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力。 高精度。合作伙伴

power. precision. partnership.

高精度变速器

precision gearboxes

上海厚凯机电设备有限公司
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NEUGART

介绍 *editorial*

高强度、高精度。
良好的合作伙伴关系。

尊敬的女士们，先生们，
超强动力，高精度以及良好的合作伙伴关系是本公司80多年来始终贯彻执行的经营理念。

今天呈现在您面前的全新编辑的产品目录中，将用90多页的篇幅向您介绍我们多年的宝贵经验和公司专业实力。

当前的供货目录中包括许多成熟的，具有创新和技术性的驱动-/变速器解决办法。 本公司可以向您提供六种不同的行星齿轮传动减速器系列，分别具备经济、高精度和高效等不同应用特点。 作为您卓越的技术合作伙伴我们还将研发并生产高精度齿轮啮合部件以及完全遵照客户需求的特殊变速器。

特别说明： WPLN代表了变速器行业技术标准。 新型高精度锥齿轮变速器的运行噪音明显降低、其具有坚固的结构设计、高效以及完美的实际应用。

如果您对产品目录2009或我们的产品/服务有疑问，欢迎随时查询，我们时刻为您服务。

Bernd Neugart
管理伙伴
managing partner

Impress with power and precision.
Inspire with partnership.

Dear Sir or Madame,
Power, precision and partnership – these values characterise our business philosophy and our work, and have for over 80 years.

In our newly designed and newly structured catalogue, introduced to you today, we present our experience and performance.

The current product range includes numerous innovative and technologically mature drive and gear solutions. We now offer six different planetary gear series for the sectors Economy and Precision. As a competent technology partner, we develop and manufacture highly precise gear parts as well as specialised gearboxes – adapted precisely to your specific needs.

Please contact us if you have any questions about the 2009 catalogue, our products or services – we're happy to help.

Thomas Herr
管理伙伴
managing partner

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注重细节，打造完美。公司产品。

高效、功能强劲，
高精度行星齿轮传动变速器。

无论在机床、铸塑机中，还是在包装机、印刷机和纺织器械中，或在自动控制技术、喷涂机械手设备中：我们的高精度行星齿轮传动变速器对于各种不同的应用领域將是最好的选择。
此外本公司还提供非标准类的器械。
本公司将持续研发高品质的驱动设备。

创新和独特：
特殊变速器。

坚固的结构设计及高性能、特殊的结构需求。食品级的认证或独特的设计:本公司可以满足客户在机械领域中的各种复杂要求。 高素质的技术工程师设计变速器系统并解决变速器各种问题。 服务、成本和质量恰到好处。
创新优势：本公司将长期的专业经验以及不断的研发成果运用到客户解决办法中。

值得信赖、高精度：
我们的结合点。

本公司提供驱动技术领域里的各种部件。根据客户要求。

概览：
> 产品种类丰富 - 标准变速器，特殊变速器和啮合件。
> 六种标准产品系列 - 多种选择。
> 特殊变速器 - 根据客户要求量身打造。
> 啮合件 - 提供不同的加工方式。
> 高质量、灵活性 - 理想供货时间。

Perfection - in every detail. Our products.

Powerful and efficient:
Our precision planetary gearboxes.

Whether in machine tools or die-casting machines, in packaging, printing and textile machines, in automation technology or in robotic painting systems: Our precision planetary gearboxes are ideally suited for numerous applications. We offer much more than just standard. The high-quality drive elements are continuously being developed further.

At a glance:
> *A broad product range – standard gearboxes, specialised gearboxes and gear parts.*
> *Six strong standard model series – many options.*
> *Specialised gearboxes – individually customised to your needs.*
> *Gear parts – a wide range of options are available.*
> *High quality and flexibility – with optimal delivery times.*

Innovative and individual:
Our specialised gearboxes.

Compact form and high performance, special construction requirements. Food grade certification or individual design: We fulfil even your most complex requirements – in all sectors of machine building. The qualified specialists of our engineering department design gearbox solutions and systems. According to your performance, quality and quality needs.Your benefit from innovation: We utilise our experience and at the same time take advantage of new developments, integrating them into our customer solutions.

Reliable and highly precise:
Our gear parts.

We offer you numerous additional components relating to drive technology. Perfect for your needs and demands.

质量好。
我们的产品质量。

顾客满意是本公司的终极目标，产品质量和服务是我们的首要任务。

本公司的质量-环保理念保证并保持了我们在国际市场上不断地取得巨大成功。

概览：

> 目标明确。
针对领导层、所有工作人员以及工作质量本公司制定了具体的质量目标。

> 承诺。应重点强调的是我们是一支高效、高素质的团队。除了权威的培训与指导之外,我们的员工会相应的对自己的任何行为负责。

> 持续。
我们坚持完善每个工作流程，从小做起构成了我们进行重大革新和完善的基石

> 可证明的。
我们设计制定、执行了质量-环保管理系统并对其进行详细记录，该管理系统涵盖了本公司所有产品。 在质量-环保管理系统文件中包含了所有一般重要规则。

Power - at a high level.
Our quality.

Your satisfaction is our measuring stick - that's why the quality of our products and services are always our top priority. With our quality and environmental policy we secure and expand our economic success on all international markets.

At a glance:

> Goal oriented.We declare concrete quality goals - under the responsibility of the management and involvement of all employees as well as consideration of the quality of work.

> Committed. We put emphasis on a highly motivated and qualified team. In addition to training and instruction, our employees receive authority as well as responsibility for their activities.

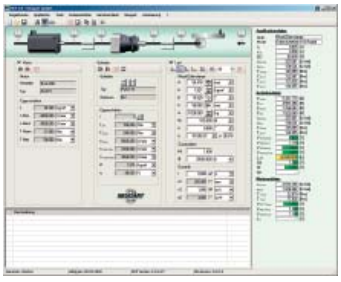
> *Consistent.*
We are in a process of continuous improvement – and we connect the large steps of innovation with the small steps of continual optimisation

> *Verifiable.*
We maintain and document a comprehensive quality and environment management system that comprises all phases of the rendering goods and services. All regulations relevant to the standards are described in the documentation of the QM/EM system.

尽情享用。
我们的服务。

我们不仅创造产品，还有根据不同功能，以经济、长远的方式解决各种不同的问题。 对此，本公司期待与您的合作以及为您提供更为舒适的服务。

> 处于领先地位：
专业技能和技术。
创新的、先进的生产工艺值得信赖，高素质的员工队伍值得信赖。 本公司免费提供NCP传动系设计软件。 在网页下载区域为您提供CAD制图，尺寸图或使用说明。



> 直接来讲：
本公司提供由咨询到研发设计的服务。您的问题就是我们的任务： 我们向您提供咨询服务并与您一起讨论研发新的、适当的解决问题的办法。 我们员工中的5%在设计和研发部门工作。

> 对所有情况：
高效。
生产面积总计扩建11.000 m²，这样足以保证我们标准产品的理想供货时间。 另外您可从我们高品质的产品中获得公平的市场价格以及长期的成本优势。

Simply greater benefit.
Our service.

We don't just make products, we create solutions - functional, economical and forward-looking. Therefore, intensive collaboration and the right service for you are important to us.

> *From one source:*
From consulting to development. Your task, our job: We provide consulting and develop new and customised solutions together with you. Roughly 5% of our employees work in development and design.

> *At a new level:*
Know-how and technology. Trust in innovative and proven manufacturing methods and in the knowledge of our employees. NCP, the design software for the power train, is available to you at no cost. And our website offers you a comprehensive download area – with CAD drawings, dimension sheets or operating instructions.

> *On all accounts:*
Focus on efficiency. With our expanded production area of 11,000 m² we can guarantee optimal delivery times for our standard products. You also profit from fairly calculated market prices, from permanent cost optimisation - with consistent high quality.

公司网络全球化。
竭诚为您服务。

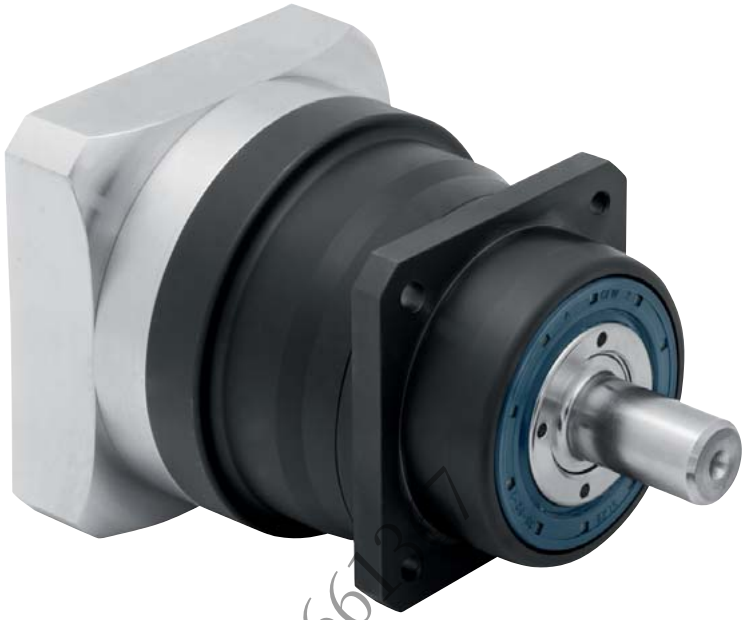
本公司在产品质量、技术支持和服务上的高标准要求得到了国际认可： 在全世界所有重要的工业国家中我们拥有超过20家代理和分支机构。

本公司只在德国进行产品制造。 在美国和中国的组装厂可以满足不同地区的需求并保证供货时间和货物调度的灵活性。

Globally active for you.
Our network.

Our high standard in product quality, support and service appreciated internationally: With over 20 representatives and branches, we are represented in all important industrial nations.

We manufacture our products exclusively in Germany. In the USA and China, our assembly factory serve regional markets, guaranteeing a high level of flexibility for adaptations as well as the shortest delivery times.



最高标准精度

The highest level of precision

PLN系列产品集创新、高效和经济于一身。
无论转矩、同步性还是运行噪音 - 该系列产品在各个功能领域都成绩非凡。

With our PLN model series we present a perfect combination of innovation, efficiency and economy. Whether torque, synchronous run or operating noise - this attractive model series is successful in every aspect.

> 转动间隙小 (<1´)
> 输出转矩高
> PCS-2标准配置
> 效率高 (98%)
> 齿轮经过精确珩磨
> 14种减速比 i=3,...,100
> 噪音低 (< 58 dB(A))
> 质量高 (ISO 9001)
> 安装位置随意
> 电机安装简便
> 终身润滑
> 其它选件
> 同向运转
> 平衡的电机齿轮

> *minimal backlash (<1´)*
> *high output torque*
> *PCS-2 is standard*
> *high degree of efficiency (98%)*
> *grinded and honed gearing*
> *14 Transmission ratios i=3,..., 100*
> *low noise (< 58 dB(A))*
> *high quality (ISO 9001)*
> *universal mounting positions*
> *simple motor mounting*
> *permanent lubrication*
> *further options*
> *equidirectional rotation*
> *balanced motor pinion*

型号	size		PLN 70	PLN 90	PLN 115	PLN 142	PLN 190	i (1)	Z (2)
额定输出扭矩 T_{2N}(3)(5)	nominal output torque T_{2N}(3)(5)	Nm	45	100	230	450	1000	3	
			60	140	300	600	1300	4	
			65	140	260	750	1600	5	1
			40	80	150	450	1000	8	
			27	60	125	305	630	10	
			68	110	250	780	1500	12	
			68	110	250	780	1500	15	
			77	150	300	1000	1800	16	
			77	150	300	1000	1800	20	
			65	140	260	900	1800	25	2
			77	150	300	1000	1800	32	
			65	140	260	900	1800	40	
			40	80	150	450	1000	64	
			27	60	125	305	630	100	

型号	size		PLN 70	PLN 90	PLN 115	PLN 142	PLN 190	i (1)	Z (2)
最大输出扭矩(3)(5)(8)	max. output torque(3)(5)(8)	Nm	72	160	368	720	1600	3	
			96	224	480	960	2080	4	
			104	224	416	1200	2560	5	1
			64	128	240	720	1600	8	
			43	96	200	488	1008	10	
			109	176	400	1248	2400	12	
			109	176	400	1248	2400	15	
			123	240	480	1600	2880	16	
			123	240	480	1600	2880	20	
			104	224	416	1440	2880	25	2
			123	240	480	1600	2880	32	
			104	224	416	1440	2880	40	
			64	128	240	720	1600	64	
			43	96	200	488	1008	100	

系列	line		PLN	Z (2)
寿命	lifetime	h	20.000	
寿命 以 T_{2N} x 0,88	lifetime at T_{2N} x 0,88		30.000	
急停扭矩(6)	emergency stop(6)	Nm	2倍于 T_{2N} /2 - times of T_{2N}	
满载效率(7)	efficiency with full load(7)	%	98	1
			95	2
最低工作温度(4)	min. operating temp.(4)	°C	-25	
最高工作温度(4)	max. operating temp.(4)		+90	
防护等级	degree of protection		IP 65	
润滑	lubrication		终生润滑 / life lubrication	
装配方式	mounting position		任意 / any	
电机法兰精度	motor flange precision		DIN 42955-R	

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 级数
(3) 这些数据在下列条件下测得:输出转速n_2=100min^{-1},电机在占空因数K_A=1及S1连续工作制下,温度T=30°C
(4) 参考体表面的中部
(5) 取决于电机轴的直径
(6) 1000次以内
(7) 取决于减速比, n_2=100min^{-1}
(8) 输出轴最大允许30000转 ; 见30页

(1) ratios($i=n_{an}/n_{ab}$)
(2) number of stages
(3) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(4) refering to the middle of the body surface
(5) depends on the motor shaft diameter
(6) allowed 1000 times
(7) depends on ratio, n_2=100min^{-1}
(8) allowable for 30.000 revolutions at the output shaft; see page 80

型号	size		PLN 70	PLN 90	PLN 115	PLN 142	PLN 190	Z [2]
回程间隙	backlash	arcmin	<3	<3	<3	<3	<3	1
			<5	<5	<5	<5	<5	2
	reduced backlash		<2	< 1	<1	<1	<1	
$Fr_{max.}$ 于 20.000 h[3][4]	$Fr_{max.}$ for 20.000 h[3][4]	N	3200	5500	6000	12500	21000	
$Fa_{max.}$ 于 20.000 h[3][4]	$Fa_{max.}$ for 20.000 h[3][4]		4400	6400	8000	15000	21000	
$Fr_{max.}$ 于 30.000 h[3][4]	$Fr_{max.}$ for 30.000 h[3][4]		3200	4800	5400	11400	18000	
$Fa_{max.}$ 于 30.000 h[3][4]	$Fa_{max.}$ for 30.000 h[3][4]		3900	5700	7000	13200	18500	
抗扭刚性	torsional stiffness	Nm / arcmin	6	9	20	44	130	1
			7	10	22	46	140	2
重量	weight	kg	1,9	3,3	6,9	16,0	30,5	1
			2,4	4,2	9,5	20,5	45	2
运转噪音[5]	running noise[5]	dB(A)	58	60	65	68	72	
最大输入速度[6]	max. input speed[6]	min^{-1}	14000	10000	8500	6500	6000	

型号	size		PLN 70	PLN 90	PLN 115	PLN 142	PLN 190	i [1]
最大输入速度在 50% T_{2N} 和 S1模式[6][7]	max. middle input speed at 50% T_{2N} and S1[6][7]	min^{-1}	2580	2500	1880	1180	930	3
			2800	2560	1900	1210	940	4
			3100	2990	2410	1240	970	5
			4480	4990	4100	2170	1820	8
			5210	6050	4860	2810	2460	10
			3960	4240	3200	1620	1330	12
			4420	4880	3200	1880	1550	15
			4220	4360	3320	1630	1390	16
			4690	5000	3820	1890	1620	20
			5210	5570	4410	2230	1820	25
			5640	6000	5000	2530	2220	32
			6000	6000	5500	2910	2450	40
			6000	6000	5500	4010	3410	64
			6000	6000	5500	4500	3500	100

型号	size		PLN 70	PLN 90	PLN 115	PLN 142	PLN 190	i [1]
最大输入速度在 100% T_{2N} 和 S1模式[6][7]	max. middle input speed at 100% T_{2N} and S1[6][7]	min^{-1}	2020	1820	1250	800	600	3
			2090	1720	1190	770	580	4
			2300	2030	1560	770	580	5
			3720	3850	3060	1530	1230	8
			4610	4960	3830	2170	1850	10
			2990	3070	2190	1030	830	12
			3410	3580	2190	1220	990	15
			3240	3120	2270	1030	870	16
			3670	3640	2660	1220	1030	20
			4300	4250	3280	1520	1200	25
			4620	4920	3650	1710	1500	32
			5260	5630	4380	2080	1710	40
			6000	6000	5500	3430	2860	64
			6000	6000	5500	4300	3500	100

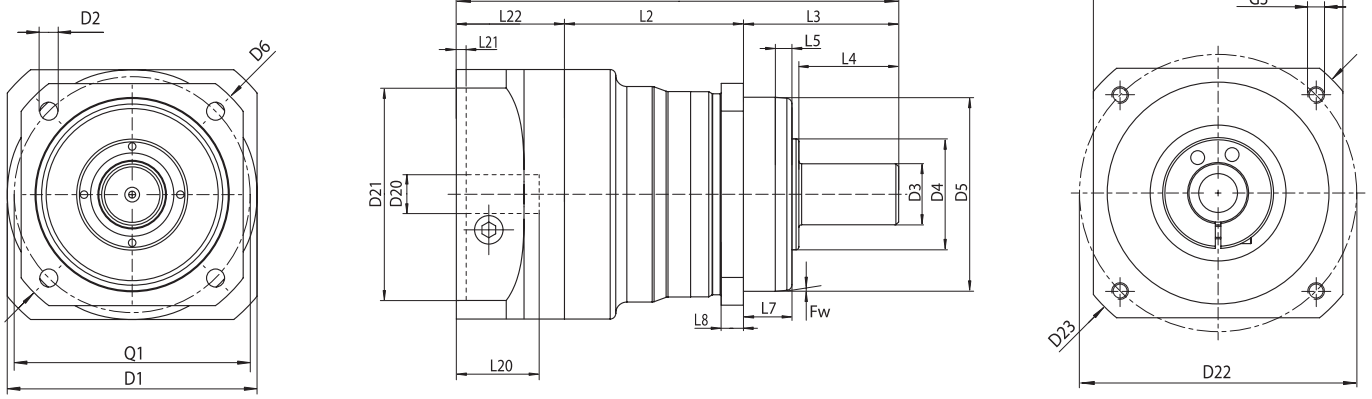
(1) 减速比($i=n_{an}/n_{ab}$)
(2) 级数
(3) 这些数据在下列条件下测得:输出转速n_2=100min-¹,电机在占空因数K_A=1及S1连续工作制下,温度T=30°C
(4) 沿着输出轴长度方向上一半处
(5) 噪音检测标准; 距离1m; 在输入转速 n_1=3000min-¹; i=5
(6) 必须保证允许的工作温度; 特殊的输入转速请联系确认
(7) 定义见81页

(1) ratios($i=n_{an}/n_{ab}$)
(2) number of stages
(3) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(4) half way along the output shaft
(5) sound pressure level; distance 1m; measured on idle running with an input speed of n_1=3000min^{-1}; i=5
(6) allowed operating temperature must be kept; other input speeds on inquiry
(7) definition see page 81

型号	size		PLN 70	PLN 90	PLN 115	PLN 142	PLN 190	i (1)
惯量(2)	inertia(2)	kgcm²	0,40	1,01	3,14	16,77	54,20	3
			0,32	0,78	2,40	12,16	39,44	4
			0,28	0,68	2,16	10,31	33,38	5
			0,25	0,59	1,93	8,73	27,49	8
			0,25	0,57	1,90	8,35	25,97	10
			0,40	1,02	3,12	16,72	54,30	12
			0,38	0,95	2,95	15,19	52,50	15
			0,35	0,89	2,74	14,52	49,90	16
			0,33	0,82	2,57	13,05	45,03	20
			0,30	0,76	2,38	11,89	40,32	25
			0,32	0,77	2,41	11,94	40,36	32
			0,29	0,70	2,23	10,79	35,68	40
			0,26	0,63	2,03	9,39	30,36	64
			0,25	0,59	1,97	8,76	27,74	100

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 转动惯量与传动轴和标准发动机轴直径D20有关。

(1) ratios($i=n_{an}/n_{ab}$)
(2) the moment of inertia relates to the input shaft and to standard motor shaft diameter D20



型号	size		PLN 70	PLN 90	PLN 115	PLN 142	PLN 190	Z [2]
所有尺寸均以毫米为单位	all dimensions in mm							
D1 法兰定位圆直径	D1 flange hole circle		68-75	85	120	165	215	
D2 安装螺孔	D2 mounting bore	4x	5,5	6,5	8,5	11	13,5	
D3 轴径	D3 shaft diameter	k6	16	22	32	40	55	
D4 轴肩	D4 shaft root	-3	35	40	45	70	80	
D5 定位凸台	D5 centering	g7	60	70	90	130	160	
D6 对角尺寸	D6 diagonal dimension		92	100	140	185	240	
D20 轴中心孔[1][4]	D20 pinion bore[1][4]		11	14	19	24	32	
D21 中心孔[1]	D21 center bore for motor[1]		60	80	95	130	180	
D22 安装孔分布圆[1]	D22 hole circle diameter[1]		75	100	115	165	215	
D23 对角尺寸	D23 diagonal dimension		92	116	145	185	240	
Fw 倒角	Fw bevel angle	°	5	5	5	5	5	
G3 安装螺纹x深度[1]	G3 mounting thread x depth[1]	4x	M5 x 10	M6 x 12	M8 x 16	M10 x 20	M12 x 24	
L1 总长[3]	L1 overall length[3]		137,5	159,5	201	276	310,5	1
			166,5	191,5	241	335	382,5	2
L2 箱体长度	L2 body length		59	64,5	61,5	91,5	116	1
			88	96,5	101,5	150,5	188	2
L3 输出轴长	L3 shaft length from output		48	56	88	110	112	
L4 轴长自定位凸台起	L4 shaft length from spigot		28	36	58	80	82	
L5 倒角长度	L5 bevel length		8	6	8	8	10	
L7 定位凸台厚度	L7 spigot depth		19	17,5	28	28	28	
L8 法兰厚度	L8 flange thickness		7	8	10	12	15	
L20 马达轴长度[3]	L20 motor shaft length[3]		23	30	40	50	60	
L21 电机定位凸台深度	L21 motor location depth		3	3,5	3,5	4	5	
L22 输入法兰厚度[3]	L22 motor flange length[3]		30,5	39	51,5	74,5	82,5	
Q1 减速机截面	Q1 gearbox section	□	70	80	110	142	190	
Q3 法兰截面[1]	Q3 flange section[1]		70	90	115	142	190	

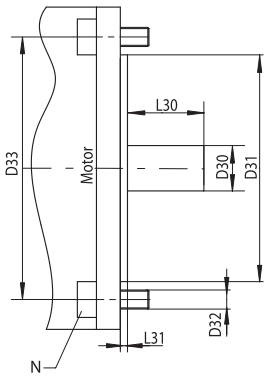
[1] 这些参数与所配套的电机型号有关，详见第12页
[2] 级数
[3] 如果所配的电机轴 L20 比表中所给尺寸更长，那么L22和L1应根据所配电机轴长度适当加长
[4] 于 j6; k6

