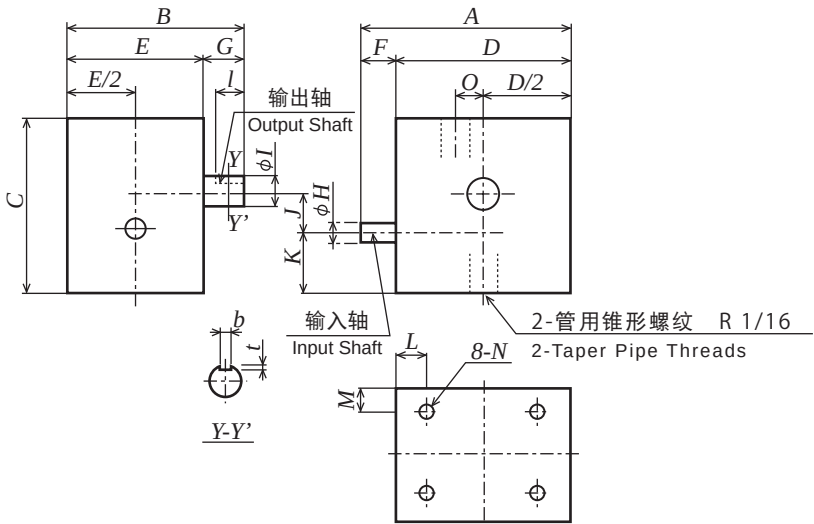
Precaution (Method of assembly of W BOX) It is not advisable to design the input shaft ϕH (axis of worm gear) on top of output shaft ϕI .

Always make sure the location of output shaft ϕI (axis of Worm wheel) is higher than input shaft ϕH .

容许传达能力扭矩表中的实验值是本公司自行进行耐力测试的结果值。

An experimental value in Allowable transfer capabilities table are our endurance test.

W-BOX 蜗轮蜗杆齿轮箱
WORM-BOXES



齿轮箱外壳材料：铝 (ISO AlMg2.5, AlMg5) 铝表面阳极氧化处理。轴材料：碳钢C45
Material : Body-Aluminium (ISO AlMg2.5, AlMg5) with Anodize treated Shaft Carbon Steel
单位：mm
Dimensions : mm

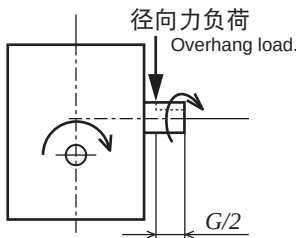
K	L	M	螺纹孔 Set Screw		键 槽 Key Way			管锥螺纹 Taper Pipe Thread	侧 隙 Backlash (')	径向力负荷容量 Maximum overhang load (N)	重 量 Weight W(kg)	产 品 型 号 Catalogue Number
			8-N	深度 Depth	b	t	l					
16.5	8	7	8-M3	6	3	1.8	8	0	25	24	0.23	WS 55R - 020
16.5	8	7	8-M3	6	3	1.8	8	0	25	24	0.23	WS 55R - 030
20	8	8	8-M3	6	3	1.8	8	0	25	24	0.34	WS 60R - 040
19	8	8	8-M3	6	3	1.8	8	8	25	24	0.36	WS 60R - 050
20.9	10	8	8-M4	6	3	1.8	12	0	25	20	0.36	WS 65R - 020
18.9	10	8	8-M4	6	3	1.8	12	8	25	20	0.38	WS 65R - 030
24	10	8	8-M4	8	3	1.8	12	0	25	33	0.60	WS 75R - 040
20	10	8	8-M4	8	3	1.8	12	15	25	33	0.64	WS 75R - 050
26	10	5	8-M5	10	3	1.8	15	0	25	24	0.61	WS 80R - 010
26	10	5	8-M5	10	3	1.8	15	0	25	24	0.61	WS 80R - 020
23.5	10	5	8-M5	10	4	2.5	15	8	25	44	0.65	WS 80R - 030
28.5	10	5	8-M5	10	5	3	20	10	25	58	0.98	WS 90R - 040
21	10	5	8-M5	10	5	3	20	17	25	58	1.02	WS 90R - 050

容许传达能力输出扭矩表

Allowable transfer capability output torque table

输入转动速度 min ⁻¹ (rpm) Input Revolution/min	输出扭矩 (N · cm) Output Torque (N · cm)							
	50	100	500	1,000	1,500	2,000	2,500	3,000
产品 型 号 Catalogue Numbers								
WS 55R - 020	27.8	25.2	18.0	14.7	13.0	11.7	10.8	10.0
WS 55R - 030	59.3	54.2	39.6	32.7	29.7	26.6	24.4	23.0
WS 60R - 040	101.7	92.8	69.4	57.7	51.3	46.9	43.5	41.1
WS 60R - 050	153.0	140.2	106.9	89.3	79.2	72.9	67.7	63.9
WS 65R - 020	84.5	75.9	53.4	44.5	37.8	35.0	32.4	30.6
WS 65R - 030	179.3	164.2	119.5	98.2	86.8	79.3	73.6	69.2
WS 75R - 040	306.0	281.4	207.0	172.6	153.6	139.0	129.9	122.4
WS 75R - 050	465.2	424.5	319.5	266.4	238.4	217.8	202.2	192.5
WS 80R - 010	191.7	171.1	112.8	90.5	77.5	69.3	63.0	58.4
WS 80R - 020	192.4	174.6	120.5	98.2	85.7	78.2	72.0	67.1
WS 80R - 030	409.1	374.0	265.7	218.2	191.7	175.2	162.8	152.8
WS 90R - 040	697.4	638.0	463.9	382.7	337.5	309.6	288.2	271.1
WS 90R - 050	1,056.7	968.1	713.2	591.9	522.9	479.7	447.4	421.7

注意：照片与平面图是输入轴φH在输出轴φI之下时的设计使用例。
Refer to picture and drawing. This is an example of usage for input shaft φ H (axis of worm gear) is lower than output shaft φ I (axis of Worm wheel).
容许传达能力扭矩表中的实验数据是本公司自行进行耐力测试的结果值。An experimental value in Allowable transfer capabilities table are our endurance test.



径向力负荷作用点和旋转方向。
Load position of overhang and direction of the rotation.

目次	CONTENTS
齿轮信息	GEAR INFORMATION
蜗轮蜗杆	GEAR BOXES
无 backlash 蜗轮	ANTI BACKLASH SPUR GEARS
研磨直齿蜗轮	GROUND SPUR GEARS
直齿蜗轮	SPUR GEARS
内齿蜗轮	INTERNAL GEARS
研磨齿条	GROUND RACKS
齿条	RACKS
斜齿蜗轮・螺旋蜗轮	HELICAL GEARS AND SCREW GEARS
蜗轮・蜗杆	WORMS AND WORM WHEELS
锥齿蜗轮	BEVEL GEARS
技术资料	REFERENCE DATA

KG 齿轮系统的信息

KG Gear - Information

Gear Systems

KG W-BOX 蜗轮蜗杆齿轮箱使用时的注意点

Precaution of usage for KG W-BOX

1) 关于跑合运转

在正式开始使用前W-BOX要进行跑合运转。我们推荐在正常负荷的1/2-1/3的为基准，运行约6个小时。

2) 关于交换润滑油

建议使用润滑油为ISO VG680或同效的润滑油。在开始正式运行约50小时为准，进行第一次润滑油交换。之后以6个月为一次的间隔进行油量和污垢的检查，并根据具体情况交换润滑油。W-BOX的外壳和内部的润滑油可能已经达到较高温度，所以交换润滑油时请注意安全。

3) 自锁功能

W-BOX基本上不能进行自锁。所以如果想完全确实的锁住，请另行装配其他的安全装置 (如锁定机制，制动器)。

4) 当发生异常音时

如果发生与正常运行时不同的噪音，或有大的震动时就要停止运行，并用手摇来确认齿轮箱转动的轻重。如果有沙粒般的声音时就要交换润滑油。

5) 出现高温状态

如果室温加上W-BOX的温度超过80度以上时，需要停止运行。需要交换润滑油，或对齿轮箱的运行条件进行再确认。

1) Warm up and test run

To warm up and test run for W-BOXES, we recommended applying 1/2 to 1/3 of normal loads for over 6 hour before actual operation.

2) Change of lubricating oil

Use lubricating oil equivalent to ISO VG680 is recommended.

When the machine runs over 50 accumulated hours, this is the tentative deadline to replace the initial lubricating oil.

Subsequently, check the amount of lubricating oil and dirt of oil every 6 months. Replace lubrication oil if necessary.

At the times of changing of lubrication oil, beware of heated body and oil temperature of W-BOX will increase.

3) Self lock

Basically self-locks function will not activate for W-BOXES.

For all range of W-BOXES, in order that the suspension of load to function properly, safety device such as lock device, one-way clutch and others are recommend to be built in separately.

4) Precaution of unusual noise

Stop the operation and check for fault if there are any occurrences such as unusual noise or unbalanced oscillation from W-BOX. Check the shaft's resistance by manually turning a micro coupling between motor and W-BOX to check the gritty-noise from W-BOX, please replace the lubrication oil if necessary.

5) Over heated W-BOX

Stop operation and check the temperature of W-BOX when the temperature of W-BOX is over 80°C (Celsius). Replace lubricating oil and check the conditions of operation if necessary.



无侧隙直齿轮

Anti Backlash Spur Gears

产品型号的解读方法 Reference of Catalogue Number

NS 50 AL 60 B + 08 08
NSG 80 S 80 B + 08 10
ASG 1 S 70 B - 10 12

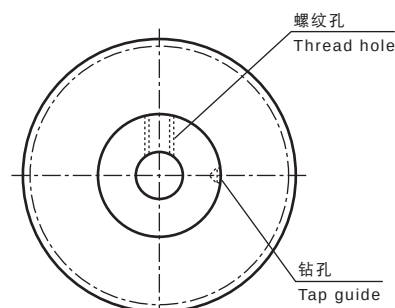
齿轮的种类和齿面加工种类 Kind of Gear	模数 Module	材料 Material	齿数 Number of Teeth	形状 Type	内径处理 Bores Processed	齿宽 Face Width	孔径 Bore Diameter
NS : 无侧隙齿轮 Anti Backlash Gears NSG : 无侧隙研磨齿轮 Anti Backlash Ground Gears ASG : 控制侧隙研磨齿轮 Control Backlash Ground Gears	表示模数大小。模数1以下时标数据是实际模数乘以100。 例：模数0.5时所标数据是50。模数0.8时所标数据是80。 Expressed the unit of module's size. Module 0.5 and 0.8 as multiple of 100. Example m0.5 → 50 m0.8 → 80	AL : 铝 Aluminium S : S45C Carbon Steel 不锈钢 S : SCM435、440(ASG) 材料：铬钼钢 Chromium Molybdenum Steel SU : SUS304 不锈钢 Stainless Steel	z : 50~120 (ASG) 30~	B : 有单侧轮毂 With Hub on one side.	[+] : 齿轮带有螺纹孔/ 无固定螺钉 NS切削加工 NSG磨削加工 Machined bore Ground bore Gear with Thread hole / without Set Screw. [-] : 齿轮无螺纹孔/ 无键槽 ASG磨削加工 Ground bore Gear without Thread hole / without Key Way.	单位 : mm Dimension : millimeter	单位 : mm Dimension : millimeter