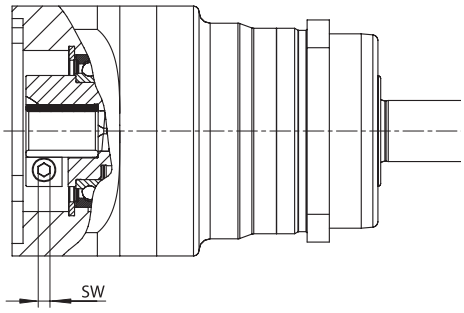
[1] dimensions refer to the mounted motor-type, see page 12
[2] number of stages
[3] for longer motor shafts L20 applies: The measured motor flange length L22 and overall length L1 will be lengthened
[4] for shaft fit j6; k6

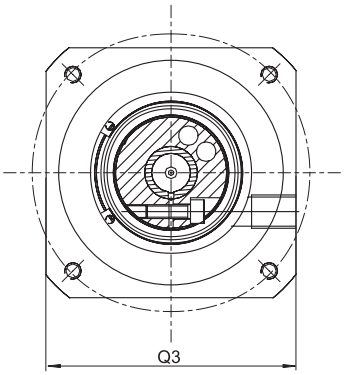
OP 2: 可能的电机装配方式

OP 2: possible motor mounting

页 page 77 更多的选配方式 other options







型号	size		PLN 70		PLN 90		PLN 115		PLN 142		PLN 190	Z [2]
D30 电机轴直径[1][5]	D30 motor shaft diameter[1][5]	mm	8/9/9,525/10/11/12/14/16/19		9,525/10/11/12/12,7/14/16/19/22/24		11/12,7/14/15,87/16/19/22/24/28/32/35		19/22/24/28/32/35/38/42		24/28/32/35/38/42/48	
D31 电机定位凸台[3]	D31 motor spigot[3]		任意/any		任意/any		任意/any		任意/any		任意/any	
D32 轴中心孔[3]	D32 pinion bore[3]		任意/any		任意/any		任意/any		任意/any		任意/any	
D33 安装孔分布圆[3]	D33 hole circle diameter[3]		任意/any		任意/any		任意/any		任意/any		任意/any	
L30 最短马达轴长度[1]	L30 min. motor shaft length[1]	mm	16 (19[6])		19 (21[7])		21 (26[8])		26 (29[9])		30	
L31 定位凸台厚度	L31 spigot depth		任意 / any		任意 / any		任意 / any		任意 / any		任意 / any	
N 安装孔的数量	N numbers of mounting bores		4		4		4		4		4	
Q3 法兰截面[1]	Q3 flange section[1]	□	70		90		115		140		190	
最大.电机重量[4]	max. motor weight[4]	kg	10		15		34		50		75	
马达类型[1]	motor type[1]		B5		B5		B5		B5		B5	
紧固螺丝扭矩	torque clamping screw	Nm	4,5	9,5	9,5	16,5	16,5	40	40	75	75	
SW 内六角扳手型号	SW wrench width	mm	3	9,5	4	5	5	6	6	8	8	

[1] 其它尺寸请联系确认
[2] 级数
[3] 如果可能请给出法兰的相关参数
[4] 与电机装配的水平度和稳定性有关
[5] 与电机轴配合精度: j6; k6
[6] D30 > 14 mm
[7] D30 > 19 mm
[8] D30 > 24 mm
[9] D30 > 35 mm

[1] other dimensions on inquiry
[2] number of stages
[3] if possible with the given flange dimensions
[4] refered to horizontal and stationary mounting
[5] shaft fit: j6; k6
[6] D30 > 14 mm
[7] D30 > 19 mm
[8] D30 > 24 mm
[9] D30 > 35 mm

OP 5: 花键轴

型号 size	花键轴 spline shaft	花键或键槽的长度 tooth width	Z 中心孔 Z centre bore
PLN 70	DIN 5480 - W 16 x 0,8 x 30 x 18 x 7 m	15	DIN 332 DR M5x12,5
PLN 70 OP 14	DIN 5480 - W 19 x 0,8 x 30 x 22 x 7 m	15	DIN 332 DR M6x16
PLN 90	DIN 5480 - W 22 x 0,8 x 30 x 26 x 7 m	21	DIN 332 DR M8x19
PLN 115	DIN 5480 - W 32 x 1,25 x 30 x 24 x 7m	42	DIN 332 DR M12x28
PLN 142	DIN 5480 - W 40 x 1,25 x 30 x 30 x 7m	65	DIN 332 DR M16x35
PLN 190	DIN 5480 - W 55 x 2 x 30 x 26 x 7m	65	DIN 332 DR M20x42

OP 5: spline shaft

OP 7: 带键的输出轴DIN 6885 T1 (1)

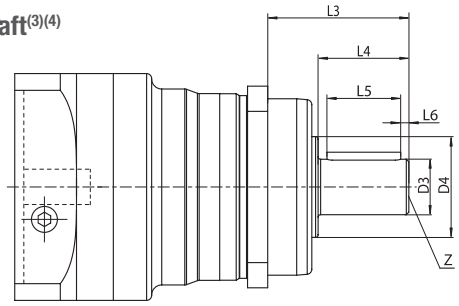
型号	size		PLN 70	PLN 70 OP14	PLN 90	PLN 115	PLN 142	PLN 190
标题	title		A5 x 5 x 25	A6 x 6 x 20	A6 x 6 x 28	A10 x 8 x 50	A12 x 8 x 65	A16 x 10 x 70
D3 [k6] 轴径	D3 [k6] shaft diameter	mm	16	19	22	32	40	55
L4 轴长自定位凸台起	L4 shaft length from spigot		28	28	36	58	80	82
L5 键长	L5 key length		25	20	28	50	65	70
L6 至轴末端的距离	L6 distance from shaft end		2	4	4	4	8	6
Z 中心孔	Z centre bore		M5 x 12,5	M6 x 16	M8 x 19	M12 x 28	M16 x 35	M20 x 42
最大输出扭矩(2)	max. output torque(2)	Nm	77	77	150	300	1000	1800

OP 7: output shaft with key DIN 6885 T1 (1)

OP 8: 特殊输出轴(3)(4)

轴径	shaft diameter	D3	
轴长自定位凸台起	shaft length from spigot	L4	
输出轴长	shaft length from output	L3	
键长	key length	L5	
至轴末端的距离	distance from shaft end	L6	
键宽	key width	B	
中心孔	centre bore	Z	

OP 8: special shaft(3)(4)

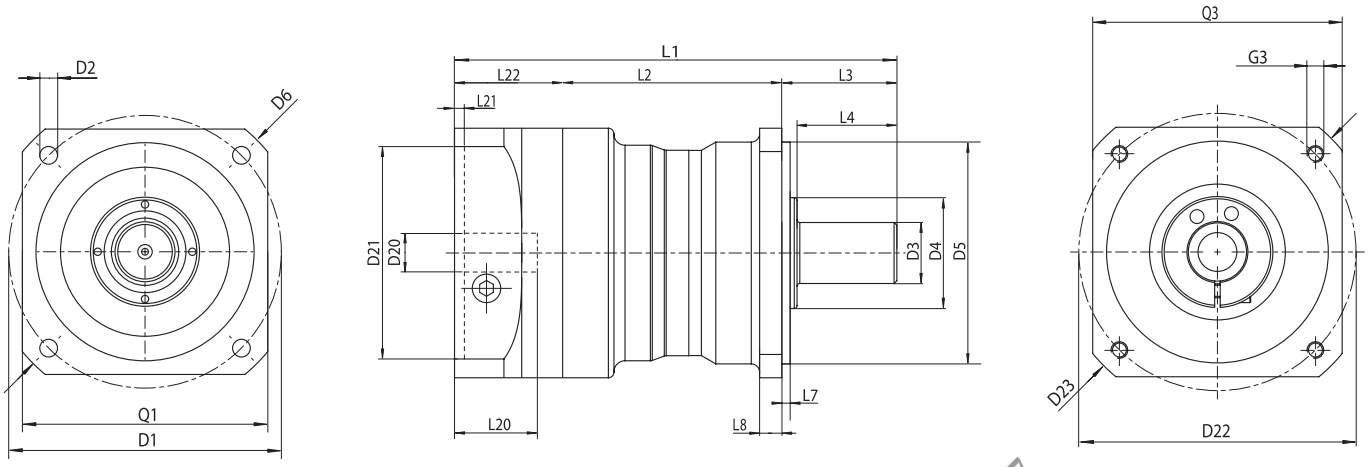


(1) 其它草图请见 OP 8
(2) 仅对峰值负载
(3) 根据您的需要将数据页或草图传真或发送给您
(4) 请联系确认

(1) sketch for variables see OP 8
(2) only for tumscent load
(3) fax page with data or send sketch with your inquiry
(4) on inquiry

OP 14: PLS系列减速器输出轴尺寸

OP 14: dimensions for the PLS output



型号	size		PLN 70 OP 14	PLN 90 OP 14	PLN 115 OP 14	PLN 142 OP 14	PLN 190 OP 14	Z(2)
所有尺寸均以毫米为单位	all dimensions in mm							
D1 法兰定位圆直径	D1 flange hole circle		75	100	130	165	215	
D2 安装螺孔	D2 mounting bore	4x	5,5	6,5	8,5	11	13,5	
D3 轴径	D3 shaft diameter	k6	19	22	32	40	55	
D4 轴肩	D4 shaft root	-3	35	40	45	70	80	
D5 定位凸台	D5 centering	h7	60	80	110	130	160	
D6 对角尺寸	D6 diagonal dimension		92	116	145	185	240	
D20 轴中心孔(1)(4)	D20 pinion bore(1)(4)		11	14	19	24	32	
D21 中心孔(1)	D21 center bore for motor(1)		60	80	95	130	180	
D22 安装孔分布圆(1)	D22 hole circle diameter(1)		75	100	115	165	215	
D23 对角尺寸	D23 diagonal dimension		92		145		240	
G3 安装螺纹x深度(1)	G3 mounting thread x depth(1)	4x	M5 x 10	M6 x 12	M8 x 16	M10 x 20	M12 x 24	
L1 总长(3)	L1 overall length(3)		137,5	159,5	201	276	310,5	1
			166,5	191,5	241	335	382,5	2
L2 箱体长度	L2 body length		75	79	85	114,5	138	1
			104	111	125	173,5	210	2
L3 输出轴长	L3 shaft length from output		32	41,5	64,5	87	90	
L4 轴长自定位凸台起	L4 shaft length from spigot		28	36	58	80	82	
L7 定位凸台厚度	L7 spigot depth		3	3	4,5	5	6	
L8 法兰厚度	L8 flange thickness		7	8	10	20	20	
L20 马达轴长度(3)	L20 motor shaft length(3)		23	30	40	50	60	
L21 电机定位凸台深度	L21 motor location depth		3	3,5	3,5	4	5	
L22 输入法兰厚度(3)	L22 motor flange length(3)		30,5	39	51,5	74,5	82,5	
Q1 减速机截面	Q1 gearbox section	□	70	90	115	142	190	
Q3 法兰截面(1)	Q3 flange section(1)		70	90	115	142	190	

(1) 这些参数与所配套的电机型号有关， 详见第12页
(2) 级数
(3) 如果所配的电机轴 L20 比表中所给尺寸更长，那么L22和L1应根据所配电机轴长度适当加长
(4) 于 j6; k6

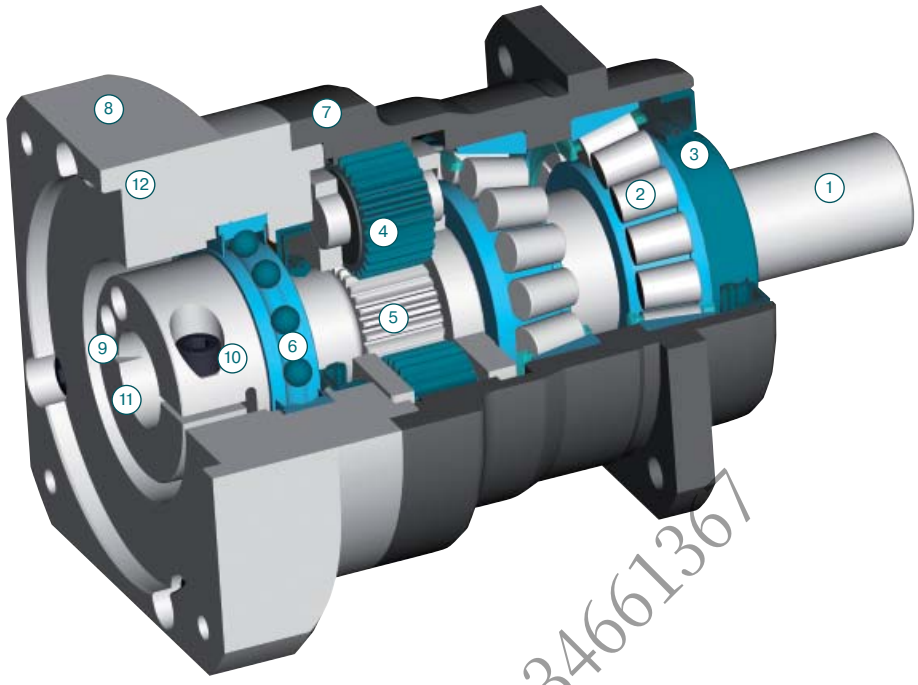
(1) dimensions refer to the mounted motor-type, see page 12
(2) number of stages
(3) for longer motor shafts L20 applies: The measured motor flange length L22 and overall length L1 will be lengthened
(4) for shaft fit j6; k6

型号	size		PLN 70 OP 14	PLN 90 OP 14	PLN 115 OP 14	PLN 142 OP 14	PLN 190 OP 14	i (1)
最大输入速度在 50% T_{2N} 和 S1模式(6)(8)	max. middle input speed at 50% T_{2N} and S1(6)(8)	min^{-1}	2380	2320	1740	1080	850	3
			2580	2370	1760	1100	860	4
			2850	2770	2220	1130	880	5
			4110	4620	3800	1990	1660	8
			4790	5610	4500	2570	2240	10
			3630	3920	2960	1480	1220	12
			4050	4510	2960	1720	1420	15
			3880	4030	3070	1490	1270	16
			4300	4620	3530	1730	1480	20
			4780	5150	4090	2040	1660	25
			5160	5980	4610	2310	2030	32
			5600	6000	5220	2660	2240	40
			6000	6000	5500	3680	3130	64
			6000	6000	5500	4300	3500	100

型号	size		PLN 70 OP 14	PLN 90 OP 14	PLN 115 OP 14	PLN 142 OP 14	PLN 190 OP 14	i (1)
最大输入速度在 100% T_{2N} 和 S1模式(6)(8)	max. middle input speed at 100% T_{2N} and S1(6)(8)	min^{-1}	1850	1680	1160	730	540	3
			1910	1590	1100	710	520	4
			2110	1870	1440	700	520	5
			3410	3560	2820	1400	1120	8
			4230	4580	3540	1980	1690	10
			2730	2820	2020	940	760	12
			3110	3290	2020	1120	900	15
			2960	2870	2090	940	790	16
			3350	3340	2450	1110	940	20
			3940	3910	3020	1380	1090	25
			4230	4520	3350	1550	1360	32
			4810	5180	4030	1900	1560	40
			5910	6000	5500	3140	2610	64
			6000	6000	5500	3940	3400	100

(1) 减速比($i=n_{an}/n_{ab}$)
(6) 必须保证允许的工作温度; 特殊的输入转速请联系确认
(8) 定义见81页

(1) ratios($i=n_{an}/n_{ab}$)
(6) allowed operating temperature must be kept; other input speeds on inquiry
(8) definition see page 81



1 输出轴
高张力不锈钢制，可最大程度确保轴的安全

2 输出轴轴承
高精度预加载荷滚柱轴承，零间隙

3 密封圈
特殊的双层密封圈，可以保留润滑剂在里面， 阻止污染物在减速机之外

4 行星轮
高精度直齿行星轮，形状和凸度经过优化，表面经过硬化及珩磨处理

5 太阳轮
高精密机器制造，优化齿轮外形， 硬化和珩磨处理提供高的承载能力，最小的磨损，阻止背隙的增加

6 太阳轮轴承
高速球轴承的浮动设计可以消除输入端的热传导，然而还可以提供以太阳轮更容易的安装位置

7 齿轮
硬化齿廓，并在硬化后珩磨以提高承载能力，最小的磨损，阻止背隙的增加

8 适配法兰
减速机输入端允许与任何伺服电机相连接，材质为铝合金导热性更好

9 夹紧环
动平衡夹紧环允许更高的转速，钢质结构可以提供更高的传输扭矩

10 夹紧螺钉
高强钢螺栓细牙螺纹可以提供更高的夹紧力

11 PCS-2系统
PCS-2系统高精度夹紧系统-当前最值得信赖的先进系统

12 安装螺孔
夹紧螺栓安装孔

1 output shaft
made of high-strength high quality steel for utmost shaft reliability

2 output shaft bearing
large high precision preloaded taper roller bearings for zero clearance

3 sealing ring
dedicated double lip seal, keeps the lubricant inside, the external contaminant outside the gearbox; IP 65

4 planet gear
precison zero helix angle gear with optimized profile modifications and crowning; case hardened and hard finished by honing

5 sun gear
precision machined optimized gear profile, case hardened and honed for high load ability, low noise run, minimum wear and consistant backlash

6 bearing for sun gear
high speed ball bearings in floating design eliminating thrust loads from thermal expansion, yet providing exact sungear position for easy mounting

7 housing with integrated ring gear
ring gear case hardened and hard finished, honed for high load ability, minimum wear, consistent backlash

8 motor adapter plate
allows to match up the gear head with virtually any servo motor, made of aluminum for enhanced thermal conductivity

9 clamping ring
balanced ring sutiable for high rpm, made of steel to allow high clamping forces for safe torque transfer

10 clamping screw
high strength steel screw with special low pitch thread to generate a high clamping force

11 PCS-2 System
Precision Clamping System - most reliable advanced system available today

12 assembly bore
access bore for the clamping screw

坚固耐用、动力强、持续低噪音

Compact, powerful, yet quiet

效率更高，运行更佳，更低的运行噪音： 该系列新型产品以低运行噪音，坚实的结构及其更为简便易行的安装方式更加值得信赖。

Higher efficiencies, better performance, quieter operation: Our new model series distinguishes itself with its reduced operating noise, compact design and its improved ease of assembly.

> 转动间隙小 (<5´)	> *minimal backlash (<5´)*
> 输出转矩高	> *high output torque*
> small installation space	> *small installation space*
> 效率高 (98%)	> *high degree of efficiency (96%)*
> 11种减速比 i=4,...,100	> *11 Transmission ratios i=4,…,100*
> 噪音低 (< 66 dB(A))	> *low noise (< 66 dB(A))*
> 质量高 (ISO 9001)	> *high quality (ISO 9001)*
> 安装位置随意	> *universal mounting positions*
> 电机安装简便	> *simple motor mounting*
> 终身润滑	> *permanent lubrication*
> 其它选件	> *further options*
> 平衡的电机连接	> *balanced motor connection*

型号	size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	i (1)	Z (2)
额定输出扭矩 T_{2N}(3)(5)	nominal output torque T_{2N}(3)(5)	Nm	45	90	160		4	1
			42	75	140		5	
			27	50	90		8	
			22	40	75		10	
			77	150	300	640	16	2
			77	150	300	800	20	
			65	140	260	700	25	
			77	108	200	360	32	
			65	135	250	450	40	
			40	80	150	450	64	
			27	60	125	305	100	

型号	size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	i (1)	Z (2)
最大输出扭矩(3)(5)(8)	max. output torque(3)(5)(8)	Nm	72	144	256		4	1
			67	120	224		5	
			43	80	144		8	
			35	64	120		10	
			123	240	480	1024	16	2
			123	240	480	1280	20	
			104	224	416	1120	25	
			123	172	320	576	32	
			104	216	400	720	40	
			64	128	240	720	64	
			43	96	200	488	100	

系列	line		WPLN	Z (2)
寿命	lifetime	h	20.000	
寿命 以 T_{2N} x 0，88	lifetime at T_{2N} x 0,88		30.000	
急停扭矩(6)	emergency stop(6)	Nm	2倍于 T_{2N} / 2 - times of T_{2N}	
满载效率(8)(7)	efficiency with full load(7)	%	96	1
			94	2
最低工作温度(4)	min. operating temp.(4)	°C	-25	
最高工作温度(4)	max. operating temp.(4)		+90	
防护等级	degree of protection		IP 65	
润滑	lubrication		终生润滑 / life lubrication	
装配方式	mounting position		任意 / any	
电机法兰精度	motor flange precision		DIN 42955-R	
????	Direction of rotation		Drive and output sides in opposite directions	

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 级数
(3) 这些数据在下列条件下测得:输出转速n2=100min-¹,电机在占空因数KA=1及S1连续工作制下,温度T=30°C
(4) 参考体表面的中部
(5) 取决于电机轴的直径
(6) 1000次以内
(7) 取决于减速比, n_2=100min^{-1}
(8) 输出轴最大允许30000转；见80页

(1) ratios($i=n_{an}/n_{ab}$)
(2) number of stages
(3) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(4) refering to the middle of the body surface
(5) depends on the motor shaft diameter
(6) allowed 1000 times
(7) depends on ratio, n_2=100min^{-1}
(8) allowable for 30.000 revolutions at the output shaft; see page 80

型号	size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	Z [2]
回程间隙[7]	backlash[7]	arcmin	<5	<5	<5	-	1
			<7	<7	<7	<7	2
$Fr_{max.}$ 于 20.000 h[3][4]	$Fr_{max.}$ for 20.000 h[3][4]	N	3200	5200	6000	-	1
			3200	5500	6000	12500	2
$Fa_{max.}$ 于 20.000 h[3][4]	$Fa_{max.}$ for 20.000 h[3][4]		4300	5900	7000	-	1
			4400	6400	8000	15000	2
$Fr_{max.}$ 于 30.000 h[3][4]	$Fr_{max.}$ for 30.000 h[3][4]		3200	5200	6000	-	1
			3200	4800	5400	11400	2
$Fa_{max.}$ 于 30.000 h[3][4]	$Fa_{max.}$ for 30.000 h[3][4]		3700	5200	6100	-	1
			3900	5700	7000	13200	2
抗扭刚性	torsional stiffness	Nm / arcmin	2,4	6,6	14,3	-	1
			2,4	11	34	58	2
重量	weight	kg	3,0	5,0	10,5	-	1
			3,9	5,3	9,2	21,5	2
运转噪音[5]	running noise[5]	dB(A)	66	67	68	70	
最大输入速度[6]	max. input speed[6]	min^{-1}	16000	14000	9500	-	1
			16000	16000	14000	9500	2

型号	size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	i [1]
最大输入速度在 50% T_{2N} 和 S1模式[6][8]	max. middle input speed at 50% T_{2N} and S1[6][8]	min^{-1}	2850	2450	1700		4
			3250	2900	1950		5
			4150	3700	2450		8
			4500	4050	2600		10
			3100	3150	2650	1700	16
			3400	3500	2900	1750	20
			3700	3900	3350	2000	25
			3800	4300	3700	2450	32
			4100	4450	3900	2600	40
			4500	5300	4700	2900	64
			4750	5700	5050	3200	100

型号	size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	i [1]
最大输入速度在 100% T_{2N} 和 S1模式[6][8]	max. middle input speed at 100% T_{2N} and S1[6][8]	min^{-1}	2100	1700	1200		4
			2450	2150	1450		5
			3450	3050	2050		8
			3900	3500	2250		10
			2550	2350	1900	1200	16
			2850	2700	2150	1200	20
			3250	3150	2650	1500	25
			3300	3650	3100	2100	32
			3700	3750	3250	2150	40
			4300	4900	4300	2550	64
			4650	5450	4800	3000	100

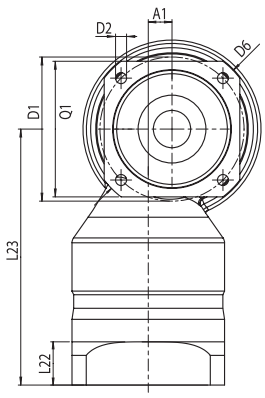
[1] 减速比($i=n_{an}/n_{ab}$)
[2] 级数
[3] 这些数据在下列条件下测得:输出转速n2=100min-¹,电机在占空因数KA=1及S1连续工作制下,温度T=30°C
[4] 沿着输出轴长度方向上一半处
[5] 噪音检测标准; 距离1m; 在输入转速 $n_1=3000min^{-1}$; i=5
[6] 必须保证允许的工作温度; 特殊的输入转速请联系确认
[7] 更低的回程间隙请联系确认
[8] 定义见81页

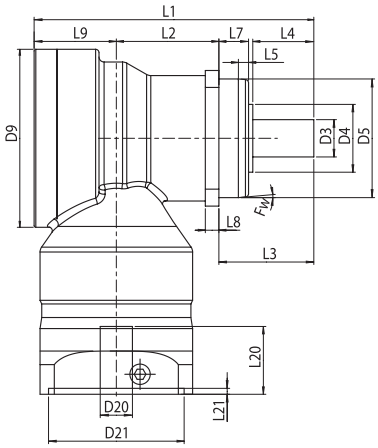
[1] ratios($i=n_{an}/n_{ab}$)
[2] number of stages
[3] these values refer to a speed of the output shaft of $n_2=100min^{-1}$ on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
[4] half way along the output shaft
[5] sound pressure level; distance 1m; measured on idle running with an input speed of $n_1=3000min^{-1}$; i=5
[6] allowed operating temperature must be kept; other input speeds on inquiry
[7] lower backlash on inquiry
[8] definition see page 81

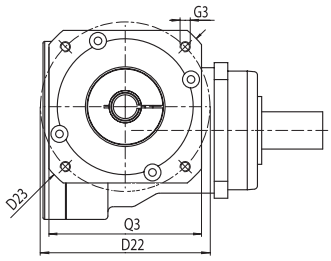
型号	size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	i (1)
惯量(2)	inertia(2)	kgcm²	0,654	1,331	5,924		4
			0,6	1,168	5,441		5
			0,532	1,004	4,989		8
			0,516	0,966	4,883		10
			0,639	0,642	1,366	6,082	16
			0,591	0,593	1,190	6,016	20
			0,590	0,591	1,186	5,500	25
			0,528	0,529	1,013	5,028	32
			0,528	0,528	1,011	5,012	40
			0,528	0,528	1,010	5,004	64
			0,514	0,514	0,970	4,892	100

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 转动惯量与传动轴和标准发动机轴直径D20有关。

(1) ratios($i=n_{an}/n_{ab}$)
(2) the moment of inertia relates to the input shaft and to standard motor shaft diameter D20







型号	size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	Z (2)
所有尺寸均以毫米为单位	all dimensions in mm						
A1 轴偏距	A1 axle offset		10	14	20	-	1
			10	10	14	20	2
D1 法兰定位圆直径	D1 flange hole circle		68-75	85	120	165	
D2 安装螺孔	D2 mounting bore	4x	5,5	6,5	8,5	11	
D3 轴径	D3 shaft diameter	k6	16	22	32	40	
D4 轴肩	D4 shaft root	-3	30	40	45	-	1
			35	40	45	70	2
D5 定位凸台	D5 centering	h7	60	70	90	130	
D6 对角尺寸	D6 diagonal dimension		92	100	140	185	
D9	D9 max. diameter		86	105	120	-	1
			86	86	105	120	2
D20 轴中心孔(1)(4)	D20 pinion bore(1)(4)		11	14	19	-	1
			11	11	14	19	2
D21 中心孔(1)	D21 center bore for motor(1)		60	80	95	-	1
			60	60	80	95	2
D22 安装孔分布圆(1)	D22 hole circle diameter(1)		75	100	115	-	1
			75	75	100	115	2
D23 对角尺寸	D23 diagonal dimension		92	116	145	-	1
			92	92	116	145	2
Fw 倒角	Fw bevel angle	°	5	5	5	5	
G3 安装螺纹x深度(1)	G3 mounting thread x depth(1)	4x	M5 x 10	M6 x 12	M8 x 16	-	1
			M5 x 10	M5 x 10	M6 x 12	M8 x 16	2
L1 总长(3)	L1 overall length(3)		137,5	165	218	-	1
			185	207	248,5	342,5	2
L2 箱体长度	L2 body length		46,5	60,5	73,5	-	1
			94	108	112	176	2
L3 输出轴长	L3 shaft length from output		48	56	88	110	
L4 轴长自定位凸台起	L4 shaft length from spigot		28	36	58	80	
L5 倒角长度	L5 bevel length		8	6	8	8	
L7 定位凸台厚度	L7 spigot depth		19	17,5	28	28	
L8 法兰厚度	L8 flange thickness		7	8	10	12	
L9 偏移长度	L9 offset length		43	48,5	56,5	56,5	
L20 马达轴长度(3)	L20 motor shaft length(3)		23	30	40	-	1
			23	23	30	40	2
L21 电机定位凸台深度	L21 motor location depth		3	3,5	3,5	-	1
			3	3	3,5	3,5	2
L22 输入法兰厚度(3)	L22 motor flange length(3)		19	25,5	27,5	-	1
			19	19	25,5	27,5	2
L23 轴高(3)	L23 axle height(3)		136	151	187,5	-	1
			136	136	151	187,5	2
Q1 减速机截面	Q1 gearbox section	□	70	80	110	142	
Q3 法兰截面(1)	Q3 flange section(1)		70	90	115	-	1
			70	70	90	115	2

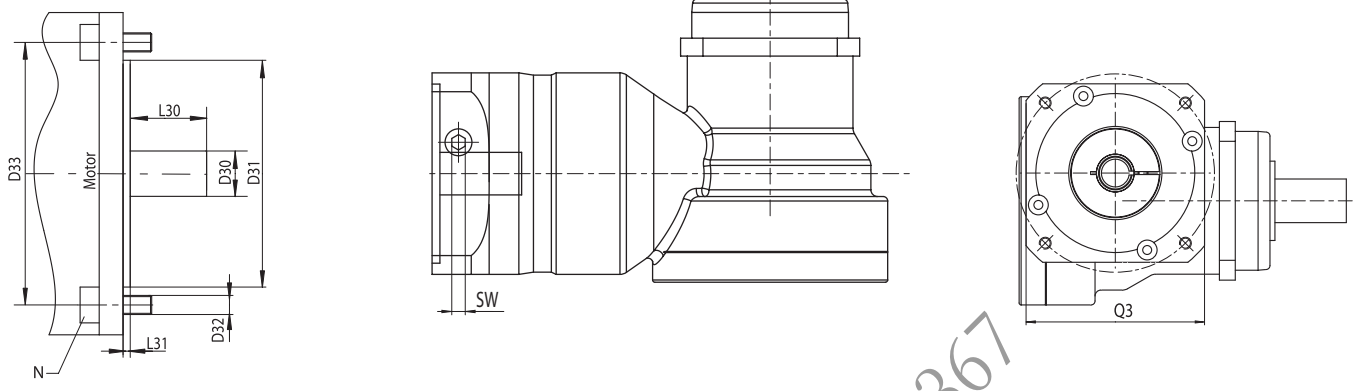
(1) 这些参数与所配套的电机型号有关，详见第24页
(2) 级数
(3) 如果所配的电机轴L20比表中所给的尺寸更长,那么L22和L23应根据所配电机轴长适当加长
(4) 于 j6; k6

(1) dimensions refer to the mounted motor-type, see page 24
(2) number of stages
(3) for longer motor shafts L20 applies: The measured motor flange length L22 and axle height L23 will be lengthened
(4) for shaft fit j6; k6

OP 2: 可能的电机装配方式

OP 2: possible motor mounting

页 page 77 更多的选配方式 other options



型号	size		WPLN 70		WPLN 90			WPLN 115			WPLN 142		Z (2)
D30 电机轴直径(1)(5)	D30 motor shaft diameter(1)(5)	mm	8/9/9,525/10/11/12/14/16/19		9,525/10/11/12/12,7/14/16/19/22/24			11/12,7/14/15,87/16/19/22/24/28/32/35			-		1
			8/9/9,525/10/11/12/14/16/19		8/9/9,525/10/11/12/12,7/14/16/19			9,525/10/11/12,7/14/15,87/16/19/22/24			11/12,7/14/15,87/16/19/22/24/28/32/35		2
D31 电机定位凸台(3)	D31 motor spigot(3)		任意 / any		任意 / any			任意 / any			任意 / any		
D32 轴中心孔(3)	D32 pinion bore(3)		任意 / any		任意 / any			任意 / any			任意 / any		
D33 安装孔分布圆(3)	D33 hole circle diameter(3)		任意 / any		任意 / any			任意 / any			任意 / any		
G4 螺纹	G4 thread		任意 / any		任意 / any			任意 / any			任意 / any		
L30 最短马达轴长度(1)	L30 min. motor shaft length(1)	mm	20 (23(6))		23 (25(7))			25 (32(8))			-		1
			20 (23(6))		20 (23(7))			23 (25(8))			25 (32(9))		2
L31 定位凸台厚度	L31 spigot depth		任意 / any		任意 / any			任意 / any			任意 / any		
N 安装孔的数量	N numbers of mounting bores		4		4			4			4		
Q3 法兰截面(1)	Q3 flange section(1)	□	70		90			115			-		1
			70		70			90			115		2
最大.电机重量(4)	max. motor weight(4)	kg	10		15			34			50		
马达类型(1)	motor type(1)		B5		B5			B5			B5		
紧固螺丝扭矩	torque clamping screw	Nm	4,5	9,5(6)	4,5	9,5	16,5(7)	9,5	16,5	40(8)	16,5	40(9)	
SW 内六角扳手型号	SW wrench width	mm	3	4(6)	3	4	5(7)	4	5	6(8)	5	6(9)	

(1) 其它尺寸请联系确认
(2) 级数
(3) 如果可能请给出法兰的相关参数
(4) 与电机装配的水平度和稳定性有关
(5) 与电机轴配合精度: j6; k6
(6) D30 > 14 mm
(7) D30 > 19 mm
(8) D30 > 24 mm
(9) D30 = 42 mm

- 根据电机输出轴承端盖（A）热调长度。

(1) other dimensions on inquiry
(2) number of stages
(3) if possible with the given flange dimensions
(4) refered to horizontal and stationary mounting
(5) shaft fit: j6; k6
(6) D30 > 14 mm
(7) D30 > 19 mm
(8) D30 > 24 mm
(9) D30 = 42 mm

- thermal length compensation with respect to the A end shield of the motor

OP 5: 花键轴[4]

OP 5: spline shaft[4]

型号 size	花键轴 spline shaft	花键或键槽的长度 tooth width	Z 中心孔 Z centre bore
WPLN 70	DIN 5480 - W 16 x 0,8 x 30 x 18 x 7 m	15	DIN 332 DR M5x12,5
WPLN 70-OP14	DIN 5480 - W 19 x 0,8 x 30 x 22 x 7 m	15	DIN 332 DR M6x16
WPLN 90	DIN 5480 - W 22 x 0,8 x 30 x 26 x 7 m	21	DIN 332 DR M8x19
WPLN 115	DIN 5480 - W 32 x 1,25 x 30 x 24 x 7m	42	DIN 332 DR M12x28
WPLN 142	DIN 5480 - W 40 x 1,25 x 30 x 30 x 7m	65	DIN 332 DR M16x35

OP 7: 带键的输出轴 DIN 6885 T1[1]

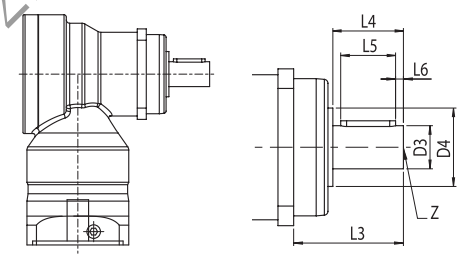
OP 7: output shaft with key DIN 6885 T1[1]

型号	size		WPLN 70	WPLN 70-OP14	WPLN 90	WPLN 115	WPLN 142
标题	title		A5 x 5 x 25	A6 x 6 x 20	A6 x 6 x 28	A10 x 8 x 50	A12 x 8 x 65
D3 [k6] 轴径	D3 [k6] shaft diameter	mm	16	19	22	32	40
L4 轴长自定位凸台起	L4 shaft length from spigot		28	28	36	58	80
L5 键长	L5 key length		25	20	28	50	65
L6 至轴末端的距离	L6 distance from shaft end		2	4	4	4	8
Z 中心孔	Z centre bore		M5 x 12,5	M6 x 16	M8 x 19	M12 x 19	M16 x 35
最大输出扭矩[2]	max. output torque[2]	Nm	77	77	150	300	1000

OP 8: 特殊输出轴[3][4]

OP 8: special shaft [3][4]

轴径	shaft diameter	D3	
轴长自定位凸台起	shaft length from spigot	L4	
输出轴长	shaft length from output	L3	
键长	key length	L5	
至轴末端的距离	distance from shaft end	L6	
键宽	key width	B	
中心孔	centre bore	Z	

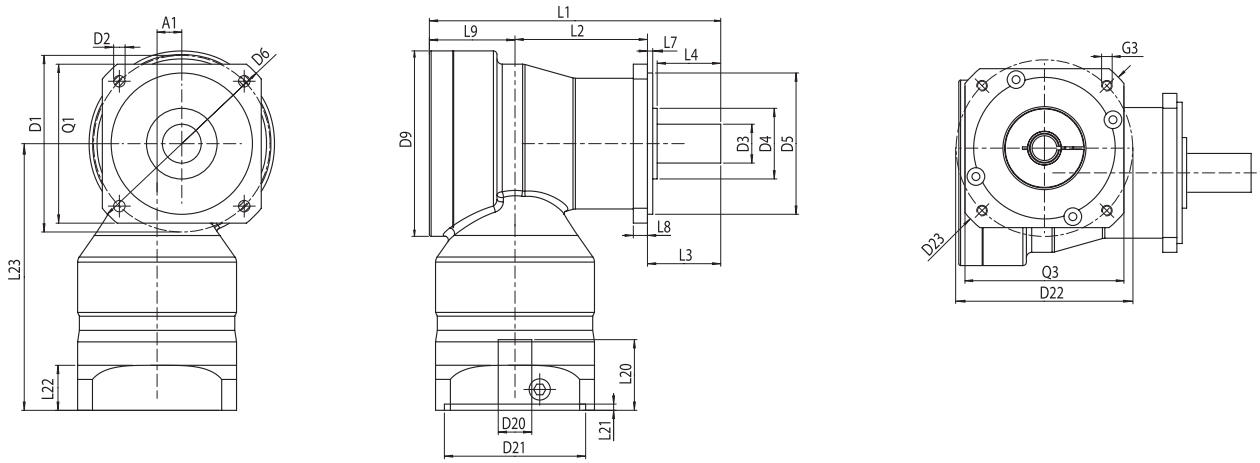


[1] 其它草图请见 OP 8
[2] 仅对峰值负载
[3] 根据您的需要将数据页或草图传真或发送给您
[4] 请联系确认

[1] sketch for variables see OP 8
[2] only for tumscent load
[3] fax page with data or send sketch with your inquiry
[4] on inquiry

OP 14: WPLS系列减速器输出轴尺寸

OP 14: dimensions for the WPLS output



型号	size		WPLN 70 OP14	WPLN 90 OP14	WPLN 115 OP14	WPLN 142 OP14	Z (2)
所有尺寸均以毫米为单位	all dimensions in mm						
A1 轴偏距	A1 axle offset		10	14	20		1
			10	10	14	20	2
D1 法兰定位圆直径	D1 flange hole circle		75	75	130	165	
D2 安装螺孔	D2 mounting bore	4x	5,5	6,5	8,5	11	
D3 轴径	D3 shaft diameter	k6	19	22	32	40	
D4 轴肩	D4 shaft root	-3	30	40	45	-	1
			35	40	45	70	2
D5 定位凸台	D5 centering	g7	60	80	90	130	
D6 对角尺寸	D6 diagonal dimension		92	116	140	185	
D9 最大直径	D9 max. diameter		86	105	120	-	1
			86	86	105	120	2
D20 轴中心孔(1)(4)	D20 pinion bore(1)(4)		11	14	19		1
			11	11	14	19	2
D21 中心孔(1)	D21 center bore for motor(1)		60	80	95		1
			60	60	80	95	2
D22 安装孔分布圆(1)	D22 hole circle diameter(1)		75	100	115		1
			75	75	100	115	2
D23 对角尺寸	D23 diagonal dimension		92	116	145		1
			92	92	116	145	2
G3 安装螺纹x深度(1)	G3 mounting thread x depth(1)	4x	M5 x 10	M6 x 12	M8 x 16		1
			M5 x 10	M5 x 10	M6 x 12	M8 x 16	2
L1 总长(3)	L1 overall length(3)		137,5	165	218		1
			185	207	248,5	342,5	2
L2 箱体长度	L2 body length		62,5	75	97		1
			110	122,5	135,5	199	2
L3 输出轴长	L3 shaft length from output		32	41,5	64,5	87	
L4 轴长自定位凸台起	L4 shaft length from spigot		28	36	58	80	
L7 定位凸台厚度	L7 spigot depth		3	3	4,5	5	
L8 法兰厚度	L8 flange thickness		7	8	10	20	
L9 偏移长度	L9 offset length		43	48,5	56,5	56,5	
L20 马达轴长度(3)	L20 motor shaft length(3)		23	30	40		1
			23	23	30	40	2
L21 电机定位凸台深度	L21 motor location depth		3	3,5	3,5		1
			3	3	3,5	3,5	2
L22 输入法兰厚度(3)	L22 motor flange length(3)		19	25,5	27,5	-	1
			19	19	25,5	27,5	2
L23 总高度(3)	L23 axle height(3)		136	151	187,5		1
			136	136	151	187,5	2
Q1 减速机截面	Q1 gearbox section	□	70	80	110	142	
Q3 法兰截面(1)	Q3 flange section(1)		70	90	115		1
			70	70	90	115	2

(1) 这些参数与所配套的电机型号有关，详见第24页
(2) 级数
(3) 如果所配的电机轴L20比表中所给的尺寸更长,那么L22和L23应根据所配电机轴长适当加长
(4) 于 j6; k6

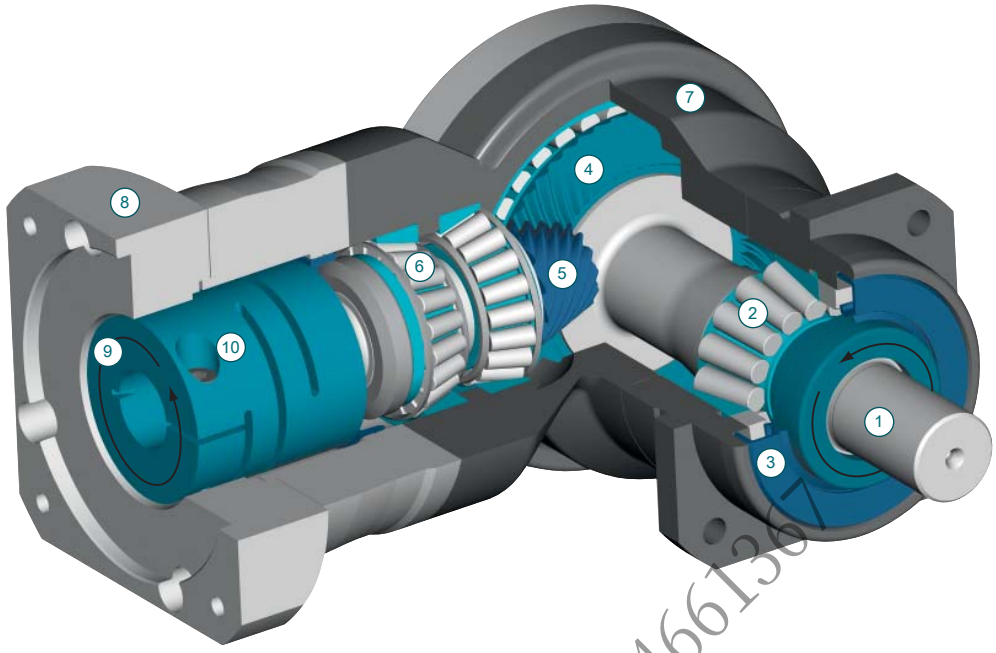
(1) dimensions refer to the mounted motor-type, see page 24
(2) number of stages
(3) for longer motor shafts L20 applies: The measured motor flange length L22 and axle height L23 will be lengthened
(4) for shaft fit j6; k6

型号	size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	i [1]
最大输入速度在 50% T_{2N} 和 S1模式[2][3]	max. middle input speed at 50% T_{2N} and S1[2][3]	min^{-1}	2650	2250	1600		4
			3000	2700	1800		5
			3850	3450	2250		8
			4150	3800	2400		10
			2900	2900	2400	1550	16
			3150	3200	2700	1600	20
			3450	3600	3100	1850	25
			3550	3950	3450	2300	32
			3800	4150	3600	2400	40
			4200	4900	4350	2700	64
			4450	5300	4700	3000	100

型号	size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	i [1]
最大输入速度在 100% T_{2N} 和 S1模式[6][8]	max. middle input speed at 100% T_{2N} and S1[6][8]	min^{-1}	1900	1600	1100		4
			2250	1950	1300		5
			3200	2850	1850		8
			3600	3250	2050		10
			2350	2150	1700	1100	16
			2600	2450	1950	1100	20
			3000	2850	2400	1350	25
			3050	3350	2850	1950	32
			3400	3450	2950	2000	40
			4000	4550	4000	2350	64
			4350	5050	4450	2800	100

[1] 减速比($i=n_{an}/n_{ab}$)
[2] 必须保证允许的工作温度; 特殊的输入转速请联系确认
[3] 定义见81页

[1] ratios($i=n_{an}/n_{ab}$)
[2] allowed operating temperature must be kept; other input speeds on inquiry
[3] definition see page 81



1 输出轴
高张力不锈钢制，可最大程度确保轴的安全

2 输出轴轴承
高精度预加载荷滚柱轴承，零间隙

3 密封圈
特殊的双层密封圈，可以保留润滑剂在里面， 阻止污染物在减速机之外

4 准双曲面轮
啮合精确、荷载能力极高且运行安静

5 准双曲面齿轮
啮合精确、荷载能力极高且运行安静

6 驱动轴轴承
高精度预加应力圆锥滚子轴承，驱动轴间无间隙

7 变速器外壳
黑色铝制外壳防腐蚀、重量轻且安装简便

8 适配法兰
减速机输入端允许与任何伺服电机相连接，材质为铝合金导热性更好

9 联轴器
联轴器已校过平衡，支持高转速，夹紧力强，确保转矩安全传输

10 夹紧螺钉
高强度钢制螺栓，确保转矩安全传输

1 output shaft
made of high-strength high quality steel for utmost shaft reliability

2 output shaft bearing
large high precision preloaded taper roller bearings for zero clearance

3 sealing ring
dedicated double lip seal, keeps the lubricant inside, the external contaminant outside the gearbox; IP 65

4 hypoid gear
Gearing optimised for maximal load capacity and quiet operation

5 hypoid pinion
Gearing optimised for maximal load capacity and quiet operation

6 Drive shaft bearing
pretensioned precision tapered roller bearing for zero play of the drive shaft

7 gearbox housing
black corrosion-protected housing made of aluminium for minimal mass and optimal ease of mounting

8 motor adapter plate
allows to match up the gear head with virtually any servo motor, made of aluminum for enhanced thermal conductivity

9 Coupling
balanced coupling for high rotational speeds and strong tension force for reliable transfer of torques

10 clamping screw
heavy-duty steel screw for reliable transfer of torques

体积小且出力大

For tough situations

PLF减速机能满足一些非常特殊的需求 高刚度、
高性能和结构紧凑短小是该系列产品的最主要特点。

Strong and compact: the PLFN gearboxes fulfill special demands. This gearbox model series is characterised by a highest level of stiffness paired with high performance, low backlash and compactness.