由于机电一体化领域的发展产生了要把齿轮侧隙变为0的要求。KG的无侧隙齿轮满足了其要求。并成为了机电一体化和精密机器所需要的必不可少的齿轮。

Anti Backlash Spur Gears can provide support to HI-TECH Mechanical, Electrical and Electronics products. It reduces the backlash to zero [0]. An essential product for Mechanical, Electrical and Precision products.

本公司无侧隙齿轮和控制侧隙研磨齿轮的特点 Feature of Anti Backlash Spur Gears

- 1) 模数范围从M0.5到M2.0。
- 2) 材质：铝，碳钢，合金钢，不锈钢。(可控侧隙齿轮是合金钢)。
- 3) 配对齿轮建议使用本公司的齿部研磨齿轮和直齿轮。主要目的是为了达到最佳效果。
- 1) The variations are from module 0.5 to 2.0.
- 2) Materials : Aluminium, Carbon Steel, Chromium Molybdenum Steel, Stainless Steel.
- 3) KG-Anti Backlash Spur Gear is able to match with other makers, however it is advisable to use KG-Ground Spur Gear series and KG-Spur Gear Series for best result.



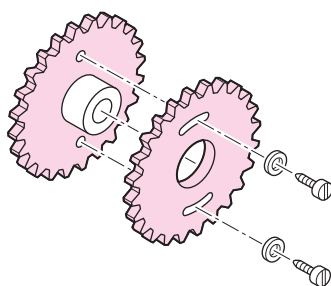
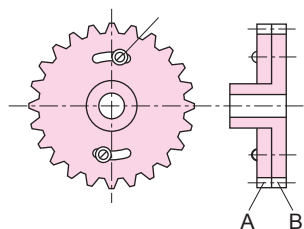
(除ASG系列)
(Excluded ASG Series)

无侧隙直齿轮的机制

Mechanism of anti Backlash Spur Gears

1. 固定型 (本公司 ASG 系列)

Fixed type (ASG series)

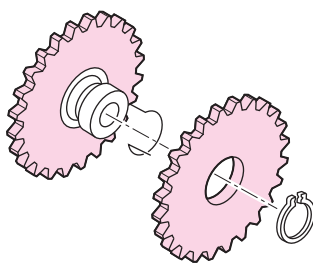
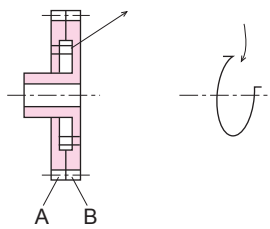


ASG系列齿轮的使用方法：在和配对齿轮进行啮合时，先将螺栓松开，然后移位A和B，使它们的齿夹注对方的齿，将侧隙调到最小，然后拧紧螺栓。能这么做的前提条件是使用精度较高的配对齿轮。

Method of ASG series is to loosen the bolts, then adjust gear A and gear B. This adjustment will allows to slip gear A and B into the match gear at a minimum backlash before tightening the bolt. This ASG series is only suitable for application that needs minimal backlash adjustment and the match gear needs to be high quality.

2. 圆弧弹簧型 (本公司 BS 型)

Circular Arc Spring type (Type BS)

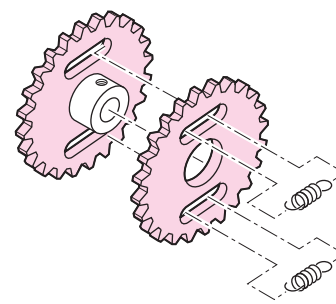
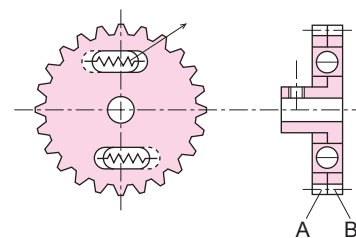


把弧形弹簧置于齿轮A与齿轮B之间，再用其弹簧的力量消除侧隙。使用方法与固定型一样，通过夹住对方齿轮的齿进行使用。这个方法经常用于传达扭矩较低的情况。

Method of BS series is using a Circular Arc Spring to place between gear A and gear B in order to eliminate the backlash. BS series gears are allowable for low torque application.

3. 线圈弹簧型 (本公司 BW 型)

Coiled Spring type (Type BW)



BW系列是和弧形弹簧一样，将齿轮A和齿轮B用弹簧连接，使两个齿轮相互平衡受压，再通过夹住对方齿轮的齿进行使用。以达到消除啮合产生的侧隙。

Method of BW series is the spring suspension of gear A and B. The tension of spring will allow them to slip relatively to each other by the force.

This method will eliminate the backlash once gear A and B engage with the match gear.

齿轮啮合原点 n0 的设定方法。 Adjustment of zero points as n0.

- 1) 依照容许传达能力扭矩列表，来选择NS或NSG。
 - 2) NS和NSG系列的调节方法是一样的。首先将B齿轮 (对齿轮) 固定住，BS形齿轮时，将齿轮A往箭头方向转动 (箭头刻在A齿轮表面)；BW形齿轮时使A齿轮慢慢旋转拉伸弹簧，所有的弹簧开始被拉伸，并齿轮A和B的齿刚好相互一致的点为n0点。
 - 3) 务必参照容许传达能力扭矩列表，不要超出所使用无侧隙齿轮的最大承受量。
- 1) For selection NS and NSG series, refer to the Allowable Transfer Capability Torque Table.
 - 2) For NS and NSG, all adjustments are similar.
Rotate the gear with arrow mark indicator to zero point until both gear teeth are fully match with no tension of spring. At zero point pitch where both gear teeth match, rotate two (2) pitches or more according to Allowable Transfer Capability Torque Table.
 - 3) Reference to the Table provided, do not exceed the load maximum limitation of Anti Backlash function.

设定容许传达扭矩值的方法。 Method for settlement of Allowable Transfer Torque.

- 1) 齿距参差调谐量的选择方法。
首先在NS，NSG系列中挑选符合使用条件的无侧隙齿轮，并确认其产品编号。然后在容许传达扭矩的表格中找出超过贵公司所要扭矩的数值，并确认其齿距参差调谐量n。
如果是NSU系列的产品时请在齿距参差调谐量n为2的情况下使用。请确认NSU系列的容许传达扭矩表数值的范围内使用。
- 2) 容许扭矩的设定方法
例：假设您采用了NSG系列中的NSG50S60B+0808，假设您所需要的扭矩为15N cm。根据容许传达扭矩表格您要移动齿距 (齿距参差调谐量) n=3。移动3个齿，以得到您所需要的啮合扭矩，然后与配对的对方齿轮进行啮合。

Method of Shifting pitch(n)

Firstly, select suitable Anti backlash Spur Gears from NS and NSG series. Secondly, find the numerical value of shifting pitch of your required torque from the Allowable Transfer Capability Torque Table (Chart).

Example: Your existing require NSG part number is NSG50S 60B+0808, your existing torque speed is 15N per cm, you need to shift 3 pitch in order to get the next largest value inside the Allowable Transfer Capability Torque Table (Chart) and assembly to match your existing gear.

For NSU series, there is a limitation to the shifting of the pitch as according to the Allowable Transfer Capability Torque Table (Chart). The minimum and maximum requirement for the shifting are allowable at 2 pitches.

Memo

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直齿
SPUR GEARS

内齿
INTERNAL GEARS

行星直齿
GROUND RACKS

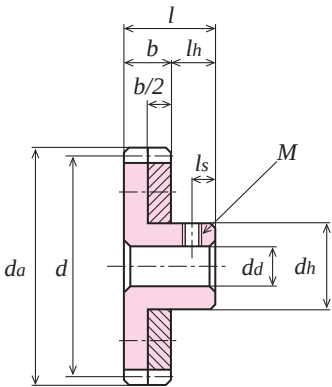
齿条
RACKS

螺旋齿轮
• 螺旋 •
HELICOL GEARS AND SCREW GEARS

蜗轮蜗杆
• 蜗轮 • 蜗杆
WORMS AND WORM WHEELS

锥齿轮
BEVEL GEARS

技术标准
REFERENCE DATA



本图纸仅供参考, BW形状
The above sketch is for reference only.
TYPE BW

订购时请写入明确完整的产品型号。
Please refer to the catalogue reference while ordering.

NSU系列产品 NSU Series 齿面切削精加工
Material : Stainless Steel SUS304 (JIS G 4303)

单位 : mm
Dimensions : mm

Table with 15 columns: Product Model, Material, Module, Number of Teeth, Reference Diameter, Tip Diameter, Type, Number of Springs, Face Width, Bore Diameter, Hub Diameter, Hub Projection, Overall Length, Set Screw (M, ls), Weight. Rows include models from NS50SU 60B to 120B.

标号[+]表示齿轮带有螺纹孔/带有固定螺钉。[+]: Gear with Thread hole / with Set Screw. (not SUS)

使用时的注意点

NSU系列与NS, NSG系列不同, 当与对方齿轮啮合时的移动齿距n固定为2。也就是从n0点移动齿距到n2后使用。并在容许传达扭矩标的范围内使用。因为NSU系列产品在材质上使用SU304不锈钢材料, 所以为了防止出现相互间的磨损, 使其顺利滑动, 进行了聚四氟乙烯表面处理。

调整移动齿距 (齿距参差调谐量) 零点的方法。

调整此无侧隙齿轮, 使各个弹簧张力刚好达到零 (刚好松懈)并两个并排的齿刚好完全一致。

Precaution of Usage

- 1. For NSU series, there is a limitation to the shifting of the pitch as according to the Allowable Transfer Capability Torque Table (Chart). The required shifting allowed is two pitch only.
- 2. NSU series for all stainless steel are completed with Teflon coating that will prevent scuffing and provide smooth motion.

Method of adjustment of zero point.

Rotate the gear with arrow mark indicator to zero point until both gear teeth are fully match with no tension of spring.

容许传达能力扭矩列表 (N · cm)

Allowable transfer capability torque table

Table with 2 columns: Product Model, Limitation of anti backlash to Funticon (N · cm) for n2. Rows include models from NS50SU 60B to 120B.

n 齿距的移动数值 Amount of shifting pitch.