> 最低的回程间隙(<1´)	> *lowest backlash (<1´)*
> 最大的输出扭矩	> *highest output torques*
> 最高的抗扭刚性	> *highest tilting stiffness*
> PCS-2标准配置	> *PCS-2 is standard*
> 高效率 (98%)	> *high efficiency (98%)*
> 齿轮经过打磨及精确珩磨	> *grinded and honed geared parts*
> 12 级减速 i=4，...，100	> *12 ratios i=4,…,100*
> 低噪音 (< 65 dB(A))	> *low noise (< 65 dB(A))*
> 高质量(ISO 9001)	> *high quality (ISO 9001)*
> 安装位置随意	> *any mounting position*
> 简易电机装配	> *easy motor mounting*
> 终身润滑	> *life time lubrication*
> 更多的选配方式	> *more options*
> 输出法兰符合 EN ISO 9409 要求	> *output flange similar to EN ISO 9409*
> 旋转方向：同向	> *direction of rotation equidirectional*

型号	size		PLFN 64	PLFN 90	PLFN 110	PLFN 140	i (1)	Z (2)
额定输出扭矩 T_{2N}(3)(5)	nominal output torque T_{2N}(3)(5)	Nm	60	140	300	600	4	1
			65	140	260	750	5	
			40	80	150	450	8	
			27	60	125	305	10	
			77	150	300	1000	16	2
			77	150	300	1000	20	
			65	140	260	900	25	
			77	150	300	800	32	
			65	140	260	800	40	
			65	130	260	620	50	
			40	80	150	450	64	
			27	60	125	305	100	

型号	size		PLFN 64	PLFN 90	PLFN 110	PLFN 140	i (1)	Z (2)
最大输出扭矩(3)(5)(8)	max. output torque(3)(5)(8)	Nm	96	224	480	960	4	1
			104	224	416	1200	5	
			64	128	240	720	8	
			43	96	200	488	10	
			123	240	480	1600	16	2
			123	240	480	1600	20	
			104	224	416	1440	25	
			123	240	480	1280	32	
			104	224	416	1280	40	
			104	208	416	992	50	
			64	128	240	720	64	
			43	96	200	488	100	

系列	line		PLFN	Z (2)
寿命	lifetime	h	20.000	
寿命 以 T_{2N} x 0，88	lifetime at T_{2N} x 0.88		30.000	
急停扭矩(6)	emergency stop(6)	Nm	2倍于 T_{2N} / 2 - times of T_{2N}	
满载效率(8)(7)	efficiency with full load(7)	%	98	1
			95	2
最低工作温度(4)	min. operating temp.(4)	°C	-25	
最高工作温度(4)	max. operating temp.(4)		+90	
防护等级	degree of protection		IP 65	
润滑	lubrication		终生润滑 / life lubrication	
装配方式	mounting position		任意 / any	
电机法兰精度	motor flange precision		DIN 42955-R	

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 级数
(3) 这些数据在下列条件下测得:输出转速n2=100min-¹,电机在占空因数KA=1及S1连续工作制下,温度T=30°C
(4) 参考体表面的中部
(5) 取决于电机轴的直径
(6) 1000次以内
(7) 取决于减速比, n_2=100min^{-1}
(8) 输出轴最大允许30000转；见80页

(1) ratios($i=n_{an}/n_{ab}$)
(2) number of stages
(3) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(4) refering to the middle of the body surface
(5) depends on the motor shaft diameter
(6) allowed 1000 times
(7) depends on ratio, n_2=100min^{-1}
(8) allowable for 30.000 revolutions at the output shaft; see page 80

型号	size		PLFN 64	PLFN 90	PLFN 110	PLFN 140	Z [2]
回程间隙	backlash	arcmin	< 3	< 3	< 3	< 3	1
			< 5	< 5	< 5	< 5	2
	reduced backlash		<2	<1	< 1	< 1	
$Fr_{max.}$ 于 20.000 h[3][4]	$Fr_{max.}$ for 20.000 h[3][4]	N	2400	4400	5500	12000	
$Fa_{max.}$ 于 20.000 h[3][4]	$Fa_{max.}$ for 20.000 h[3][4]		4300	8200	9500	8500	
$Fr_{max.}$ 于 30.000 h[3][4]	$Fr_{max.}$ for 30.000 h[3][4]		2100	3900	4800	11000	
$Fa_{max.}$ 于 30.000 h[3][4]	$Fa_{max.}$ for 30.000 h[3][4]		3800	7200	8400	7500	
抗扭刚性	torsional stiffness	Nm / arcmin	16	35	90	200	1
			14	30	80	180	2
重量	weight	kg	1,5	3,0	6,5	13	1
			2,2	4,0	8	16	2
运转噪音[5]	running noise[5]	dB(A)	< 65	< 65	< 68	< 70	
最大输入速度[6]	max. input speed[6]	min^{-1}	14000	10000	8500	6500	

型号	size		PLFN 64	PLFN 90	PLFN 110	PLFN 140	i [1]
最大输入速度在 50% T_{2N} 和 S1模式[6][7]	max. middle input speed at 50% T_{2N} and S1[6][7]	min^{-1}	2450	2050	1550	1150	4
			2800	2450	1950	1200	5
			4100	4050	3300	2100	8
			4850	4950	4000	2700	10
			4300	4450	3850	2150	16
			4800	5100	4500	2600	20
			5400	5850	5500	3200	25
			5900	6000	6000	4250	32
			6000	6000	6000	4900	40
			6000	6000	6000	5500	50
			6000	6000	6000	5500	64
			6000	6000	6000	5500	100

型号	size		PLFN 64	PLFN 90	PLFN 110	PLFN 140	i [1]
最大输入速度在 100% T_{2N} 和 S1模式[6][7]	max. middle input speed at 100% T_{2N} and S1[6][7]	min^{-1}	1950	1500	1050	800	4
			2150	1800	1400	850	5
			3500	3300	2650	1550	8
			4400	4250	3350	2150	10
			3350	3200	2550	1300	16
			3850	3700	3050	1550	20
			4500	4400	3900	2000	25
			4900	5050	4400	2750	32
			5600	5900	5500	3250	40
			6000	6000	6000	3850	50
			6000	6000	6000	5500	64
			6000	6000	6000	5500	100

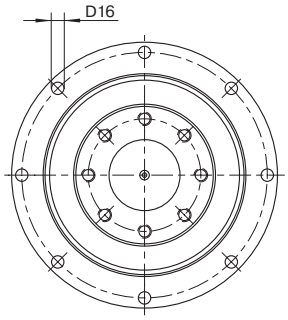
(1) 减速比($i=n_{an}/n_{ab}$)
(2) 级数
(3) 这些数据在下列条件下测得:输出转速n =100min-¹,电机在占空因数 K_A=1及S1连续工作制下,温度T=30°C
(4) 参考法兰输出轴的表面
(5) 噪音检测标准; 距离1m; 在输入转速 n_1=3000min-¹; i=5
(6) 必须保证允许的工作温度; 特殊的输入转速请联系确认
(7) 定义见81页

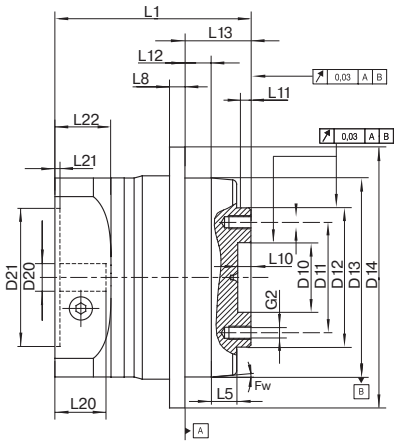
(1) ratios($i=n_{an}/n_{ab}$)
(2) number of stages
(3) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(4) refering to the face of the flange output shaft
(5) sound pressure level; distance 1m; measured on idle running with an input speed of n_1=3000min^{-1}; i=5
(6) allowed operating temperature must be kept; other input speeds on inquiry
(7) definition see page 81

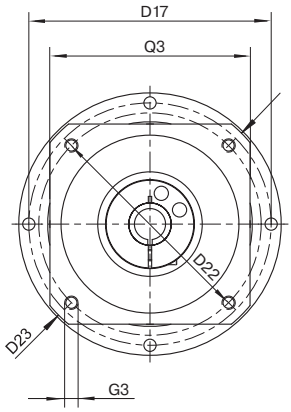
型号	size		PLFN 64	PLFN 90	PLFN 110	PLFN 140	i (1)
惯量(2)	inertia(2)	kgcm²	0,29	0,92	2,94	11,78	4
			0,26	0,77	2,51	9,70	5
			0,22	0,63	2,08	7,71	8
			0,21	0,59	2,00	7,40	10
			0,32	0,58	1,73	6,73	16
			0,30	0,56	1,65	6,51	20
			0,27	0,45	1,30	5,00	25
			0,29	0,54	1,60	6,31	32
			0,26	0,43	1,24	4,82	40
			0,22	0,28	0,80	3,08	50
			0,23	0,30	0,85	3,11	64
			0,22	0,26	0,75	2,67	100

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 转动惯量与传动轴和标准发动机轴直径D20有关。

(1) ratios($i=n_{an}/n_{ab}$)
(2) the moment of inertia relates to the input shaft and to standard motor shaft diameter D20







型号	size		PLFN 64	PLFN 90	PLFN 110	PLFN 140	Z (2)
所有尺寸均以毫米为单位	all dimensions in mm						
D10 定位凸台	D10 centering	H7	20	31,5	40	50	
D11 安装孔分布圆	D11 hole circle diameter		31,5	50	63	80	
D12 定位凸台	D12 centering	h7	40	63	80	100	
D13 定位凸台	D13 centering		64	90	110	140	
D14 外径	D14 outside diameter		86	118	145	179	
D16 轴中心孔	D16 pinion bore		4,5 8x45°	5,5 8x45°	5,5 8x45°	6,6 12x30°	
D17 安装孔分布圆	D17 hole circle diameter		79	109	135	168	
D20 轴中心孔(1)(4)	D20 pinion bore(1)(4)		11	14	19	24	1
			11	11	14	19	2
D21 中心孔(1)	D21 center bore for motor(1)		60	80	95	130	1
			60	60	80	95	2
D22 安装孔分布圆(1)	D22 hole circle diameter(1)		75	100	115	165	1
			75	75	100	115	2
D23 对角尺寸	D23 diagonal dimension		92	116	145	185	1
			92	92	116	145	2
Fw 倒角	Fw bevel angle	°	3	5	5	5	
G2 螺纹x深度	G2 thread x depth		M5x7 8x45°	M6x10 8x45°	M6x12 12x22,5°/45°	M8x15 12x30°	
G3 安装螺纹x深度(1)	G3 mounting thread x depth(1)	4x	M5x10	M6x12	M8x16	M10x20	1
			M5x10	M5x10	M6x12	M8x16	2
L1 总长(3)	L1 overall length(3)		71	89	108	157	1
			99,5	111	130	187,5	2
L5 倒角长度	L5 bevel length		6	11,5	10,5	17	
L8 法兰厚度	L8 flange thickness		4	7	8	10	
L10 定位凸台厚度	L10 length of centering		4	6	6	6	
L11 定位凸台厚度	L11 spigot depth	≥	3	6	6	6	
L12 定位凸台厚度	L12 spigot depth		10	12	12	14	
L13 输出法兰长度	L13 length of output flange		19,5	30	29	38	
L20 马达轴长度(3)	L20 motor shaft length(3)		23	30	40	50	1
			23	23	30	40	2
L21 电机定位凸台深度	L21 motor location depth		3	3,5	3,5	4	1
			3	3	3,5	3,5	2
L22 输入法兰厚度(3)	L22 motor flange length(3)		19	25,5	27,5	50,5	1
			19	19	25,5	27,5	2
Q3 法兰截面(1)	Q3 flange section(1)	□	70	90	115	142	1
			70	70	90	115	2

(1) 这些参数与所配套的电机型号有关，详见第
(2) 级数
(3) 如果所配的电机轴 L20 比表中所给尺寸更长，那么L22和L1应根据所配电机轴长度适当加长
(4) 于 j6; k6

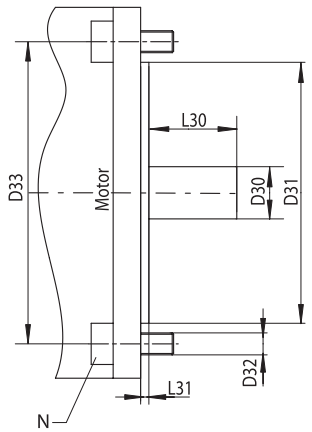
(1) dimensions refer to the mounted motor-type, see OP 2
(2) number of stages
(3) for longer motor shafts L20 applies: The measured motor flange length L22 and overall length L1 will be lengthened
(4) for shaft fit j6; k6

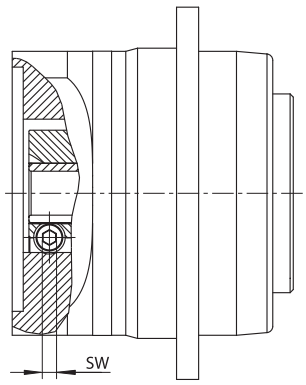
PLFN

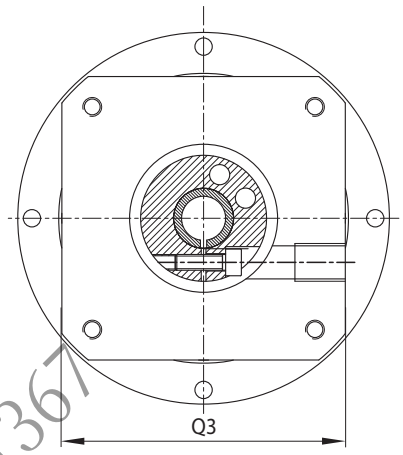
OP 2: 可能的电机装配方式

OP 2: possible motor mounting

页 page 77 更多的选配方式 other options



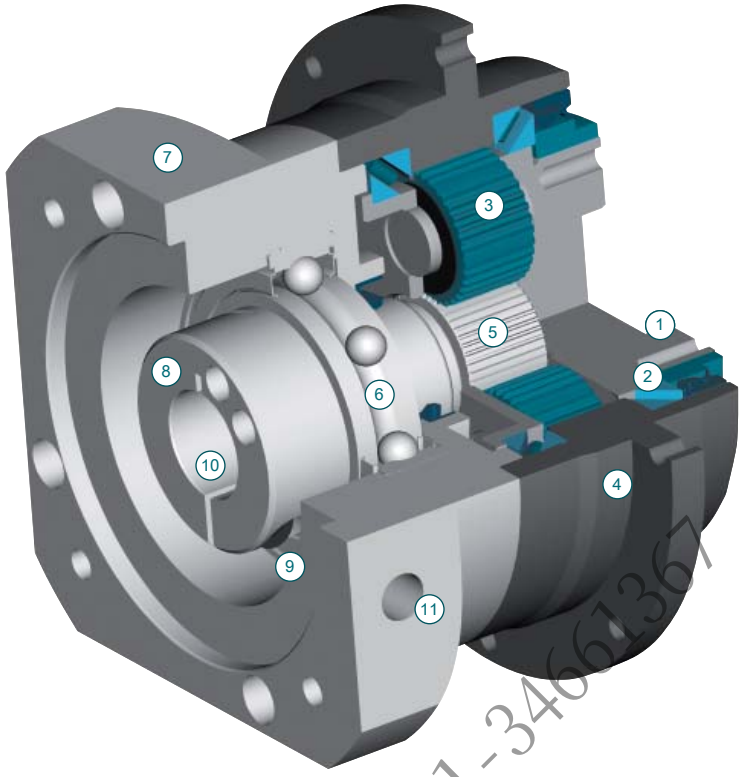




型号	size		PLFN 64		PLFN 90			PLFN 110			PLFN 140		Z [2]
D30 电机轴直径[1][5]	D30 motor shaft diameter[1][5]	mm	8/9/9,525/10/ 11/12/14/16/19		9,525/10/11/12/ 12,7/14/16/19/ 22/24			11/12,7/14/ 15,87/16/19/22/ 24/28/32/35			19/22/24/28/32/ 35/38/42/48		1
			8/9/9,525/10/ 11/12/14/16/19		8/9/9,525/10/ 11/12/14/ 16/19			9,525/10/11/12/ 12,7/14/16/19/ 22/24			11/12,7/14/ 15,87/16/19/22/ 24/28/32/35		2
D31 电机定位凸台[3]	D31 motor spigot[3]		任意/any		任意/any			任意/any			任意/any		
D32 轴中心孔[3]	D32 pinion bore[3]		任意/any		任意/any			任意/any			任意/any		
D33 安装孔分布圆[3]	D33 hole circle diameter[3]		任意/any		任意/any			任意/any			任意/any		
L30 最短马达轴长度[1]	L30 min. motor shaft length[1]	mm	16 (19[6])		19 (21[7])			21 (26[8])			26(29[9])		1
			16 (19[6])		16 (19[6])			19 (21[7])			21(26[8])		2
L31 定位凸台厚度	L31 spigot depth		任意/any		任意/any			任意/any			任意/any		
N 安装孔的数量	N numbers of mounting bores		4		4			4			5		
Q3 法兰截面[1]	Q3 flange section[1]	□	70		90			115			142		1
			70		70			90			115		2
最大.电机重量[4]	max. motor weight[4]	kg	10		15			34			50		
马达类型[1]	motor type[1]		B5		B5			B5			B6		
紧固螺丝扭矩	torque clamping screw	Nm	4,5	9,5[6]	4,5	9,5	16,5[7]	9,5	16,5	40[8]	16,5	40[9]	
SW 内六角扳手型号	SW wrench width	mm	3	4[6]	3	4	5[7]	4	5	6[8]	5	6[9]	

[1] 其它尺寸请联系确认
[2] 级数
[3] 如果可能请给出法兰的相关参数
[4] 与电机装配的水平度和稳定性有关
[5] 与电机轴配合精度: j6; k6
[6] D30 > 14 mm
[7] D30 > 19 mm
[8] D30 > 24 mm
[9] D30 > 35mm

[1] other dimensions on inquiry
[2] number of stages
[3] if possible with the given flange dimensions
[4] refered to horizontal and stationary mounting
[5] shaft fit: j6; k6
[6] D30 > 14 mm
[7] D30 > 19 mm
[8] D30 > 24 mm
[9] D30 > 35mm



1 输出轴
高张力不锈钢制，使抗扭性能达到最高

2 输出轴轴承
大型高精度预紧圆锥滚子轴承，支座两侧均无间隙（双侧轴承固定）

3 行星轮
高精度直齿行星轮，形状和凸度经过优化，表面经过硬化及珩磨处理

4 齿轮
硬化齿廓，并在硬化后珩磨以提高承载能力，最小的磨损，阻止背隙的增加

5 太阳轮
高精密机器制造，优化齿轮外形， 硬化和珩磨处理提供高的承载能力，最小的磨损，阻止背隙的增加

6 太阳轮轴承
高速球轴承的浮动设计可以消除输入端的热传导，然而还可以提供以太阳轮更容易的安装位置

7 适配法兰
减速机输入端允许与任何伺服电机相连接，材质为铝合金导热性更好

8 夹紧环
动平衡夹紧环允许更高的转速，钢质结构可以提供更高的传输扭矩

9 夹紧螺钉
高强钢螺栓细牙螺纹可以提供更高的夹紧力

10 PCS-2系统
PCS-2系统高精度夹紧系统-当前最值得信赖的先进系统

11 安装螺孔
夹紧螺栓安装孔

1 output flange shaft
made of high-strength high quality steel for utmost torsional stiffness

2 output shaft bearing
large high precision preloaded angular contact ball bearings for zero clearance on both sides of the carrier (straddle bearing support)

3 planet gear
precison zero helix angle gear with optimized profile modifications and crowning; case hardened and hard finished by honing

4 housing with integrated ring gear
ring gear case hardened and hard finished, honed for high load ability, minimum wear, consistent backlash

5 sun gear
precision machined optimized gear profile, case hardened and honed for high load ability, low noise run, minimum wear and consistant backlash

6 bearing for sun gear
high speed ball bearings in floating design eliminating thrust loads from thermal expansion, yet providing exact sungear position for easy mounting

7 motor adapter plate
allows to match up the gear head with virtually any servo motor, made of aluminum for enhanced thermal conductivity

8 clamping ring
balanced ring sutiable for high rpm, made of steel to allow high clamping forces for safe torque transfer

9 clamping screw
high strength steel screw with special low pitch thread to generate a high clamping force

10 PCS-2 System
Precision Clamping System - most reliable advanced system available today

11 assembly bore
access bore for the clamping screw

合理的经济选择

The powerful alternative

与PLS系列行星齿轮减速机相比，PLE系列行星齿轮减速机更加经济实用。
此系列产品适合那些无需极低齿隙的应用场合。

The PLE is the perfect economy alternative to the PLN. We have specifically designedthis planetary gear for all applications in which a particularly low backlash is not necessarily the main focus.

PLE

- > 最低的回程间隙 / *> low backlash*
- > 最大的输出扭矩 / *> high output torque*
- > 专利的PCS® / *> PCS-2 System*
- > 高效率(96%) / *> high efficiency (96%)*
- > 22 级减速 i=3，...，512 / *> 22 ratios i=3,...,512*
- > 低噪音 / *> low noise*
- > 高质量(ISO 9001) / *> high quality (ISO 9001)*
- > 安装位置随意 / *> any mounting position*
- > 简易电机装配 / *> easy motor mounting*
- > 终身润滑 / *> life time lubrication*
- > 更多的选配方式 / *> more options*
- > 旋转方向：同向 / *> direction of rotation equidirectional*
- > 平衡的电机齿轮 / *> balanced motor pinion*

型号	size		PLE 40	PLE 60	PLE 80	PLE 120	PLE 160	i (1)	Z (2)
额定输出扭矩 T_{2N}(3)(4)(5)	nominal output torque T_{2N}(3)(4)(5)	Nm	11	28	85	115	400	3	1
			15	38	115	155	450	4	
			14	40	110	195	450	5	
			6	18	50	120	450	8	
			16,5	44	130	210	-	9	2
			20	44	120	260	800	12	
			18	44	110	230	700	15	
			20	44	120	260	800	16	
			20	44	120	260	800	20	
			18	40	110	230	700	25	
			20	44	120	260	800	32	
			18	40	110	230	700	40	
			7,5	18	50	120	450	64	
			20	44	110	260	-	60	3
			20	44	120	260	-	80	
			20	44	120	260	-	100	
			18	44	110	230	-	120	
			20	44	120	260	-	160	
			18	40	110	230	-	200	
			20	44	120	260	-	256	
			18	40	110	230	-	320	
			7,5	18	50	120	-	512	

型号	size		PLE 40	PLE 60	PLE 80	PLE 120	PLE 160	i (1)	Z (2)
最大输出扭矩(3)(4)(5)(6)	max. output torque(3)(4)(5)(6)	Nm	17,6	45	136	184	640	3	1
			24	61	184	248	720	4	
			22	64	176	312	720	5	
			10	29	80	192	720	8	
			26	70	208	336	-	9	2
			32	70	192	416	1280	12	
			29	70	176	368	1120	15	
			32	70	192	416	1280	16	
			32	70	192	416	1280	20	
			29	64	176	368	1120	25	
			32	70	192	416	1280	32	
			29	64	176	368	1120	40	
			12	29	80	192	720	64	
			32	70	176	416	-	60	3
			32	70	192	416	-	80	
			32	70	192	416	-	100	
			29	70	176	368	-	120	
			32	70	192	416	-	160	
			29	64	176	368	-	200	
			32	70	192	416	-	256	
			29	64	176	368	-	320	
			12	29	80	192	-	512	

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 级数
(3) 这些数据在下列条件下测得:输出转速n2=100min-¹,电机在占空因数KA=1及S1连续工作制下,温度T=30°C
(4) 取决于电机轴的直径
(5) 带键: 于峰值负载
(6) 输出轴最大允许30000转；见80页

(1) ratios($i=n_{an}/n_{ab}$)
(2) number of stages
(3) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(4) depends on the motor shaft diameter
(5) with key, at tumscent load
(6) allowable for 30.000 revolutions at the output shaft; see page 80

型号	size		PLE 60/70	PLE 80/90	PLE 120/115	i (1)	Z (2)
额定输出扭矩 T_{2N}(3)(4)(5)	nominal output torque T_{2N}(3)(4)(5)	Nm	28	85	115	3	1
			38	115	155	4	
			40	110	195	5	
			18	50	120	8	
			44	130	210	9	2
			44	120	260	12	
			44	110	230	15	
			44	120	260	16	
			44	120	260	20	
			40	110	230	25	
			44	120	260	32	
			40	110	230	40	
			18	50	120	64	
			44	110	260	60	3
			44	120	260	80	
			44	120	260	100	
			44	110	230	120	
			44	120	260	160	
			40	110	230	200	
			44	120	260	256	
			40	110	230	320	
			18	50	120	512	

型号	size		PLE 60/70	PLE 80/90	PLE 120/115	i (1)	Z (2)
最大输出扭矩(3)(4)(5)(6)	max. output torque(3)(4)(5)(6)	Nm	45	136	184	3	1
			61	184	248	4	
			64	176	312	5	
			29	80	192	8	
			70	208	336	9	2
			70	192	416	12	
			70	176	368	15	
			70	192	416	16	
			70	192	416	20	
			64	176	368	25	
			70	192	416	32	
			64	176	368	40	
			29	80	192	64	
			70	176	416	60	3
			70	192	416	80	
			70	192	416	100	
			70	176	368	120	
			70	192	416	160	
			64	176	368	200	
			70	192	416	256	
			64	176	368	320	
			29	80	192	512	

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 级数
(3) 这些数据在下列条件下测得:输出转速n2=100min-¹,电机在占空因数KA=1及S1连续工作制下,温度T=30°C
(5) 取决于电机轴的直径
(8) 带键: 于峰值负载
(9) 输出轴最大允许30000转；见80页

(1) ratios($i=n_{an}/n_{ab}$)
(2) number of stages
(3) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(5) depends on the motor shaft diameter
(8) with key, at tumscent load
(9) allowable for 30.000 revolutions at the output shaft; see page 80

系列	line		PLE	Z (2)
寿命	lifetime	h	30.000	
急停扭矩(6)	emergency stop(6)	Nm	2倍于 T_{2N} / 2 - times of T_{2N}	
满载效率(8)(7)	efficiency with full load(7)	%	96	1
			94	2
			90	3
最低工作温度(4)	min. operating temp.(4)	°C	-25	
最高工作温度(4)	max. operating temp.(4)		+90	
防护等级	degree of protection		IP 54	
润滑	lubrication		终生润滑 / life lubrication	
装配方式	mounting position		任意 / any	
电机法兰精度	motor flange precision		DIN 42955-N	

型号	size		PLE 40	PLE 60	PLE 80	PLE 120	PLE 160	Z (2)
回程间隙(7)	backlash(7)	arcmin	< 24	< 16	< 9	< 8	< 6	1
			< 28	< 20	< 14	< 12	< 10	2
			< 30	< 22	< 16	< 14	-	3
$Fr_{max.}$ 于 10.000 h(3)(4)	$Fr_{max.}$ for 10.000 h(3)(4)	N	200	500	950	2000	6000	
$Fa_{max.}$ 于 10.000 h(3)(4)	$Fa_{max.}$ for 10.000 h(3)(4)		200	600	1200	2800	8000	
$Fr_{max.}$ 于 30.000 h(3)(4)	$Fr_{max.}$ for 30.000 h(3)(4)		160	340	650	1500	4200	
$Fa_{max.}$ 于 30.000 h(3)(4)	$Fa_{max.}$ for 30.000 h(3)(4)		160	450	900	2100	6000	
抗扭刚性	torsional stiffness	Nm / arcmin	1,0	2,3	6	12	38	1
			1,1	2,5	6,5	13	41	2
			1,0	2,5	6,3	12	-	3
重量	weight	kg	0,35	0,9	2,1	6,0	18	1
			0,45	1,1	2,6	8,0	22	2
			0,55	1,3	3,1	10,0	-	3
运转噪音(5)	running noise(5)	dB(A)	58	58	60	65	70	
最大输入速度(6)	max. input speed(6)	min^{-1}	18000	13000	7000	6500	6500	

(1) 级数
(2) 这些数据在下列条件下测得:输出转速n_2=100min^{-1},电机在占空因数K_A=1及S1连续工作制下,温度T=30°C
(3) 沿着输出轴长度方向上一半处
(4) 参考体表面的中部
(5) 噪音检测标准; 距离1m; 在输入转速 n_1=3000min^{-1}; i=5
(6) 1000次以内
(7) 取决于减速比, n_2=100min^{-1}
(8) 必须保证允许的工作温度; 特殊的输入转速请联系确认

(1) number of stages
(2) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(3) half way along the output shaft
(4) refering to the middle of the body surface
(5) sound pressure level; distance 1m; measured on idle running with an input speed of n_1=3000min^{-1}; i=5
(6) allowed 1000 times
(7) depends on ratio, n_2=100min^{-1}
(8) allowed operating temperature must be kept; other input speeds on inquiry

系列	line		PLE	Z [2]
寿命	lifetime	h	30.000	
急停扭矩[6]	emergency stop[6]	Nm	2倍于 T_{2N} /2 - times of T_{2N}	
满载效率[8][7]	efficiency with full load[7]	%	96	1
			94	2
			90	3
最低工作温度[4]	min. operating temp.[4]	°C	-25	
最高工作温度[4]	max. operating temp.[4]		+90	
防护等级	degree of protection		IP 54	
润滑	lubrication		终生润滑 / life lubrication	
装配方式	mounting position		任意 / any	
电机法兰精度	motor flange precision		DIN 42955-N	

型号	size		PLE 60/70	PLE 80/90	PLE 120/115	Z [2]
回程间隙[7]	backlash[7]	arcmin	< 16	< 9	< 8	1
			< 20	< 14	< 12	2
			< 22	< 16	< 14	3
$Fr_{max.}$ 于 10.000 h[3][4]	$Fr_{max.}$ for 10.000 h[3][4]	N	1000	2500	3500	
$Fa_{max.}$ 于 10.000 h[3][4]	$Fa_{max.}$ for 10.000 h[3][4]		1200	2800	2800	
$Fr_{max.}$ 于 30.000 h[3][4]	$Fr_{max.}$ for 30.000 h[3][4]		700	1700	2400	
$Fa_{max.}$ 于 30.000 h[3][4]	$Fa_{max.}$ for 30.000 h[3][4]		800	2000	2100	
抗扭刚性	torsional stiffness	Nm / arcmin	2,3	6	12	1
			2,5	6,5	13	2
			2,5	6,3	12	3
重量	weight	kg	1,1	3,2	6,6	1
			1,3	3,7	8,6	2
			1,5	4,2	10,6	3
运转噪音[5]	running noise[5]	dB(A)	58	60	65	
最大输入速度[6]	max. input speed[6]	min^{-1}	13000	7000	6500	

(1) 级数
(2) 这些数据在下列条件下测得:输出转速n_2=100min^{-1},电机在占空因数K_A=1及S1连续工作制下,温度T=30°C
(3) 沿着输出轴长度方向上一半处
(4) 参考体表面的中部
(5) 噪音检测标准; 距离1m; 在输入转速 n_1=3000min^{-1}; i=5
(6) 1000次以内
(7) 取决于减速比, n_2=100min^{-1}
(8) 必须保证允许的工作温度; 特殊的输入转速请联系确认

(1) number of stages
(2) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(3) half way along the output shaft
(4) refering to the middle of the body surface
(5) sound pressure level; distance 1m; measured on idle running with an input speed of n_1=3000min^{-1}; i=5
(6) allowed 1000 times
(7) depends on ratio, n_2=100min^{-1}
(8) allowed operating temperature must be kept; other input speeds on inquiry

型号	size		PLE 40	PLE 60	PLE 80	PLE 120	PLE 160	i (1)
最大输入速度在 50% T_{2N} 和 S1模式(2)(3)	max. middle input speed at 50% T_{2N} and S1(2)(3)	min^{-1}	5000	4500	3900	3500	1700	3
			5000	4500	3650	3500	1700	4
			5000	4500	4000	3500	2000	5
			5000	4500	4000	3500	2900	8
			5000	4500	4000	3500	-	9
			5000	4500	4000	3500	1950	12
			5000	4500	4000	3500	2600	15
			5000	4500	4000	3500	2300	16
			5000	4500	4000	3500	2700	20
			5000	4500	4000	3500	3000	25
			5000	4500	4000	3500	3000	32
			5000	4500	4000	3500	3000	40
			5000	4500	4000	3500	-	60
			5000	4500	4000	3500	3000	64
			5000	4500	4000	3500	-	80
			5000	4500	4000	3500	-	100
			5000	4500	4000	3500	-	120
			5000	4500	4000	3500	-	160
			5000	4500	4000	3500	-	200
			5000	4500	4000	3500	-	256
			5000	4500	4000	3500	-	320
			5000	4500	4000	3500	-	512

型号	size		PLE 40	PLE 60	PLE 80	PLE 120	PLE 160	i (1)
最大输入速度在 100% T_{2N} 和 S1模式(2)(3)	max. middle input speed at 100% T_{2N} and S1(2)(3)	min^{-1}	5000	4450	2400	2500	1000	3
			5000	4400	2150	2250	1000	4
			5000	4500	2650	2250	1150	5
			5000	4500	4000	3500	1750	8
			5000	4500	2700	2500	-	9
			5000	4500	3450	2500	1050	12
			5000	4500	4000	3250	1450	15
			5000	4500	4000	3000	1200	16
			5000	4500	4000	3500	1500	20
			5000	4500	4000	3500	2050	25
			5000	4500	4000	3500	2250	32
			5000	4500	4000	3500	2950	40
			5000	4500	4000	3500	-	60
			5000	4500	4000	3500	3000	64
			5000	4500	4000	3500	-	80
			5000	4500	4000	3500	-	100
			5000	4500	4000	3500	-	120
			5000	4500	4000	3500	-	160
			5000	4500	4000	3500	-	200
			5000	4500	4000	3500	-	256
			5000	4500	4000	3500	-	320
			5000	4500	4000	3500	-	512

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 必须保证允许的工作温度; 特殊的输入转速请联系确认
(3) 输出轴最大允许30000转；见81页

(1) ratios($i=n_{an}/n_{ab}$)
(2) allowed operating temperature must be kept; other input speeds on inquiry
(3) allowable for 30.000 revolutions at the output shaft; see page 81

型号	size		PLE 60/70	PLE 80/90	PLE 120/115	i (1)
最大输入速度在50% T_{2N} 和S1模式(2)(3)	max. middle input speed at 50% T_{2N} and S1(2)(3)	min^{-1}	4500	3350	3500	3
			4500	3250	3500	4
			4500	3900	3500	5
			4500	4000	3500	8
			4500	4000	3500	9
			4500	4000	3500	12
			4500	4000	3500	15
			4500	4000	3500	16
			4500	4000	3500	20
			4500	4000	3500	25
			4500	4000	3500	32
			4500	4000	3500	40
			4500	4000	3500	60
			4500	4000	3500	64
			4500	4000	3500	80
			4500	4000	3500	100
			4500	4000	3500	120
			4500	4000	3500	160
			4500	4000	3500	200
			4500	4000	3500	256
			4500	4000	3500	320
			4500	4000	3500	512

型号	size		PLE 60/70	PLE 80/90	PLE 120/115	i (1)
最大输入速度在100% T_{2N} 和S1模式(2)(3)	max. middle input speed at 100% T_{2N} and S1(2)(3)	min^{-1}	3900	2200	2500	3
			3900	2000	2250	4
			4350	2450	2250	5
			4500	4000	3500	8
			4500	2600	2500	9
			4500	3350	2500	12
			4500	4000	3250	15
			4500	4000	3000	16
			4500	4000	3500	20
			4500	4000	3500	25
			4500	4000	3500	32
			4500	4000	3500	40
			4500	4000	3500	60
			4500	4000	3500	64
			4500	4000	3500	80
			4500	4000	3500	100
			4500	4000	3500	120
			4500	4000	3500	160
			4500	4000	3500	200
			4500	4000	3500	256
			4500	4000	3500	320
			4500	4000	3500	512

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 必须保证允许的工作温度; 特殊的输入转速请联系确认
(3) 输出轴最大允许30000转 ; 见81页

(1) ratios($i=n_{an}/n_{ab}$)
(2) allowed operating temperature must be kept; other input speeds on inquiry
(3) allowable for 30.000 revolutions at the output shaft; see page 81

型号	size		PLE 40	PLE 60	PLE 80	PLE 120	PLE 160	i (1)
惯量(2)	inertia(2)	kgcm²	0,031	0,135	0,77	2,63	12,14	3
			0,022	0,093	0,52	1,79	7,78	4
			0,019	0,078	0,45	1,53	6,07	5
			0,017	0,065	0,39	1,32	4,63	8
			0,030	0,131	0,74	2,62	-	9
			0,029	0,127	0,72	2,56	12,37	12
			0,023	0,077	0,71	2,53	12,35	15
			0,022	0,088	0,50	1,75	7,47	16
			0,019	0,075	0,44	1,50	6,65	20
			0,019	0,075	0,44	1,49	5,81	25
			0,017	0,064	0,39	1,30	6,36	32
			0,016	0,064	0,39	1,30	5,28	40
			0,029	0,076	0,51	2,57	-	60
			0,016	0,064	0,39	1,30	4,50	64
			0,019	0,075	0,50	1,50	-	80
			0,019	0,075	0,44	1,49	-	100
			0,029	0,064	0,70	2,50	-	120
			0,016	0,064	0,39	1,30	-	160
			0,016	0,064	0,39	1,30	-	200
			0,016	0,064	0,39	1,30	-	256
			0,016	0,064	0,39	1,30	-	320
			0,016	0,064	0,39	1,30	-	512

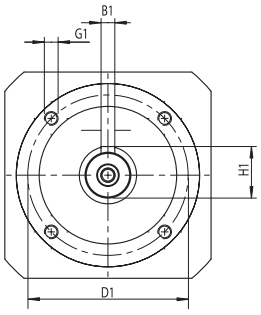
(1) 减速比($i=n_{an}/n_{ab}$)
(2) 转动惯量与传动轴和标准发动机轴直径D20有关。

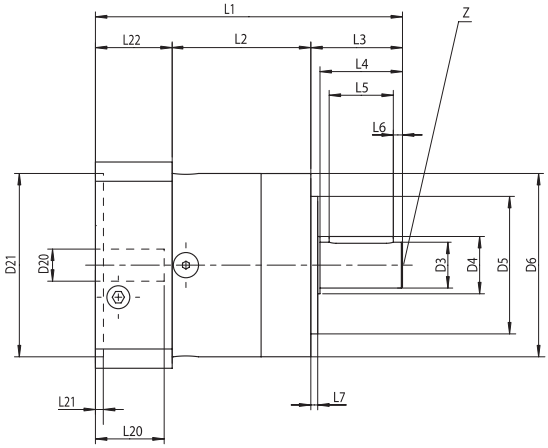
(1) ratios($i=n_{an}/n_{ab}$)
(2) the moment of inertia relates to the input shaft and to standard motor shaft diameter D20

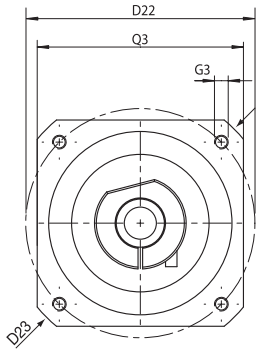
型号	size		PLE 60/70	PLE 80/90	PLE 120/115	i (1)
惯量(2)	inertia(2)	kgcm²	0,135	0,77	2,63	3
			0,093	0,52	1,79	4
			0,078	0,45	1,53	5
			0,065	0,39	1,32	8
			0,131	0,74	2,62	9
			0,127	0,72	2,56	12
			0,077	0,71	2,53	15
			0,088	0,50	1,75	16
			0,075	0,44	1,50	20
			0,075	0,44	1,49	25
			0,064	0,39	1,30	32
			0,064	0,39	1,30	40
			0,076	0,51	2,57	60
			0,064	0,39	1,30	64
			0,075	0,50	1,50	80
			0,075	0,44	1,49	100
			0,064	0,70	2,50	120
			0,064	0,39	1,30	160
			0,064	0,39	1,30	200
			0,064	0,39	1,30	256
			0,064	0,39	1,30	320
			0,064	0,39	1,30	512

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 转动惯量与传动轴和标准发动机轴直径D20有关。

(1) ratios($i=n_{an}/n_{ab}$)
(2) the moment of inertia relates to the input shaft and to standard motor shaft diameter D20



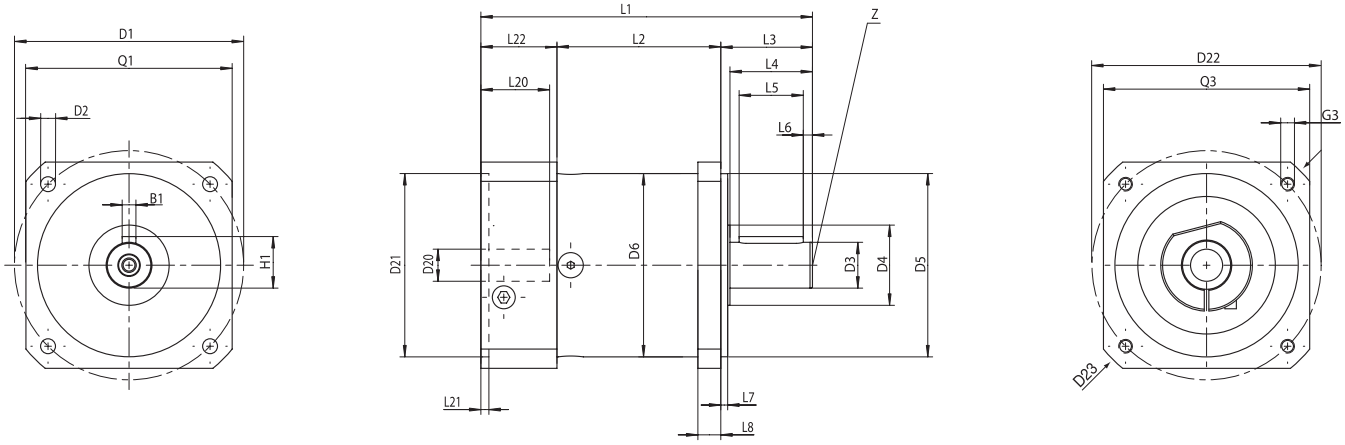




型号	size		PLE 40	PLE 60	PLE 80	PLE 120	PLE 160	Z (2)
所有尺寸均以毫米为单位	all dimensions in mm							
B1 键 DIN 6885 T1	B1 key DIN 6885 T1		3	5	6	8	12	
D1 法兰定位圆直径	D1 flange hole circle		34	52	70	100	145	
D3 轴径	D3 shaft diameter	h7	10	14	20	25	40	
D4 轴肩	D4 shaft root	-3	12	17	25	35	55	
D5 定位凸台	D5 centering	h7	26	40	60	80	130	
D6 箱体直径	D6 body diameter		40	60	80	115	160	
D20 轴中心孔(1)(4)	D20 pinion bore(1)(4)		6	9	14	19	24	
D21 中心孔(1)	D21 center bore for motor(1)		30	40	80	95	130	
D22 安装孔分布圆(1)	D22 hole circle diameter(1)		46	63	100	115	165	
D23 对角尺寸	D23 diagonal dimension		54	80	116	145	185	
G1 安装螺纹x深度(1)	G1 mounting thread x depth(1)	4x	M4x6	M5x8	M6x10	M10x16	M12x20	
G3 安装螺纹x深度(1)	G3 mounting thread x depth(1)		M4x10	M5x12	M6x15	M8x20	M10x25	
H1 键 DIN 6885 T1	H1 key DIN 6885 T1		11,2	16	22,5	28	43	
L1 总长(3)	L1 overall length(3)		93,5	106,5	134	176,5	255,5	1
			106,5	118,5	151	203,5	305	2
			119	131,5	168,5	230,5	-	3
L2 箱体长度	L2 body length		39	47	60	74	104	1
			52	59	77,5	101	153,5	2
			64,5	72	95	128	-	3
L3 输出轴长	L3 shaft length from output		26	35	40	55	87	
L4 轴长自定位凸台起	L4 shaft length from spigot		23	30	36	50	80	
L5 键长	L5 key length		18	25	28	40	65	
L6 至轴末端的距离	L6 distance from shaft end		2,5	2,5	4	5	8	
L7 定位凸台厚度	L7 spigot depth		2	3	3	4	5	
L20 马达轴长度(3)	L20 motor shaft length(3)		25	23	30	40	50	
L21 电机定位凸台深度	L21 motor location depth		3	2,5	3,5	3,5	4	
L22 输入法兰厚度(3)	L22 motor flange length(3)		28,5	24,5	33,5	47,5	64,5	
Q3 法兰截面(1)	Q3 flange section(1)	□	40	60	90	115	140	
Z DIN 332,第2页, DR表格	Z centre bore DIN 332, page 2, form DR		M3x9	M5x12	M6x16	M10x22	M16x36	

(1) 这些参数与所配套的电机型号有关，见52页
(2) 级数
(3) 如果所配的电机轴 L20 比表中所给尺寸更长，那么L22和L1应根据所配电机轴长度适当加长
(4) 于 j6; k6

(1) dimensions refer to the mounted motor-type, see page 52
(2) number of stages
(3) for longer motor shafts L20 applies: The measured motor flange length L22 and overall length L1 will be lengthened
(4) for shaft fit j6; k6