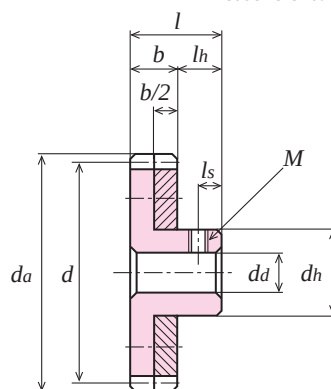
无侧隙齿轮

ANTI BACKLASH SPUR GEARS

模数
MODULE

0.5/0.8/1

压力角 20° (普通齿)
20° PRESSURE ANGLE FULL DEPTH TOOTH



本图纸仅供参考, BS, BW形状
The above sketch is for reference only.
TYPE BS, BW

订购时请写入明确完整的产品型号。

Please refer to the catalogue reference while ordering.

NG系列 NS Series 齿面切削精加工

Material : Aluminium (JIS A5056) Carbon Steel (ISO C45)

单位 : mm
Dimensions : mm

产品型号 Catalogue Number	材料 Material	模数 Module	齿数 Number of Teeth	分度圆直径 Reference Diameter	齿顶圆直径 Tip Diameter	形状 Type	弹簧的数量 Number of Springs	齿宽 Face Width	孔径 Bore Diameter	轮毂外径 Hub Diameter	轮毂长度 Hub Projection	全长 Overall Length	螺纹孔 Set Screw		重量 Weight
	M	m	z	d	da			b	da(H8)	dh	lh	l	M	ls	W(g)
NS50AL 60B + 0808	AL	0.5	60	φ 30	φ 31	BS	1	8	φ 8	φ 16	8	16	M4	4	16
NS50AL 70B + 0808	AL	0.5	70	φ 35	φ 36	BS	1	8	φ 8	φ 16	8	16	M4	4	21
NS50AL 80B + 0808	AL	0.5	80	φ 40	φ 41	BS	1	8	φ 8	φ 20	8	16	M4	4	30
NS50AL 90B + 0810	AL	0.5	90	φ 45	φ 46	BS	1	8	φ 10	φ 20	8	16	M4	4	36
NS50AL 100B + 0810	AL	0.5	100	φ 50	φ 51	BS	1	8	φ 10	φ 20	8	16	M4	4	44
NS50AL 120B + 0810	AL	0.5	120	φ 60	φ 61	BS	1	8	φ 10	φ 20	8	16	M4	4	62
NS80AL 50B + 0810	AL	0.8	50	φ 40	φ 41.6	BS	1	8	φ 10	φ 20	10	18	M5	5	30
NS80AL 60B + 0810	AL	0.8	60	φ 48	φ 49.6	BS	1	8	φ 10	φ 20	10	18	M5	5	42
NS80AL 70B + 0810	AL	0.8	70	φ 56	φ 57.6	BS	1	8	φ 10	φ 20	10	18	M5	5	52
NS80S 80B + 0810	S	0.8	80	φ 64	φ 65.6	BW	2	8	φ 10(H7)	φ 20	10	18	M5	5	200
NS80S 90B + 0810	S	0.8	90	φ 72	φ 73.6	BW	2	8	φ 10(H7)	φ 20	10	18	M5	5	253
NS80S 100B + 0810	S	0.8	100	φ 80	φ 81.6	BW	2	8	φ 10(H7)	φ 24	10	18	M5	5	324
NS80S 120B + 0810	S	0.8	120	φ 96	φ 97.6	BW	2	8	φ 10(H7)	φ 24	10	18	M5	5	463
NS1AL 50B + 1010	AL	1.0	50	φ 50	φ 52	BS	1	10	φ 10	φ 20	10	20	M6	5	49
NS1AL 60B + 1010	AL	1.0	60	φ 60	φ 62	BS	1	10	φ 10	φ 20	10	20	M6	5	72
NS1S 70B + 1012	S	1.0	70	φ 70	φ 72	BW	2	10	φ 12(H7)	φ 24	10	20	M6	5	298
NS1S 80B + 1012	S	1.0	80	φ 80	φ 82	BW	2	10	φ 12(H7)	φ 24	10	20	M6	5	390
NS1S 90B + 1012	S	1.0	90	φ 90	φ 92	BW	3	10	φ 12(H7)	φ 24	10	20	M6	5	495
NS1S 100B + 1012	S	1.0	100	φ 100	φ 102	BW	3	10	φ 12(H7)	φ 30	10	20	M6	5	632
NS1S 120B + 1012	S	1.0	120	φ 120	φ 122	BW	3	10	φ 12(H7)	φ 30	10	20	M6	5	903

材料 AL : 铝A5056(进行了白色阳极氧化处理) Gear with Anodize treated.

Materials S : S45C (ISO C45) 钢 (进行了盐浴软氮化处理) Carbon steel with Isonite treated.

类型 BS : 使用弧形弹簧 Circular Arc Spring type

Type BW : 使用螺旋弹簧 Coiled Spring type

标号[+]表示齿轮带有螺纹孔/带有固定螺钉。

[+] : Gear with Thread hole / with Set Screw.

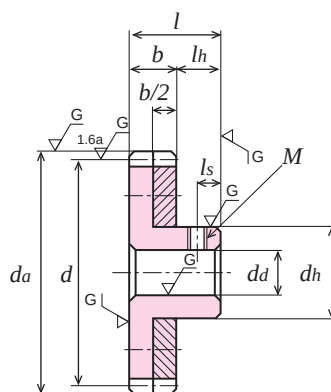
容许传达能力扭矩列表 (N · cm)

Allowable transfer capability torque table

产品型号 Catalogue Numbers	容许传达扭矩 (N · cm) Limitation of anti backlash to Funticon (N · cm)			
	n2	n3	n4	n5
NS50AL 60B + 0808	13.33	21.18	31.08	40.79
NS50AL 70B + 0808	10.86	16.35	24.83	32.72
NS50AL 80B + 0808	11.50	16.47	20.79	26.93
NS50AL 90B + 0810	10.00	14.41	19.12	23.68
NS50AL 100B + 0810	8.16	12.91	17.81	22.55
NS50AL 120B + 0810	7.25	10.39	15.29	18.43

产品型号 Catalogue Numbers	容许传达扭矩 (N · cm) Limitation of anti backlash to Funticon (N · cm)			
	n2	n3	n4	n5
NS80AL 50B + 0810	14.12	25.36	32.68	42.09
NS80AL 60B + 0810	13.80	19.77	28.55	35.61
NS80AL 70B + 0810	14.46	18.85	25.26	32.58
NS80S 80B + 0810	46.44	56.48	66.73	76.98
NS80S 90B + 0810	50.36	64.72	76.49	92.49
NS80S 100B + 0810	47.59	61.19	74.53	87.33
NS80S 120B + 0810	43.61	55.23	67.78	80.02
NS1AL 50B + 1010	18.14	27.29	35.13	47.85
NS1AL 60B + 1010	16.86	23.92	31.77	40.99
NS1S 70B + 1012	31.35	41.41	-	-
NS1S 80B + 1012	33.73	46.02	56.48	-
NS1S 90B + 1012	62.66	87.08	103.55	-
NS1S 100B + 1012	74.19	103.29	122.90	145.78
NS1S 120B + 1012	81.19	109.04	139.63	160.81

n : 齿距的移动数值 Amount of shifting pitch.



本图纸仅供参考, BS, BW 形状
The above sketch is for reference only.
TYPE BS, BW

NSG系列 NSG Series 齿面磨削加工 SCM435, 440 铬钼合金钢

Material : Chromium Molybdenum Steel (ISO 34CrMo4, 42CrMo4)

单位 : mm
Dimensions : mm

产品型号 Catalogue Number	材料 Material	模数 Module	齿数 Number of Teeth	分度圆直径 Reference Diameter	齿顶圆直径 Tip Diameter	形状 Type	弹簧的数量 Number of Springs	齿宽 Face Width	孔径 Bore Diameter	轮毂外径 Hub Diameter	轮毂长度 Hub Projection	全长 Overall Length	螺纹孔 Set Screw		重量 Weight
	M	m	z	d	da	Type		b	da(H7)	dh	lh	l	M	ls	W(g)
NSG50S 60B + 0808	SCM	0.5	60	φ 30	φ 31	BS	1	8	φ 8	φ 16	8	16	M4	4	45
NSG50S 70B + 0808	SCM	0.5	70	φ 35	φ 36	BS	1	8	φ 8	φ 16	8	16	M4	4	61
NSG50S 80B + 0808	SCM	0.5	80	φ 40	φ 41	BS	1	8	φ 8	φ 20	8	16	M4	4	87
NSG50S 90B + 0810	SCM	0.5	90	φ 45	φ 46	BS	1	8	φ 10	φ 20	8	16	M4	4	105
NSG50S 100B + 0810	SCM	0.5	100	φ 50	φ 51	BS	1	8	φ 10	φ 20	8	16	M4	4	128
NSG50S 120B + 0810	SCM	0.5	120	φ 60	φ 61	BS	1	8	φ 10	φ 20	8	16	M4	4	182
NSG80S 50B + 0810	SCM	0.8	50	φ 40	φ 41.6	BS	1	8	φ 10	φ 20	10	18	M5	5	87
NSG80S 60B + 0810	SCM	0.8	60	φ 48	φ 49.6	BS	1	8	φ 10	φ 20	10	18	M5	5	122
NSG80S 70B + 0810	SCM	0.8	70	φ 56	φ 57.6	BS	1	8	φ 10	φ 20	10	18	M5	5	152
NSG80S 80B + 0810	SCM	0.8	80	φ 64	φ 65.6	BW	2	8	φ 10	φ 20	10	18	M5	5	200
NSG80S 90B + 0810	SCM	0.8	90	φ 72	φ 73.6	BW	2	8	φ 10	φ 20	10	18	M5	5	253
NSG80S 100B + 0810	SCM	0.8	100	φ 80	φ 81.6	BW	2	8	φ 10	φ 24	10	18	M5	5	324
NSG80S 120B + 0810	SCM	0.8	120	φ 96	φ 97.6	BW	2	8	φ 10	φ 24	10	18	M5	5	463
NSG1S 50B + 1010	SCM	1.0	50	φ 50	φ 52	BS	1	10	φ 10	φ 20	10	20	M6	5	144
NSG1S 60B + 1010	SCM	1.0	60	φ 60	φ 62	BS	1	10	φ 10	φ 20	10	20	M6	5	212
NSG1S 70B + 1012	SCM	1.0	70	φ 70	φ 72	BW	2	10	φ 12	φ 24	10	20	M6	5	298
NSG1S 80B + 1012	SCM	1.0	80	φ 80	φ 82	BW	2	10	φ 12	φ 24	10	20	M6	5	390
NSG1S 90B + 1012	SCM	1.0	90	φ 90	φ 92	BW	3	10	φ 12	φ 24	10	20	M6	5	495
NSG1S 100B + 1012	SCM	1.0	100	φ 100	φ 102	BW	3	10	φ 12	φ 30	10	20	M6	5	632
NSG1S 120B + 1012	SCM	1.0	120	φ 120	φ 122	BW	3	10	φ 12	φ 30	10	20	M6	5	903

类型 BS : 使用弧形弹簧 Circular Arc Spring type
Type BW : 使用螺旋弹簧 Coiled Spring type

标号[+]表示齿轮带有螺纹孔/带有固定螺钉。
[+] : Gear with Thread hole / with Set Screw.