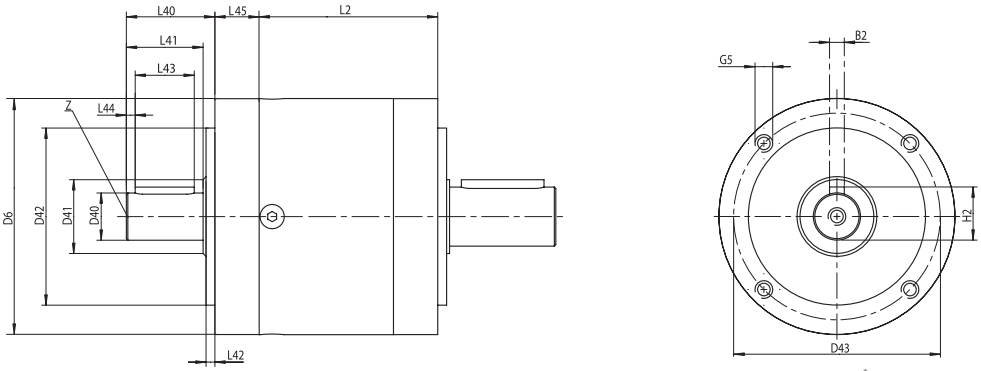
型号	size		PLE 60/70	PLE 80/90	PLE 120/115	Z [2]
所有尺寸均以毫米为单位	all dimensions in mm					
B1 键 DIN 6885 T1	B1 key DIN 6885 T1		5	6	8	
D1 法兰定位圆直径	D1 flange hole circle		75	100	130	
D2 安装螺孔	D2 mounting bore	4x	5,5	6,5	8,5	
D3 轴径	D3 shaft diameter	h7	16	20	25	
D4 轴肩	D4 shaft root	-3	20	35	35	
D5 定位凸台	D5 centering	h7	60	80	110	
D6 箱体直径	D6 body diameter		60	80	115	
D20 轴中心孔[1][4]	D20 pinion bore[1][4]		9	14	19	
D21 中心孔[1]	D21 center bore for motor[1]		40	80	95	
D22 安装孔分布圆[1]	D22 hole circle diameter[1]		63	100	115	
D23 对角尺寸	D23 diagonal dimension		80	116	145	
G3 安装螺纹x深度[1]	G3 mounting thread x depth[1]	4x	M5x8	M6x15	M8x20	
H1 键 DIN 6885 T1	H1 key DIN 6885 T1		18	22,5	28	
L1 总长[3]	L1 overall length[3]		111,5	145	201,5	1
			124	162	228,5	2
			136,5	179,5	255,5	3
L2 箱体长度	L2 body length		55	71,5	99	1
			67,5	88,5	126	2
			80	106	153	3
L3 输出轴长	L3 shaft length from output		32	40	55	
L4 轴长自定位凸台起	L4 shaft length from spigot		28	36	50	
L5 键长	L5 key length		20	28	40	
L6 至轴末端的距离	L6 distance from shaft end		4	4	5	
L7 定位凸台厚度	L7 spigot depth		3	3	4	
L8 法兰厚度	L8 flange thickness		10	10	15	
L20 马达轴长度[3]	L20 motor shaft length[3]		23	30	40	
L21 电机定位凸台深度	L21 motor location depth		2,5	3,5	3,5	
L22 输入法兰厚度[3]	L22 motor flange length[3]		24,5	33,5	47,5	
Q1 法兰截面	Q1 flange section	□	70	90	115	
Q3 法兰截面[1]	Q3 flange section[1]		60	90	115	
Z DIN 332,第2页, DR表格	Z centre bore DIN 332, page 2, form DR		M5x12	M6x16	M10x22	

[1] 这些参数与所配套的电机型号有关，见52页
[2] 级数
[3] 如果所配的电机轴 L20 比表中所给尺寸更长，那么L22和L1应根据所配电机轴长度适当加长
[4] 于 j6; k6

[1] dimensions refer to the mounted motor-type, see page 52
[2] number of stages
[3] for longer motor shafts L20 applies: The measured motor flange length L22 and overall length L1 will be lengthened
[4] for shaft fit j6; k6

OP 1: 任意输入轴 (1)

OP 1: free input shaft (1)



型号	size		PLE 40	PLE 60-60/70	PLE 80-80/90	PLE 120-120/115	PLE 160	Z (2)
B2 键 DIN 6885 T1	B2 key DIN 6885 T1	mm	2	3	5	6	10	
D6 法兰直径	D6 flange diameter		40	60	80	115	160	
D40 轴径	D40 shaft diameter	j6	8	10	16	20	35	
D41 轴肩	D41 shaft root	mm	12	17	25	35	55	
D42 定位凸台	D42 centering	h7	26	40	60	80	110	
D43 法兰定位圆直径	D43 flange hole circle	mm	34	52	70	100	130	
G5 安装螺纹x深度	G5 mounting thread x depth	4x	M4x6	M5x8	M6x10	M10x16	M10x25	
H2 键 DIN 6885 T1	H2 key DIN 6885 T1	mm	8,8	11,2	18	22,5	38	
L2 箱体长度	L2 body length		页/page 48	页/page 48	页/page 48	页/page 48	页/page 48	1
L40 输入轴长	L40 shaft length from input		20	28	30	45	65	
L41 轴长自定位凸台起	L41 shaft length from spigot		17	23	26	40	58	
L42 定位凸台厚度	L42 spigot depth length		2	3	3	4	5	
L43 键长	L43 key length		12	18	20	32	45	
L44 至轴末端的距离	L44 distance from shaft end		2,5	2,5	3	4	7	
L45 输入法兰长度	L45 input flange length		10,2	12,7	15	31	58	
最大输入速度(5)	max. input speed(5)	min^{-1}	18000	13000	7000	6500	4500	
建议输入速度(3)(5)	max. middle input speed(3)(5)		页/page 44	页/page 44	页/page 44	页/page 44	页/page 44	
输入轴向负载(4)	input shaft load axial(4)	N	120	300	500	1300	1600	
输入径向负载(4)	input shaft load radial(4)		100	250	450	1000	1400	
Z DIN 332,第2页, DR表格	Z centre bore DIN 332, page 2, form DR	4x	M3x9	M3x9	M5x12	M6x16	M12x28	

(1) 这种减速机必须在输入端和输出端都配有法兰
(2) 级数
(3) 该值是在S1模式，环境温度20° C下测得
(4) 寿命为10.000h,轴的转速为n1=1000min-¹时,作用在轴心线的中点处
(5) 必须保证允许的工作温度; 特殊的输入转速请联系确认

(1) the gearboxes have to be flanged on input and output flange
(2) number of stages
(3) these values refer to S1 - mode and ambient temperature 20° C
(4) half way along shaft at n_1=1000 min^{-1} refered to 10.000 h lifetime
(5) allowed operating temperature must be kept; other input speeds on inquiry

OP 1: 任意输入轴 (1)

OP 1: free input shaft (1)

型号	size		PLE 40	PLE 60-60/70	PLE 80-80/90	PLE 120-120/115	PLE 160	i (1)	Z (2)
惯量(2)	inertia(2)	kgcm²	0,018	0,080	0,73	2,30	17	3	1
			0,010	0,048	0,35	1,85	12,5	4	
			0,006	0,037	0,24	1,42	11	5	
			0,005	0,027	0,18	1,40	9,5	8	
			0,017	0,087	0,73	2,50	-	9	2
			0,016	0,085	0,36	2,40	17	12	
			0,015	0,039	0,72	2,40	17	15	
			0,009	0,049	0,35	1,65	12,3	16	
			0,007	0,039	0,25	1,60	11,7	20	
			0,007	0,038	0,25	1,40	10,8	25	
			0,005	0,027	0,18	1,40	11,4	32	
			0,005	0,027	0,18	1,30	10,3	40	
			0,005	0,025	0,16	1,30	9,5	64	
			0,015	0,039	0,35	2,20	-	60	3
			0,007	0,039	0,28	1,60	-	80	
			0,007	0,039	0,25	1,40	-	100	
			0,013	0,016	0,70	2,20	-	120	
			0,005	0,016	0,18	1,50	-	160	
			0,005	0,016	0,18	1,30	-	200	
			0,005	0,016	0,18	1,30	-	256	
			0,005	0,016	0,16	1,20	-	320	
			0,005	0,016	0,16	1,20	-	512	

(1) 减速比($i=n_{an}/n_{ab}$)
(1) 这种减速机必须在输入端和输出端都配有法兰
(2) 转动惯量参考输入轴
(2) 级数

(1) ratios($i=n_{an}/n_{ab}$)
(1) the gearboxes have to be flanged on input and output flange
(2) the moment of inertia refers to input shaft
(2) number of stages

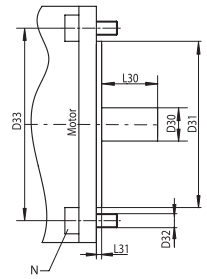
PLE

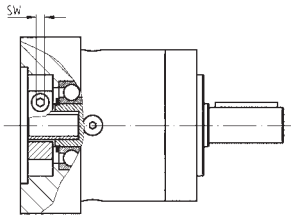
OP 2: 可能的电机装配方式

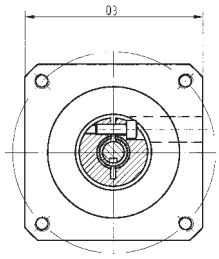
OP 2: possible motor mounting

页 page 77 更多的选配方式 other options

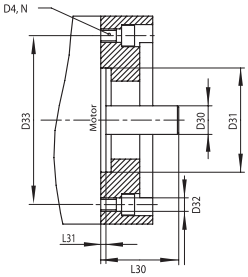
B5

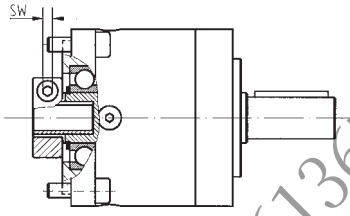


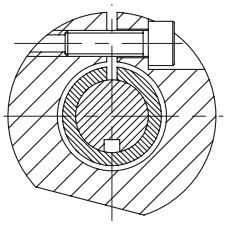




B14



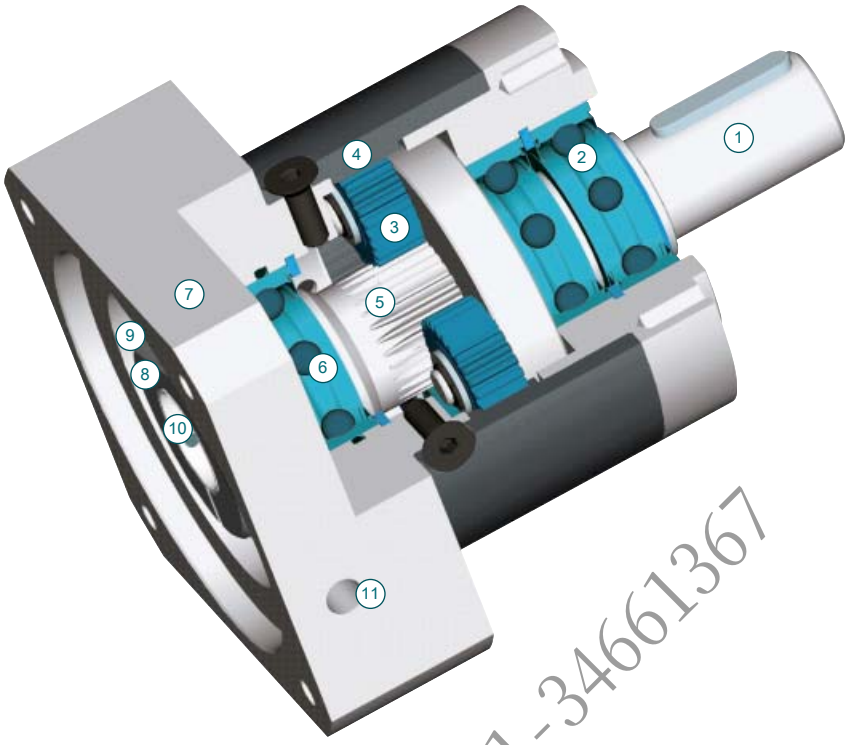




型号	size		PLE 40		PLE 60-60/70		PLE 80-80/90		PLE 120-120/115		PLE 160	Z (2)
D4 轴中心孔(3)	D4 pinion bore(3)		任意/any		任意/any		任意/any		任意/any		任意/any	
D30 电机轴直径(1)(5)	D30 motor shaft diameter(1)(5)	mm	4/5/6/6,35/ 8/9/11		6/6,35/8/ 9/9,525/11/ 12/14/16/19		9,525/10/11/ 12/12,7/14/ 16/19/22/24		11/12,7/14/ 15,87/16/19/ 22/24/28/32/35		19/24/28/ 32/35	
D31 电机定位凸台(3)	D31 motor spigot(3)		任意/any		任意/any		任意/any		任意/any		任意/any	
D32 轴中心孔(3)	D32 pinion bore(3)		任意/any		任意/any		任意/any		任意/any		任意/any	
D33 安装孔分布圆(3)	D33 hole circle diameter(3)		任意/any		任意/any		任意/any		任意/any		任意/any	
G4 螺纹	G4 thread		任意/any		任意/any		任意/any		任意/any		任意/any	
L30 最短马达轴长度(1)	L30 min. motor shaft length(1)	mm	12,5 (16(6))		16 (19(7))		19 (21(8))		21 (26(9))		26	
L31 定位凸台厚度	L31 spigot depth		任意/any		任意/any		任意/any		任意/any		任意/any	
N 安装孔的数量	N numbers of mounting bores		4		4		4		4		4	
Q3 法兰截面(1)	Q3 flange section(1)	□	40		60		80		115		140	
最大.电机重量(4)	max. motor weight(4)	kg	2		3,5		9		16,5		40	
马达类型(1)	motor type(1)		B5/B14		B5/B14		B5/B14		B5/B14		B5/B14	
紧固螺丝扭矩	torque clamping screw	Nm	2	4,5	4,5	9,5	9,5	16,5	16,5	40	40	
SW 内六角扳手型号	SW wrench width	mm	2,5	3	3	4	4	5	5	6	6	

(1) 其它尺寸请联系确认
(2) 级数
(3) 如果可能请给出法兰的相关参数
(4) 与电机装配的水平度和稳定性有关
(5) 与电机轴配合精度: j6; k6
(6) D30 > 9 mm
(7) D30 > 14 mm
(8) D30 > 19 mm
(9) D30 > 24 mm

(1) other dimensions on inquiry
(2) number of stages
(3) if possible with the given flange dimensions
(4) refered to horizontal and stationary mounting
(5) shaft fit: j6; k6
(6) D30 > 9 mm
(7) D30 > 14 mm
(8) D30 > 19 mm
(9) D30 > 24 mm



1 输出轴
高强度一体结构行支架和输出轴

2 输出轴轴承
深沟球轴承与密封圈连接

3 行星轮
高精度、零螺旋角齿轮以优化齿廓的修改和冠状化;并且硬化后珩磨处理

4 齿轮
硬化齿廓，最小的磨损，阻止背隙的增加

5 太阳轮
高精密机器制造，优化齿轮外形， 硬化和珩磨处理提供高的承载能力，最小的磨损，阻止背隙的增加

6 太阳轮轴承
高速球轴承的浮动设计可以消除输入端的热传导，然而还可以提供以太阳轮更容易的安装位置

7 适配法兰
减速机输入端允许与任何伺服电机相连接，材质为铝合金导热性更好

8 夹紧环
动平衡夹紧环允许更高的转速，钢质结构可以提供更高的传输扭矩

9 夹紧螺钉
高强钢螺栓细牙螺纹可以提供更高的夹紧力

10 PCS-2系统
PCS-2系统高精度夹紧系统-当前最值得信赖的先进系统

11 安装螺孔
夹紧螺栓安装孔

1 output shaft
high strength one piece planet carrier & output shaft

2 output shaft bearing
deep groove ball bearings with contact seals

3 planet gear
precison zero helix angle gear with optimized profile modifications and crowning; case hardened and hard finished by honing

4 housing with integrated ring gear
ring gear case hardened for high load ability, minimum wear, consistent backlash

5 sun gear
precision machined optimized gear profile, case hardened and honed for high load ability, low noise run, minimum wear and consistant backlash

6 bearing for sun gear
high speed ball bearings in floating design eliminating thrust loads from thermal expansion, yet providing exact sungear position for easy mounting

7 motor adapter plate
allows to match up the gear head with virtually any servo motor, made of aluminum for enhanced thermal conductivity

8 clamping ring
balanced ring sutiable for high rpm, made of steel to allow high clamping forces for safe torque transfer

9 clamping screw
high strength steel screw with special low pitch thread to generate a high clamping force

10 PCS-2 System
Precision Clamping System - most reliable advanced system available today

11 assembly bore
access bore for the clamping screw

崭新的未来

For new perspectives

WPLE- 直角输出减速机系列是对PLE-系列有效的拓展。
这种转角型减速机适用于对减速机/电机安装空间要求非常节省的场合。

The WPLE is the logical refinement of our PLE series. This bevel gearbox series was designed especially for space-saving installation in a right-angle position of the motor/gearbox combination.

- > 最低的回程间隙 / > low backlash
- > 最大的输出扭矩 / > high output torque
- > 专利的PCS® / > patented PCS®
- > 高效率(94%) / > high efficiency (94%)
- > 22 级减速 i=3，...，512 / > 22 ratios i=3,...,512
- > 低噪音 / > low noise
- > 高质量(ISO 9001) / > high quality (ISO 9001)
- > 安装位置随意 / > any mounting position
- > 简易电机装配 / > easy motor mounting
- > 终身润滑 / > life time lubrication
- > 更多的选配方式 / > more options
- > 旋转方向 / > balanced motor pinion

型号	size		WPLE 40	WPLE 60	WPLE 80	WPLE 120	i (1)	Z (2)
额定输出扭矩 T_{2N}(3)(4)(6)	nominal output torque T_{2N}(3)(4)(6)	Nm	4,5	14	40(7)	80	3	1
			6	19	53(7)	105(7)	4	
			7,5	24	67(7)	130(7)	5	
			6	18	50	120	8	
			16,5(7)	44(7)	130(7)	210(7)	9	2
			20(7)	44	120(7)	260(7)	12	
			18(7)	44	110	230	15	
			20(7)	44	120	260	16	
			20(7)	44	120	260	20	
			18	40	110	230	25	
			20	44	120	260	32	
			18	40	110	230	40	
			7,5	18	50	120	64	
			20	44	110	260	60	3
			20	44	120	260	80	
			20	44	120	260	100	
			18	44	110	230	120	
			20	44	120	260	160	
			18	40	110	230	200	
			20	44	120	260	256	
			18	40	110	230	320	
			7,5	18	50	120	512	

型号	size		WPLE 40	WPLE 60	WPLE 80	WPLE 120	i (1)	Z (2)
最大输出扭矩(3)(4)(5)(6)	max. output torque(3)(4)(5)(6)	Nm	7	22	64	128	3	1
			10	30	85	168	4	
			12	38	107	208	5	
			10	29	80	192	8	
			26	70	208	336	9	2
			32	70	192	416	12	
			29	70	176	368	15	
			32	70	192	416	16	
			32	70	192	416	20	
			29	64	176	368	25	
			32	70	192	416	32	
			29	64	176	368	40	
			12	29	80	192	64	
			32	70	176	416	60	3
			32	70	192	416	80	
			32	70	192	416	100	
			29	70	176	368	120	
			32	70	192	416	160	
			29	64	176	368	200	
			32	70	192	416	256	
			29	64	176	368	320	
			12	29	80	192	512	

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 级数
(3) 这些数据在下列条件下测得:输出转速n_2=100min-¹,电机在占空因数K_A=1及S1连续工作制下,温度T=30°C
(4) 取决于电机轴的直径
(5) 输出轴最大允许30000转；见80页
(6) 带键: 于峰值负载
(7) T_{2N} 作用时 寿命不是10.000 h

(1) ratios($i=n_{an}/n_{ab}$)
(2) number of stages
(3) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(4) depends on the motor shaft diameter
(5) allowable for 30.000 revolutions at the output shaft; see page 80
(6) with key, at tumscent load
(7) different lifetime 10.000 h at T_{2N}

型号	size		WPLE 80/90	WPLE 120/115	i (1)	Z (2)
额定输出扭矩 T_{2N}(3)(4)(6)	nominal output torque T_{2N}(3)(4)(6)	Nm	40(7)	80	3	1
			53(7)	105(7)	4	
			67(7)	130(7)	5	
			50	120	8	
			130(7)	210(7)	9	2
			120(7)	260(7)	12	
			110	230	15	
			120	260	16	
			120	260	20	
			110	230	25	
			120	260	32	
			110	230	40	
			50	120	64	
			110	260	60	3
			120	260	80	
			120	260	100	
			110	230	120	
			120	260	160	
			110	230	200	
			120	260	256	
			110	230	320	
			50	120	512	

型号	size		WPLE 80/90	WPLE 120/115	i (1)	Z (2)
最大输出扭矩(3)(4)(5)(6)	max. output torque(3)(4)(5)(6)	Nm	64	128	3	1
			85	168	4	
			107	208	5	
			80	192	8	
			208(7)	336(7)	9	2
			192(7)	416(7)	12	
			176	368	15	
			192	416	16	
			192	416	20	
			176	368	25	
			192	416	32	
			176	368	40	
			80	192	64	
			176	416	60	3
			192	416	80	
			192	416	100	
			176	368	120	
			192	416	160	
			176	368	200	
			192	416	256	
			176	368	320	
			80	192	512	

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 级数
(3) 这些数据在下列条件下测得:输出转速n2=100min-1,电机在占空因数KA=1及S1连续工作制下,温度T=30°C
(5) 取决于电机轴的直径
(8) 输出轴最大允许30000转；见80页
(9) 带键: 于峰值负载
(10) T2N 作用时 寿命不是10.000 h

(1) ratios($i=n_{an}/n_{ab}$)
(2) number of stages
(3) these values refer to a speed of the output shaft of n_2=100min-1 on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(5) depends on the motor shaft diameter
(8) allowable for 30.000 revolutions at the output shaft; see page 80
(9) with key, at tumscent load
(10) different lifetime 10.000 h at T_{2N}

系列	line		WPLE	Z (2)
寿命	lifetime	h	20.000	
寿命 以 T_{2N} x 0，88	lifetime at T_{2N} x 0,88		30.000	
急停扭矩(6)	emergency stop(6)	Nm	2倍于 T_{2N} / 2 - times of T_{2N}	
满载效率(8)(7)	efficiency with full load(7)	%	94	1
			92	2
			88	3
最低工作温度(4)	min. operating temp.(4)	°C	-25	
最高工作温度(4)	max. operating temp.(4)		+90	
防护等级	degree of protection		IP 54	
润滑	lubrication		终生润滑 / life lubrication	
装配方式	mounting position		任意 / any	
电机法兰精度	motor flange precision		DIN 42955-N	
轴密封	shaft seal		接触型胶盖密封轴承 / contact rubber seal of bearings	

型号	size		WPLE 40	WPLE 60	WPLE 80	WPLE 120	Z (2)
回程间隙(7)	backlash(7)	arcmin	< 30	< 22	< 15	< 12	1
			< 34	< 26	< 19	< 16	2
			< 36	< 28	< 21	< 18	3
$Fr_{max.}$ 于 10.000 h(3)(4)	$Fr_{max.}$ for 10.000 h(3)(4)	N	200	500	950	2000	
$Fa_{max.}$ 于 10.000 h(3)(4)	$Fa_{max.}$ for 10.000 h(3)(4)		200	600	1200	2800	
$Fr_{max.}$ 于 30.000 h(3)(4)	$Fr_{max.}$ for 30.000 h(3)(4)		160	340	650	1500	
$Fa_{max.}$ 于 30.000 h(3)(4)	$Fa_{max.}$ for 30.000 h(3)(4)		160	450	900	2100	
抗扭刚性	torsional stiffness	Nm / arcmin	0,7	1,5	4,5	10	1
			1,1	2,5	6,5	13	2
			1,0	2,5	6,3	12	3
重量	weight	kg	0,51	1,7	4,4	12,0	1
			0,61	1,9	5,0	14,0	2
			0,71	2,1	5,5	16,0	3
运转噪音(5)	running noise(5)	dB(A)	68	70	73	75	
最大输入速度(6)	max. input speed(6)	min^{-1}	18000	13000	7000	6500	

(1) 级数
(2) 这些数据在下列条件下测得:输出转速n_2=100min-¹,电机在占空因数 K_A=1及S1连续工作制下,温度T=30°C
(3) 沿着输出轴长度方向上一半处
(4) 参考体表面的中部
(5) 噪音检测标准; 距离1m; 在输入转速 n_1=3000min^{-1}; i=5
(6) 1000次以内
(7) 取决于减速比, n_2=100min^{-1}
(8) 必须保证允许的工作温度; 特殊的输入转速请联系确认