容许传达能力扭矩列表 (N · cm)

Allowable transfer capability torque table

产品型号 Catalogue Numbers	容许传达扭矩 (N · cm) Limitation of anti backlash to Function (N · cm)			
	n2	n3	n4	n5
NSG50S 60B + 0808	13.33	21.18	31.08	40.79
NSG50S 70B + 0808	10.86	16.35	24.83	32.72
NSG50S 80B + 0808	11.50	16.47	20.79	26.93
NSG50S 90B + 0810	10.00	14.41	19.12	23.68
NSG50S 100B + 0810	8.16	12.91	17.81	22.55
NSG50S 120B + 0810	7.25	10.39	15.29	18.43

产品型号 Catalogue Numbers	容许传达扭矩 (N · cm) Limitation of anti backlash to Function (N · cm)			
	n2	n3	n4	n5
NSG80S 50B + 0810	14.12	25.36	32.68	42.09
NSG80S 60B + 0810	13.80	19.77	28.55	35.61
NSG80S 70B + 0810	14.46	18.85	25.26	32.58
NSG80S 80B + 0810	46.44	56.48	66.73	76.98
NSG80S 90B + 0810	50.36	64.72	76.49	92.49
NSG80S 100B + 0810	47.59	61.19	74.53	87.33
NSG80S 120B + 0810	43.61	55.23	67.78	80.02
NSG1S 50B + 1010	18.14	27.29	35.13	47.85
NSG1S 60B + 1010	16.86	23.92	31.77	40.99
NSG1S 70B + 1012	31.35	41.41	-	-
NSG1S 80B + 1012	33.73	46.02	56.48	-
NSG1S 90B + 1012	62.66	87.08	103.55	-
NSG1S 100B + 1012	74.19	103.29	122.90	145.78
NSG1S 120B + 1012	81.19	109.04	139.63	160.81

n : 齿距的移动数值 Amount of shifting pitch.

控制侧隙研磨齿轮

CONTROL BACKLASH GROUND SPUR GEAR

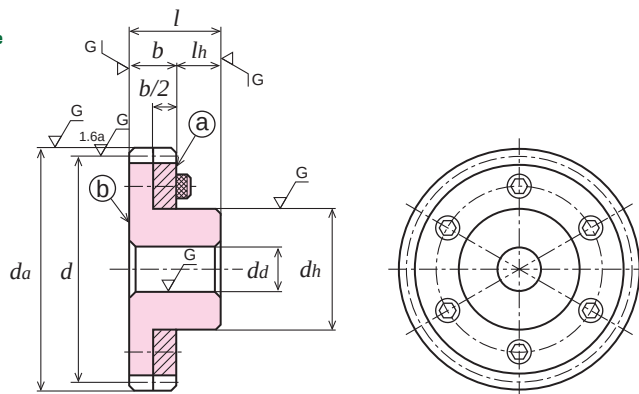
模数
MODULE

1/1.5/2

压力角 20° (普通齿)

20° PRESSURE ANGLE FULL DEPTH TOOTH

齿部高周波淬火 硬度 HRC 49-55.



本图纸仅供参考
The above sketch is for reference only.

ASG系列 ASG Series 齿面磨削加工SCM435, 440 铬钼合金钢

Material : Chromium Molybdenum Steel (ISO 34CrMo4, 42CrMo4)

单位 : mm
Dimensions : mm

产品型号 Catalogue Number	材料 Material	模数 Module	齿数 Number of Teeth	分度圆直径 Reference Diameter	齿顶圆直径 Tip Diameter	齿宽 Face Width	孔径 Bore Diameter	轮毂外径 Hub Diameter	轮毂长度 Hub Projection	全长 Overall Length	固定螺栓 Fixed Bolts	重量 Weight
<i>M</i>		<i>m</i>	<i>z</i>	<i>d</i>	<i>d_a</i>	<i>b</i>	<i>d_a(H7)</i>	<i>d_h</i>	<i>l_h</i>	<i>l</i>		<i>W(kg)</i>
ASG1S 70B — 1012	SCM	1	70	φ 70	φ 72	10	φ12	φ40	10	20	6-M4-φ 54	0.39
ASG1S 80B — 1012	SCM	1	80	φ 80	φ 82	10	φ12	φ45	10	20	6-M4-φ 62	0.51
ASG1S 100B — 1012	SCM	1	100	φ100	φ102	10	φ12	φ60	10	20	6-M5-φ 80	0.82
ASG1S 120B — 1015	SCM	1	120	φ120	φ122	10	φ15	φ80	10	20	6-M5-φ100	1.25
ASG1.5S 40B — 1515	SCM	1.5	40	φ 60	φ 63	15	φ15	φ35	15	30	6-M4-φ 46	0.41
ASG1.5S 50B — 1520	SCM	1.5	50	φ 75	φ 78	15	φ20	φ45	15	30	6-M5-φ 58	0.64
ASG1.5S 60B — 1520	SCM	1.5	60	φ 90	φ 93	15	φ20	φ60	15	30	6-M5-φ 74	1.02
ASG1.5S 80B — 1520	SCM	1.5	80	φ120	φ123	15	φ20	φ80	15	30	6-M6-φ 98	1.85
ASG2S 30B — 2015	SCM	2	30	φ 60	φ 64	20	φ15	φ35	20	40	6-M4-φ 45	0.54
ASG2S 40B — 2020	SCM	2	40	φ 80	φ 84	20	φ20	φ50	20	40	6-M5-φ 62	1.01
ASG2S 50B — 2020	SCM	2	50	φ100	φ104	20	φ20	φ60	20	40	6-M6-φ 78	1.59
ASG2S 60B — 2025	SCM	2	60	φ120	φ124	20	φ25	φ80	20	40	6-M6-φ 98	2.42

齿部高周波淬火 硬度 HRC 49-55.

Gear tooth surface completed with induction hardening, Hardness HRC49 to 55.

注：使用时的注意事项

1. 在装配之前，请确认齿轮a与b的缝隙间有无异物。
2. 当对控制侧隙齿轮的a齿轮与b齿轮用固定用螺栓进行固定时。先对a齿轮和b齿轮的位置进行调整，使其刚好可以在侧隙最小的情况下与对方齿轮相啮合。并在此位置用适当的扭矩夹紧6个螺栓，固定控制侧隙齿轮。然后将两个齿轮啮合，旋转一周。如果出现因为侧隙不足而旋转吃力的情况，请再次进行调整。
3. 追加加工时，请用软爪三爪卡盘进行定心。如果加工精度不好，会出现无法缩小侧隙量的现象。同时注意避免对齿轮表面的损伤。
4. 当要进一步缩小啮合侧隙量时，控制侧隙齿轮可换另一个齿与对方齿轮啮合，就有可能得到更小的侧隙。
5. 请尽量避免进行齿孔内径的加工。
6. KG的控制侧隙研磨齿轮的内径是不可以追加加工的。

容许传达动力表 弯曲强度 (kW)

Allowable transfer capability table (kW) Bending Strength

产品型号 Catalogue Numbers	转速/min revolution/min					
	400	800	1,200	1,500	1,800	2,500
ASG1S 70B — 1012	1.38	2.77	4.01	4.90	5.79	7.66
ASG1S 80B — 1012	1.62	3.21	4.62	5.67	6.67	8.71
ASG1S 100B — 1012	2.09	4.05	5.84	7.13	8.27	10.70
ASG1S 120B — 1015	2.56	4.87	7.02	8.45	9.73	12.67
ASG1.5S 40B — 1515	2.36	4.72	6.95	8.49	10.02	13.45
ASG1.5S 50B — 1520	3.12	6.22	8.98	10.99	12.95	17.03
ASG1.5S 60B — 1520	3.89	7.64	11.01	13.47	15.76	20.38
ASG1.5S 80B — 1520	5.46	10.40	15.01	18.04	20.79	27.06
ASG2S 30B — 2015	3.84	7.67	11.29	13.80	16.27	21.85
ASG2S 40B — 2020	5.60	11.10	15.99	19.59	23.06	30.11
ASG2S 50B — 2020	7.40	14.37	20.72	25.28	29.32	37.96
ASG2S 60B — 2025	9.23	17.58	25.36	30.49	35.13	45.73

上述数值相当于JGMA公式,仅供参考。The above numerical values are equivalent to JGMA formulas as reference only.

动力换算公式请确认册别的KG综合产品目录的P26页。Please refer to the conversion formulas of power on page26 in KG CATALOGUE.

KG控制侧隙研磨齿轮可与其他齿轮制造商的齿轮相配对。

但是为了得到最佳的效果，建议相配对齿轮也使用KG研磨齿轮系列。

KG-Ground Control Backlash Spur gear is able to match with other gear makers however it is advisable to use KG-Ground Spur gear series for best result.

Precaution of Usage.

1. Before assembly ensure dust free between gear ㊸ and ㊹ .
2. Firstly fix gear ㊸ and ㊹ to form Ground Control Backlash Gear and put back all the fixed bolts (6 pieces) without tightening.
3. Secondly assemble match gear to form Ground Control Backlash Gear, and tighten the fixed bolts (6 pieces) equally space between them. If possible use a dial gauge.
4. Ensure to provide minimum backlash between Ground Control Backlash Spur Gear and match gear.
5. If unable to obtain your requisite backlash, shift to another position of each gear tooth between Ground Control Backlash Gear and match gear to adjust a less backlash.
6. Additional machining for bore is not advisable for our KG-Control Backlash Spur Gears.

容许传达动力表 齿面强度 (kW)

Allowable transfer capability table (kW) Surface Durability

	转速/min revolution/min					
	400	800	1,200	1,500	1,800	2,500
	0.86	1.77	2.62	3.25	3.87	5.23
	1.14	2.33	3.43	4.25	5.06	6.74
	1.82	3.64	5.37	6.64	7.79	10.28
	2.66	5.24	7.73	9.42	10.98	14.57
	0.95	1.93	2.90	3.58	4.26	5.84
	1.50	3.07	4.52	5.60	6.67	8.95
	2.19	4.43	6.52	8.08	9.55	12.60
	3.99	7.86	11.60	14.14	16.47	21.85
	1.26	2.58	3.86	4.77	5.69	7.78
	2.29	4.66	6.85	8.51	10.12	13.48
	3.64	7.29	10.74	13.28	15.57	20.56
	5.32	10.48	15.47	18.85	21.95	29.13