(1) number of stages
(2) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(3) half way along the output shaft
(4) refering to the middle of the body surface
(5) sound pressure level; distance 1m; measured on idle running with an input speed of n_1=3000min^{-1}; i=5
(6) allowed 1000 times
(7) depends on ratio, n_2=100min^{-1}
(8) allowed operating temperature must be kept; other input speeds on inquiry

系列	line		WPLE	Z [2]
寿命	lifetime	h	20.000	
寿命 以 T_{2N} x 0，88	lifetime at T_{2N} x 0,88		30.000	
急停扭矩[6]	emergency stop[6]	Nm	2倍于 T_{2N} / 2 - times of T_{2N}	
满载效率[8][7]	efficiency with full load[7]	%	94	1
			92	2
			88	3
最低工作温度[4]	min. operating temp.[4]	°C	-25	
最高工作温度[4]	max. operating temp.[4]		+90	
防护等级	degree of protection		IP 54	
润滑	lubrication		终生润滑 / life lubrication	
装配方式	mounting position		任意 /any	
电机法兰精度	motor flange precision		DIN 42955-N	
轴密封	shaft seal		接触型胶盖密封轴承 / contact rubber seal of bearings	

型号	size		WPLE 80/90	WPLE 120/115	Z [2]
回程间隙[7]	backlash[7]	arcmin	< 15	< 12	1
			< 19	< 16	2
			< 21	< 18	3
$Fr_{max.}$ 于 10.000 h[3][4]	$Fr_{max.}$ for 10.000 h[3][4]	N	2500	3500	
$Fa_{max.}$ 于 10.000 h[3][4]	$Fa_{max.}$ for 10.000 h[3][4]		2800	2800	
$Fr_{max.}$ 于 30.000 h[3][4]	$Fr_{max.}$ for 30.000 h[3][4]		1700	2400	
$Fa_{max.}$ 于 30.000 h[3][4]	$Fa_{max.}$ for 30.000 h[3][4]		2000	2100	
抗扭刚性	torsional stiffness	Nm / arcmin	4,5	10	1
			6,5	13	2
			6,3	12	3
重量	weight	kg	5,5	12,6	1
			6,1	14,6	2
			6,6	16,6	3
运转噪音[5]	running noise[5]	dB(A)	73	75	
最大输入速度[6]	max. input speed[6]	min^{-1}	7000	6500	

(1) 级数
(2) 这些数据在下列条件下测得:输出转速n_2=100min-¹,电机在占空因数 K_A=1及S1连续工作制下,温度T=30°C
(3) 沿着输出轴长度方向上一半处
(4) 参考体表面的中部
(5) 噪音检测标准; 距离1m; 在输入转速 n_1=3000min^{-1}; i=5
(6) 1000次以内
(7) 取决于减速比, n_2=100min^{-1}
(8) 必须保证允许的工作温度; 特殊的输入转速请联系确认

(1) number of stages
(2) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(3) half way along the output shaft
(4) refering to the middle of the body surface
(5) sound pressure level; distance 1m; measured on idle running with an input speed of n_1=3000min^{-1}; i=5
(6) allowed 1000 times
(7) depends on ratio, n_2=100min^{-1}
(8) allowed operating temperature must be kept; other input speeds on inquiry

型号	size		WPLE 40	WPLE 60	WPLE 80	WPLE 120	i (1)
最大输入速度在 50% T_{2N} 和 S1模式(2)(3)	max. middle input speed at 50% T_{2N} and S1(2)(3)	min^{-1}	5000	4500	4000	3500	3
			5000	4500	4000	3500	4
			5000	4500	4000	3500	5
			5000	4500	4000	3500	8
			5000	4500	3600	3450	9
			5000	4500	4000	3500	12
			5000	4500	4000	3500	15
			5000	4500	4000	3500	16
			5000	4500	4000	3500	20
			5000	4500	4000	3500	25
			5000	4500	4000	3500	32
			5000	4500	4000	3500	40
			5000	4500	4000	3500	60
			5000	4500	4000	3500	64
			5000	4500	4000	3500	80
			5000	4500	4000	3500	100
			5000	4500	4000	3500	120
			5000	4500	4000	3500	160
			5000	4500	4000	3500	200
			5000	4500	4000	3500	256
			5000	4500	4000	3500	320
			5000	4500	4000	3500	512

型号	size		WPLE 40	WPLE 60	WPLE 80	WPLE 120	i (1)
最大输入速度在 100% T_{2N} 和 S1模式(2)(3)	max. middle input speed at 100% T_{2N} and S1(2)(3)	min^{-1}	5000	4450	2750	2200	3
			5000	4450	2650	2150	4
			5000	4400	2650	2150	5
			5000	4500	4000	3300	8
			3350	3850	2150	2050	9
			5000	4500	2850	2150	12
			5000	4500	3550	2800	15
			5000	4500	3400	2650	16
			5000	4500	4000	3050	20
			5000	4500	4000	3500	25
			5000	4500	4000	3500	32
			5000	4500	4000	3500	40
			5000	4500	4000	3500	60
			5000	4500	4000	3500	64
			5000	4500	4000	3500	80
			5000	4500	4000	3500	100
			5000	4500	4000	3500	120
			5000	4500	4000	3500	160
			5000	4500	4000	3500	200
			5000	4500	4000	3500	256
			5000	4500	4000	3500	320
			5000	4500	4000	3500	512

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 必须保证允许的工作温度; 特殊的输入转速请联系确认
(3) 输出轴最大允许30000转 ; 见81页

(1) ratios($i=n_{an}/n_{ab}$)
(2) allowed operating temperature must be kept; other input speeds on inquiry
(3) allowable for 30.000 revolutions at the output shaft; see page 81

型号	size		WPLE 80/90	WPLE 120/115	i (1)
最大输入速度在 50% T_{2N} 和 S1模式(2)(3)	max. middle input speed at 50% T_{2N} and S1(2)(3)	min^{-1}	3550	3500	3
			3700	3500	4
			3800	3500	5
			4000	3500	8
			3450	3450	9
			4000	3500	12
			4000	3500	15
			4000	3500	16
			4000	3500	20
			4000	3500	25
			4000	3500	32
			4000	3500	40
			4000	3500	60
			4000	3500	64
			4000	3500	80
			4000	3500	100
			4000	3500	120
			4000	3500	160
			4000	3500	200
			4000	3500	256
			4000	3500	320
			4000	3500	512

型号	size		WPLE 80/90	WPLE 120/115	i (1)
最大输入速度在 100% T_{2N} 和 S1模式(2)(3)	max. middle input speed at 100% T_{2N} and S1(2)(3)	min^{-1}	2500	2200	3
			2500	2150	4
			2500	2150	5
			4000	3300	8
			2100	2050	9
			2850	2150	12
			3550	2800	15
			3400	2650	16
			4000	3050	20
			4000	3500	25
			4000	3500	32
			4000	3500	40
			4000	3500	60
			4000	3500	64
			4000	3500	80
			4000	3500	100
			4000	3500	120
			4000	3500	160
			4000	3500	200
			4000	3500	256
			4000	3500	320
			4000	3500	512

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 必须保证允许的工作温度; 特殊的输入转速请联系确认
(3) 输出轴最大允许30000转；见81页

(1) ratios($i=n_{an}/n_{ab}$)
(2) allowed operating temperature must be kept; other input speeds on inquiry
(3) allowable for 30.000 revolutions at the output shaft; see page 81

型号	size		WPLE 40	WPLE 60	WPLE 80	WPLE 120	i (1)
惯量(2)	inertia(2)	kgcm²	0,044	0,246	1,189	5,75	3
			0,035	0,204	0,939	3,91	4
			0,032	0,189	0,869	3,35	5
			0,030	0,176	0,809	2,89	8
			0,043	0,242	1,159	5,73	9
			0,042	0,238	1,139	5,60	12
			0,036	0,188	1,129	5,53	15
			0,035	0,199	0,919	3,83	16
			0,032	0,186	0,859	3,28	20
			0,032	0,186	0,859	3,26	25
			0,030	0,175	0,809	2,84	32
			0,029	0,175	0,809	2,84	40
			0,042	0,187	0,929	5,62	60
			0,029	0,175	0,809	2,84	64
			0,032	0,186	0,919	3,28	80
			0,032	0,186	0,859	3,26	100
			0,042	0,175	1,119	5,47	120
			0,029	0,175	0,809	2,84	160
			0,029	0,175	0,809	2,84	200
			0,029	0,175	0,809	2,84	256
			0,029	0,175	0,809	2,84	320
			0,029	0,175	0,809	2,84	512

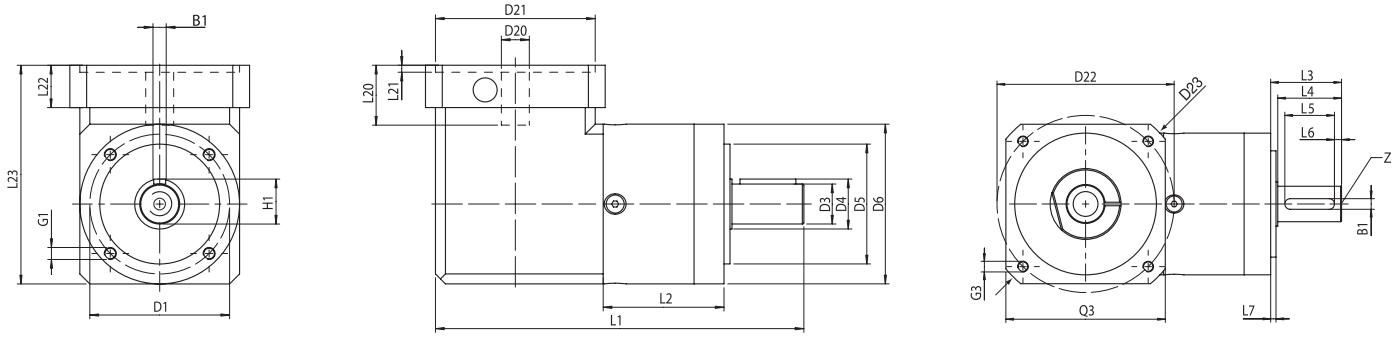
(1) 减速比($i=n_{an}/n_{ab}$)
(2) 转动惯量与传动轴和标准发动机轴直径D20有关。

(1) ratios($i=n_{an}/n_{ab}$)
(2) the moment of inertia relates to the input shaft and to standard motor shaft diameter D20

型号	size		WPLE 80/90	WPLE 120/115	i (1)
惯量(2)	inertia(2)	kgcm²	1,189	5,75	3
			0,939	3,91	4
			0,869	3,35	5
			0,809	2,89	8
			1,159	5,73	9
			1,139	5,60	12
			1,129	5,53	15
			0,919	3,83	16
			0,859	3,28	20
			0,859	3,26	25
			0,809	2,84	32
			0,809	2,84	40
			0,929	5,62	60
			0,809	2,84	64
			0,919	3,28	80
			0,859	3,26	100
			1,119	5,47	120
			0,809	2,84	160
			0,809	2,84	200
			0,809	2,84	256
			0,809	2,84	320
			0,809	2,84	512

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 转动惯量与传动轴和标准发动机轴直径D20有关。

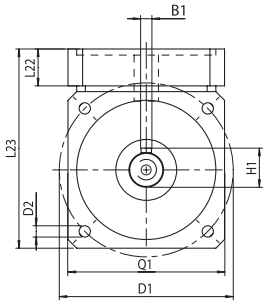
(1) ratios($i=n_{an}/n_{ab}$)
(2) the moment of inertia relates to the input shaft and to standard motor shaft diameter D20

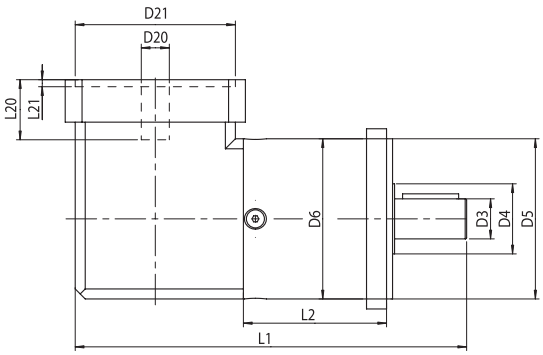


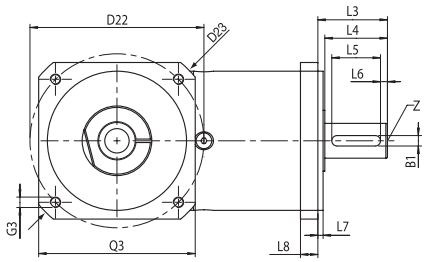
型号	size		WPLE 40	WPLE 60	WPLE 80	WPLE 120	Z (2)
所有尺寸均以毫米为单位	all dimensions in mm						
B1 键 DIN 6885 T1	B1 key DIN 6885 T1		3	5	6	8	
D1 法兰定位圆直径	D1 flange hole circle		34	52	70	100	
D3 轴径	D3 shaft diameter	h7	10	14	20	25	
D4 轴肩	D4 shaft root	-3	12	17	25	35	
D5 定位凸台	D5 centering	h7	26	40	60	80	
D6 箱体直径	D6 body diameter		40	60	80	115	
D20 轴中心孔(1)(4)	D20 pinion bore(1)(4)		6	9	14	19	
D21 中心孔(1)	D21 center bore for motor(1)		30	40	80	95	
D22 安装孔分布圆(1)	D22 hole circle diameter(1)		46	63	100	115	
D23 对角尺寸	D23 diagonal dimension		54	80	116	145	
G1 安装螺纹x深度(1)	G1 mounting thread x depth(1)	4x	M4x6	M5x8	M6x10	M10x16	
G3 安装螺纹x深度(1)	G3 mounting thread x depth(1)		M4x6	M5x8	M6x10	M8x20	
H1 键 DIN 6885 T1	H1 key DIN 6885 T1		11,2	16	22,5	28	
L1 总长(3)	L1 overall length(3)		110	147,5	184	249,5	1
			123	159,5	201,5	276,5	2
			135	172,5	219	303,5	3
L2 箱体长度	L2 body length		39	47	60	74	1
			52	59	77,5	101	2
			64	72	95	128	3
L3 输出轴长	L3 shaft length from output		26	35	40	55	
L4 轴长自定位凸台起	L4 shaft length from spigot		23	30	36	50	
L5 键长	L5 key length		18	25	28	40	
L6 至轴末端的距离	L6 distance from shaft end		2,5	2,5	4	5	
L7 定位凸台厚度	L7 spigot depth		2	3	3	4	
L20 马达轴长度(3)	L20 motor shaft length(3)		25	23	30	40	
L21 电机定位凸台深度	L21 motor location depth		3	2,5	3,5	3,5	
L22 输入法兰厚度(3)	L22 motor flange length(3)		19	16	21,2	21,8	
L23 总高度(3)	L23 overall hight(3)		68	85,5	109,5	145,5	1
Q3 法兰截面(1)	Q3 flange section(1)	□	40	60	90	115	
Z DIN 332,第2页, DR表格	Z centre bore DIN 332, page 2, form DR		M3x9	M5x12	M6x16	M10x22	

(1) 这些参数与所配套的电机型号有关；见66页
(2) 级数
(3) 如果所配的电机轴L20比表中所给的尺寸更长,那么L22和L23应根据所配电机轴长适当加长
(4) 于 j6; k6

(1) dimensions refer to the mounted motor-type, see page 66
(2) number of stages
(3) for longer motor shafts L20 applies: The measured motor flange length L22 and overall hight L23 will be lengthened
(4) for shaft fit j6; k6







型号	size		WPLE 80/90	WPLE 120/115	Z (2)
所有尺寸均以毫米为单位	all dimensions in mm				
B1 键 DIN 6885 T1	B1 key DIN 6885 T1		6	8	
D1 法兰定位圆直径	D1 flange hole circle		100	130	
D2 安装螺孔	D2 mounting bore	4x	6,5	8,5	
D3 轴径	D3 shaft diameter	h7	20	25	
D4 轴肩	D4 shaft root	-3	35	35	
D5 定位凸台	D5 centering	h7	80	110	
D6 箱体直径	D6 body diameter		80	115	
D20 轴中心孔(1)(4)	D20 pinion bore(1)(4)		14	19	
D21 中心孔(1)	D21 center bore for motor(1)		80	95	
D22 安装孔分布圆(1)	D22 hole circle diameter(1)		100	115	
D23 对角尺寸	D23 diagonal dimension		116	145	
G3 安装螺纹x深度(1)	G3 mounting thread x depth(1)	4x	M6x15	M8x20	
H1 键 DIN 6885 T1	H1 key DIN 6885 T1		22,5	28	
L1 总长(3)	L1 overall length(3)		195,5	274,5	1
			212,5	301,5	2
			230	328,5	3
L2 箱体长度	L2 body length		71,5	99	1
			88,5	126	2
			106	153	3
L3 输出轴长	L3 shaft length from output		40	55	
L4 轴长自定位凸台起	L4 shaft length from spigot		36	50	
L5 键长	L5 key length		28	40	
L6 至轴末端的距离	L6 distance from shaft end		4	5	
L7 定位凸台厚度	L7 spigot depth		3	4	
L8 法兰厚度	L8 flange thickness		10	15	
L20 马达轴长度(3)	L20 motor shaft length(3)		30	40	
L21 电机定位凸台深度	L21 motor location depth		3,5	3,5	
L22 输入法兰厚度(3)	L22 motor flange length(3)		21,2	21,8	
L23 总高度(3)	L23 overall hight(3)		114,5	145,5	1
Q1 法兰截面	Q1 flange section	□	90	115	
Q3 法兰截面(1)	Q3 flange section(1)		90	115	
Z DIN 332,第2页, DR表格	Z centre bore DIN 332, page 2, form DR		M6x16	M10x22	

(1) 这些参数与所配套的电机型号有关；见66页
(2) 级数
(3) 如果所配的电机轴L20比表中所给的尺寸更长,那么L22和L23应根据所配电机轴长适当加长
(4) 于 j6; k6

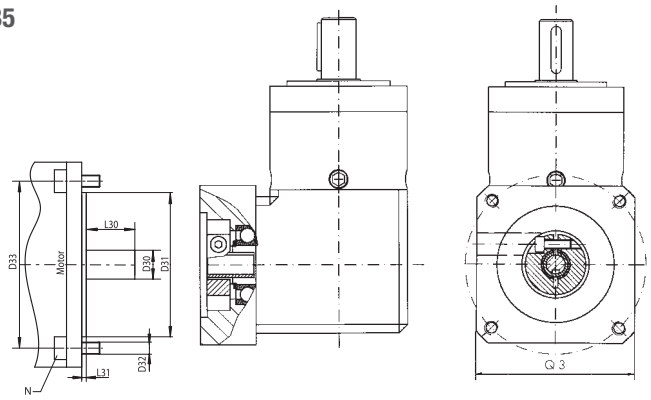
(1) dimensions refer to the mounted motor-type, see page 66
(2) number of stages
(3) for longer motor shafts L20 applies: The measured motor flange length L22 and overall hight L23 will be lengthened
(4) for shaft fit j6; k6

OP 2: 可能的电机装配方式

OP 2: possible motor mounting

页 page 77 更多的选配方式 other options

B5



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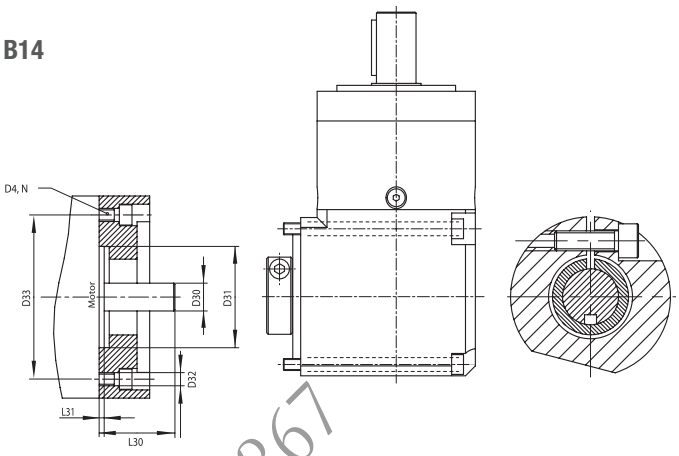
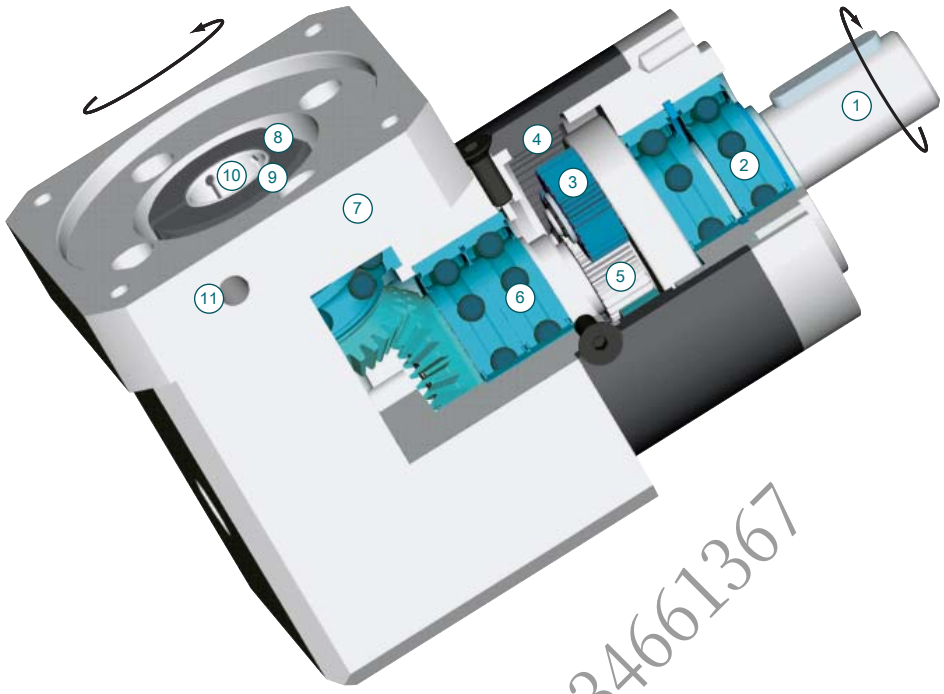


型号	size		WPLE 40	WPLE 60	WPLE 80-80/90	WPLE 120-120/115	Z (2)
D30 电机轴直径(1)(5)	D30 motor shaft diameter(1)(5)	mm	4/5/6/ 6,35/8/9	6/6,35/8/9/ 9,525/11/14	9,525/10/11/ 12/12,7/14/ 16/19	11/12,7/14/ 15,875/16/19/ 22/24	
D31 电机定位凸台(3)	D31 motor spigot(3)		任意/any	任意/any	任意/any	任意/any	
D32 轴中心孔(3)	D32 pinion bore(3)		任意/any	任意/any	任意/any	任意/any	
D33 安装孔分布圆(3)	D33 hole circle diameter(3)		任意/any	任意/any	任意/any	任意/any	
G4 螺纹	G4 thread		任意/any	任意/any	任意/any	任意/any	
L30 最短马达轴长度(1)	L30 min. motor shaft length(1)	mm	12,5	16	19	21	
L31 定位凸台厚度	L31 spigot depth		任意/any	任意/any	任意/any	任意/any	
N 安装孔的数量	N numbers of mounting bores		4	4	4	4	
Q3 法兰截面(1)	Q3 flange section(1)	□	40	60	90	115	
最大.电机重量(4)	max. motor weight(4)	kg	2	3,5	9	16	
马达类型(1)	motor type(1)		B5/B14	B5/B14	B5/B14	B5/B14	
紧固螺丝扭矩	torque clamping screw	Nm	2	4,5	9,5	16,5	
SW 内六角扳手型号	SW wrench width	mm	2,5	3	4	5	

(1) 其它尺寸请联系确认
(2) 级数
(3) 如果可能请给出法兰的相关参数
(4) 与电机装配的水平度和稳定性有关
(5) 与电机轴配合精度: j6; k6

(1) other dimensions on inquiry
(2) number of stages
(3) if possible with the given flange dimensions
(4) refered to horizontal and stationary mounting
(5) shaft fit: j6; k6



1 输出轴
高强度一体结构行支架和输出轴
2 输出轴轴承
深沟球轴承与密封圈连接
3 行星轮
高精度直齿行星轮，形状和凸度经过优化，表面经过硬化及珩磨处理
4 齿轮
硬化齿廓，最小的磨损，阻止背隙的增加
5 太阳轮
高精密机器制造，优化齿轮外形， 硬化和珩磨处理提供高的承载能力，最小的磨损，阻止背隙的增加
6 太阳轮轴承
双列深沟球轴承
7 适配法兰
减速机输入端允许与任何伺服电机相连接，材质为铝合金导热性更好
8 夹紧环
动平衡夹紧环允许更高的转速，钢质结构可以提供更高的传输扭矩
9 夹紧螺钉
高强钢螺栓细牙螺纹可以提供更高的夹紧力
10 PCS系统
多个开槽的夹紧系统-当今可获得的最先进的夹紧系统
11 安装螺孔
夹紧螺栓安装孔
12 伞齿轮
直齿伞齿轮；淬火

1 output shaft
made of high-strength high quality steel for utmost shaft reliability
2 output shaft bearing
deep groove ball bearings with contact seals
3 planet gear
precison zero helix angle gear with optimized profile modifications and crowning; case hardened and hard finished by honing
4 housing with integrated ring gear
ring gear case hardened for high load ability, minimum wear, consistent backlash
5 sun gear
precision machined optimized gear profile, case hardened and honed for high load ability, low noise run, minimum wear and consistant backlash
6 bearing for sun gear
paired deep groove ball bearings
7 motor adapter plate
allows to match up the gear head with virtually any servo motor, made of aluminum for enhanced thermal conductivity
8 clamping ring
balanced ring sutiable for high rpm, made of steel to allow high clamping forces for safe torque transfer
9 clamping screw
high strength steel screw with special low pitch thread to generate a high clamping force
10 PCS System
patented multiple closed slot Precision Clamping System - most reliable advanced system available today
11 assembly bore
access bore for the clamping screw
12 bevel gears
straight thoothed bevel gears; hardened

低回程间隙经济型法兰输出减速机

When strengths complement one another

PLFE减速机结合PLFN系列法兰减速机的结构紧凑和PLE系列减速机的高效率于一身。

High output torque, high tilting rigidity and moderate backlash: the PLFE series is impressive in many aspects. The Economy Flange gearboxes combine the compactness of our PLFN with the economical aspects of the PLE gearboxes.

PLFE

> 最低的回程间隙	> lowest backlash
> 最大的输出扭矩	> highest output torques
> 最高的抗扭刚性	> highest tilting stiffness
> 专利的PCS®	> PCS-2 System
> 高效率(96%)	> high efficiency (96%)
> 珩磨齿	> honed geared parts
> 13 级减速 i=3，...，64	> 13 ratios i=3,...,64
> 低噪音(< 65 dB(A))	> low noise (< 65 dB(A))
> 高质量(国际标准组织9001)	> high quality (ISO 9001)
> 安装位置随意	> any mounting position
> 简易电机装配	> easy motor mounting
> 终身润滑	> life time lubrication
> 输出法兰符合 EN ISO 9409 要求	> output flange according to EN ISO 9409
> 旋转方向：同向	> direction of rotation equidirectional
> 平衡的电机齿轮	> balanced motor pinion

型号	size		PLFE 64	PLFE 90	PLFE 110	i (1)	Z (2)
额定输出扭矩 T_{2N}(3)(5)	nominal output torque T_{2N}(3)(5)	Nm	28	85	115	3	1
			38	115	155	4	
			40	110	195	5	
			18	50	120	8	
			44	130	240	9	2
			44	120	260	12	
			44	110	230	15	
			44	120	260	16	
			44	120	260	20	
			40	110	230	25	
			44	120	260	32	
			40	110	230	40	
			18	50	120	64	

型号	size		PLFE 64	PLFE 90	PLFE 110	i (1)	Z (2)
最大输出扭矩(3)(5)(8)	max. output torque(3)(5)(8)	Nm	45	136	184	3	1
			61	184	248	4	
			64	176	312	5	
			29	80	192	8	
			70	208	384	9	2
			70	192	416	12	
			70	176	368	15	
			70	192	416	16	
			70	192	416	20	
			64	176	368	25	
			70	192	416	32	
			64	176	368	40	
			29	80	192	64	

系列	line		PLFE	Z (2)
寿命	lifetime	h	30.000	
急停扭矩(6)	emergency stop(6)	Nm	2倍于 T_{2N} / 2 - times of T_{2N}	
满载效率(8)(7)	efficiency with full load(7)	%	96	1
			94	2
最低工作温度(4)	min. operating temp.(4)	°C	-25	
最高工作温度(4)	max. operating temp.(4)		+90	
防护等级	degree of protection		IP 54	
润滑	lubrication		终生润滑 / life lubrication	
装配方式	mounting position		任意 / any	
电机法兰精度	motor flange precision		DIN 42955-N	

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 级数
(3) 这些数据在下列条件下测得:输出转速n2=100min-¹,电机在占空因数KA=1及S1连续工作制下,温度T=30°C
(4) 参考体表面的中部
(5) 取决于电机轴的直径
(6) 1000次以内
(7) 取决于减速比, n_2=100min^{-1}
(8) 输出轴最大允许30000转；见80页

(1) ratios($i=n_{an}/n_{ab}$)
(2) number of stages
(3) these values refer to a speed of the output shaft of n_2=100min^{-1} on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(4) refering to the middle of the body surface
(5) depends on the motor shaft diameter
(6) allowed 1000 times
(7) depends on ratio, n_2=100min^{-1}
(8) allowable for 30.000 revolutions at the output shaft; see page 80

型号	size		PLFE 64	PLFE 90	PLFE 110	Z [2]
回程间隙	backlash	arcmin	< 16	< 9	< 8	1
			< 20	< 14	< 12	2
$Fr_{max.}$ 于 20.000 h[3][4]	$Fr_{max.}$ for 20.000 h[3][4]	N	550	1400	2400	
$Fa_{max.}$ 于 20.000 h[3][4]	$Fa_{max.}$ for 20.000 h[3][4]		1200	3000	3300	
$Fr_{max.}$ 于 30.000 h[3][4]	$Fr_{max.}$ for 30.000 h[3][4]		500	1200	2100	
$Fa_{max.}$ 于 30.000 h[3][4]	$Fa_{max.}$ for 30.000 h[3][4]		1200	3000	3300	
抗扭刚性	torsional stiffness	Nm / arcmin	18	34	93	1
			12	25	68	2
重量	weight	kg	1,1	2,9	7,0	1
			1,5	3,3	9,0	2
运转噪音[5]	running noise[5]	dB(A)	58	60	65	
最大输入速度[6]	max. input speed[6]	min^{-1}	13000	7000	6500	

型号	size		PLFE 64	PLFE 90	PLFE 110	i [1]
最大输入速度在 50% T_{2N} 和 S1模式[6][7]	max. middle input speed at 50% T_{2N} and S1[6][7]	min^{-1}	3600	2750	2450	3
			4450	2800	2550	4
			4500	3400	2650	5
			4500	4000	3500	8
			4500	4000	3200	9
			4500	4000	3300	12
			4500	4000	3500	15
			4500	4000	3500	16
			4500	4000	3500	20
			4500	4000	3500	25
			4500	4000	3500	32
			4500	4000	3500	40
			4500	4000	3500	64

型号	size		PLFE 64	PLFE 90	PLFE 110	i [1]
最大输入速度在 100% T_{2N} 和 S1模式[6][7]	max. middle input speed at 100% T_{2N} and S1[6][7]	min^{-1}	3000	1900	1700	3
			3200	1800	1700	4
			3650	2250	1700	5
			4500	4000	3250	8
			4150	2500	2000	9
			4500	3200	2000	12
			4500	4000	2650	15
			4500	3800	2450	16
			4500	4000	2900	20
			4500	4000	3500	25
			4500	4000	3500	32
			4500	4000	3500	40
			4500	4000	3500	64

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 级数
(3) 这些数据在下列条件下测得:输出转速n2=100min-1,电机在占空因数KA=1及S1连续工作制下,温度T=30°C
(4) 参考法兰输出轴的表面
(5) 噪音检测标准; 距离1m; 在输入转速 n_1=3000min-1; i=5
(6) 必须保证允许的工作温度; 特殊的输入转速请联系确认
(7) 定义见81页

(1) ratios($i=n_{an}/n_{ab}$)
(2) number of stages
(3) these values refer to a speed of the output shaft of n_2=100min-1 on duty cycle K_A=1 and S1-mode for electrical machines and T=30°C
(4) refering to the face of the flange output shaft
(5) sound pressure level; distance 1m; measured on idle running with an input speed of n_1=3000min-1; i=5
(6) allowed operating temperature must be kept; other input speeds on inquiry
(7) definition see page 81

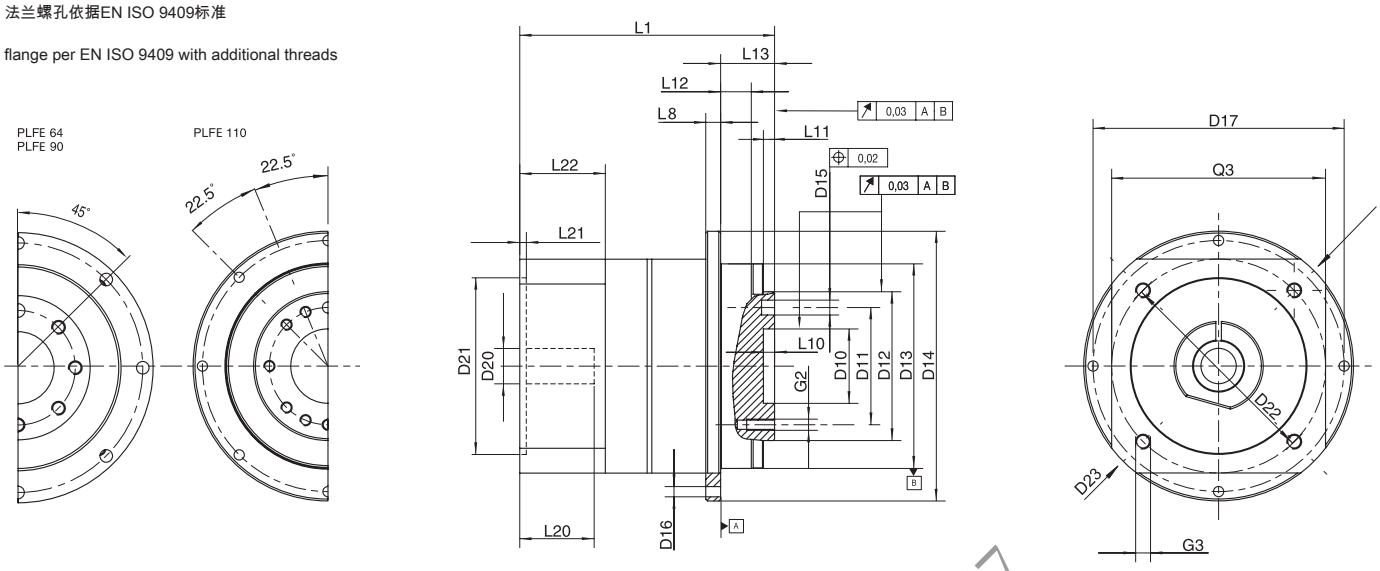
型号	size		PLFE 64	PLFE 90	PLFE 110	i (1)
惯量(2)	inertia(2)	kgcm²	0,183	1,01	3,43	3
			0,123	0,67	2,28	4
			0,097	0,53	1,84	5
			0,071	0,41	1,45	8
			0,145	0,79	2,87	9
			0,134	0,75	2,75	12
			0,087	0,73	2,68	15
			0,101	0,54	1,96	16
			0,084	0,45	1,84	20
			0,084	0,44	1,64	25
			0,074	0,46	1,42	32
			0,073	0,46	1,40	40
			0,071	0,45	1,38	64

(1) 减速比($i=n_{an}/n_{ab}$)
(2) 转动惯量与传动轴和标准发动机轴直径D20有关。

(1) ratios($i=n_{an}/n_{ab}$)
(2) the moment of inertia relates to the input shaft and to standard motor shaft diameter D20

法兰螺孔依据EN ISO 9409标准

flange per EN ISO 9409 with additional threads



型号	size		PLFE 64	PLFE 90	PLFE 110	Z (2)
所有尺寸均以毫米为单位	all dimensions in mm					
D10 定位凸台	D10 centering	H7	20	31,5	40	
D11 安装孔分布圆	D11 hole circle diameter		31,5	50	63	
D12 定位凸台	D12 centering	h7	40	63	80	
D13 定位凸台	D13 centering		64	90	110	
D14 外径	D14 outside diameter		86	118	145	
D15 孔x深度	D15 bore x depth	H7	5x6	6x7	6x7	
D16 轴中心孔	D16 pinion bore		4,5	5,5	5,5	
D17 安装孔分布圆	D17 hole circle diameter		79	109	135	
D20 轴中心孔(1)(4)	D20 pinion bore(1)(4)		9	14	19	
D21 中心孔(1)	D21 center bore for motor(1)		40	80	95	
D22 安装孔分布圆(1)	D22 hole circle diameter(1)		63	100	115	
D23 对角尺寸	D23 diagonal dimension		80	116	145	
G2 螺纹x深度	G2 thread x depth		7xM5x7	7xM6x10	11xM6x12	
G3 安装螺纹x深度(1)	G3 mounting thread x depth(1)(4)	4x	M5x12	M6x15	M8x20	
L1 总长(3)	L1 overall length(3)		69,5	99	125	1
			82	116,5	152	2
L8 法兰厚度	L8 flange thickness		4	7	8	
L10 定位凸台厚度	L10 length of centering		4	6	6	
L11 定位凸台厚度	L11 spigot depth		3	6	6	
L12 定位凸台厚度	L12 spigot depth		7	10	10	
L13 输出法兰长度	L13 length of output flange		19,5	30	29	
L20 马达轴长度(3)	L20 motor shaft length(3)		23	30	40	
L21 电机定位凸台深度	L21 motor location depth		2,5	3,5	3,5	
L22 输入法兰厚度(3)	L22 motor flange length(3)		24,5	33,5	47,5	
Q3 法兰截面(1)	Q3 flange section(1)	□	60	90	115	

(1) 这些参数与所配套的电机型号有关，详见第74页
(2) 级数
(3) 如果所配的电机轴 L20 比表中所给尺寸更长，那么L22和L1应根据所配电机轴长度适当加长
(4) 于 j6; k6

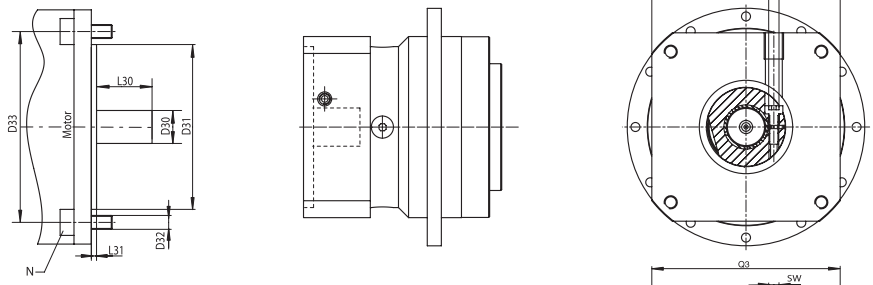
(1) dimensions refer to the mounted motor-type, see page 74
(2) number of stages
(3) for longer motor shafts L20 applies: The measured motor flange length L22 and overall length L1 will be lengthened
(4) for shaft fit j6; k6

OP 2: 可能的电机装配方式

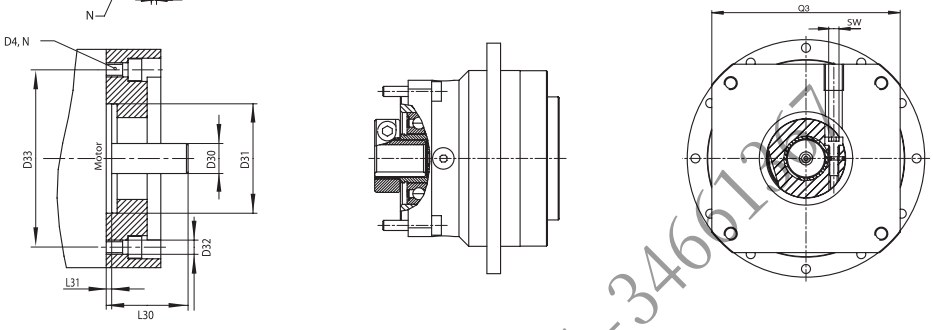
OP 2: possible motor mounting

页 page 77 更多的选配方式 other options

B5



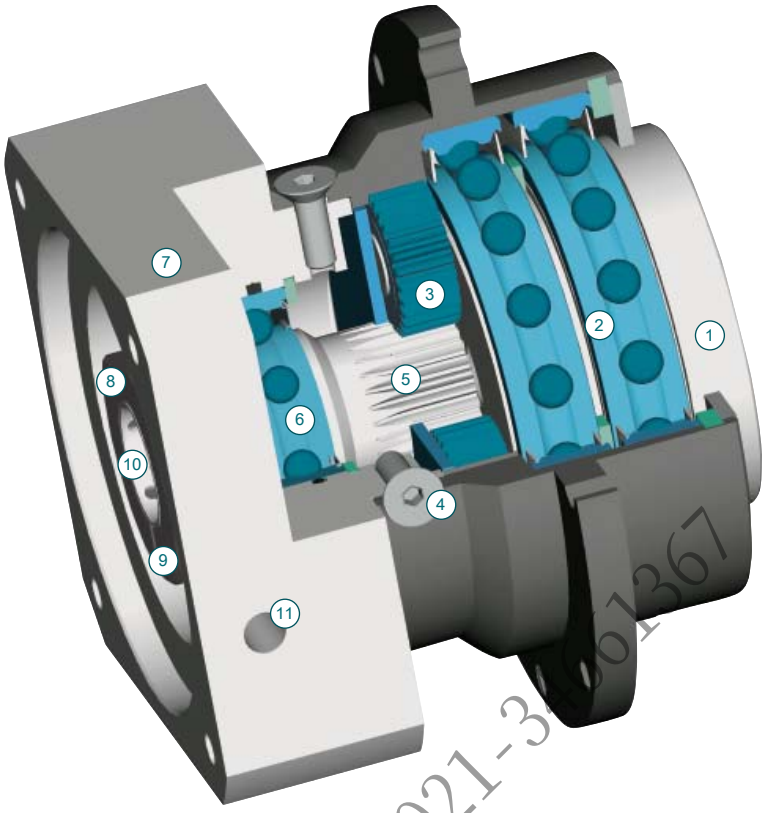
B14



型号	size		PLFE 64	PLFE 90	PLFE 110	Z [2]
D4 轴中心孔[3]	D4 pinion bore[3]		任意/any	任意/any	任意/any	
D30 电机轴直径[1][5]	D30 motor shaft diameter[1][5]	mm	6/6,35/8/9/ 9,525/11/14/ 16/19	9,525/10/11/12/ 12,7/14/16/19/ 22/24	11/12,7/14/15,875/ 16/19/22/24/28/ 32/35	
D31 电机定位凸台[3]	D31 motor spigot[3]		任意/any	任意/any	任意/any	
D32 轴中心孔[3]	D32 pinion bore[3]		任意/any	任意/any	任意/any	
D33 安装孔分布圆[3]	D33 hole circle diameter[3]		任意/any	任意/any	任意/any	
G4 螺纹	G4 thread		任意/any	任意/any	任意/any	
L30 最短马达轴长度[1]	L30 min. motor shaft length[1]	mm	16 (19[6])	19 (21[7])	21 (26[8])	
L31 定位凸台厚度	L31 spigot depth		任意/any	任意/any	任意/any	
N 安装孔的数量	N numbers of mounting bores		4	4	4	
Q3 法兰截面[1]	Q3 flange section[1]	□	60	90	115	
最大.电机重量[4]	max. motor weight[4]	kg	3,5	9	16,5	
马达类型[1]	motor type[1]		B5/B14	B5/B14	B5/B14	
紧固螺丝扭矩	torque clamping screw	Nm	4,5/9,5	9,5/16,5	16,5/40	
SW 内六角扳手型号	SW wrench width	mm	3/4	4/5	5/6	

[1] 其它尺寸请联系确认
[2] 级数
[3] 如果可能请给出法兰的相关参数
[4] 与电机装配的水平度和稳定性有关
[5] 与电机轴配合精度: j6; k6
[6] D30 > 14 mm
[7] D30 > 19 mm
[8] D30 > 24 mm

[1] other dimensions on inquiry
[2] number of stages
[3] if possible with the given flange dimensions
[4] refered to horizontal and stationary mounting
[5] shaft fit: j6; k6
[6] D30 > 14 mm
[7] D30 > 19 mm
[8] D30 > 24 mm



1 输出轴
高强度一体结构行支架和输出轴

2 输出轴轴承
深沟球轴承与密封圈连接

3 行星轮
高精度直齿行星轮，形状和凸度经过优化，表面经过硬化及珩磨处理

4 齿轮
硬化齿廓，最小的磨损，阻止背隙的增加

5 太阳轮
高精密机器制造，优化齿轮外形， 硬化和珩磨处理提供高的承载能力，最小的磨损，阻止背隙的增加

6 太阳轮轴承
高速球轴承的浮动设计可以消除输入端的热传导，然而还可以提供以太阳轮更容易的安装位置

7 适配法兰
减速机输入端允许与任何伺服电机相连接，材质为铝合金导热性更好

8 夹紧环
动平衡夹紧环允许更高的转速，钢质结构可以提供更高的传输扭矩

9 夹紧螺钉
高强钢螺栓细牙螺纹可以提供更高的夹紧力

10 PCS-2系统
PCS-2系统高精度夹紧系统-当前最值得信赖的先进系统

11 安装螺孔
夹紧螺栓安装孔

1 output flange shaft
high strength one piece planet carrier & output shaft

2 output shaft bearing
large deep groove ball bearings with contact seals

3 planet gear
precison zero helix angle gear with optimized profile modifications and crowning; case hardened and hard finished by honing

4 housing with integrated ring gear
ring gear case hardened for high load ability, minimum wear, consistent backlash

5 sun gear
precision machined optimized gear profile, case hardened and honed for high load ability, low noise run, minimum wear and consistant backlash

6 bearing for sun gear
high speed ball bearings in floating design eliminating thrust loads from thermal expansion, yet providing exact sungear position for easy mounting

7 motor adapter plate
allows to match up the gear head with virtually any servo motor, made of aluminum for enhanced thermal conductivity

8 clamping ring
balanced ring sutiable for high rpm, made of steel to allow high clamping forces for safe torque transfer

9 clamping screw
high strength steel screw with special low pitch thread to generate a high clamping force

10 PCS-2 System
Precision Clamping System - most reliable advanced system available today

11 assembly bore
access bore for the clamping screw

PLN 70 – 3 / Motor – OP 5 + 14

系列 *line*	型号 *size*	减速比 i *ratio i*	电机详述 *motor designation*	选择 *options*	页 *page*
PLN					
	PLN 70	3 – 100	(制造商-型号)	OP 2	12
	PLN 90		*(manufacturer-type)*	OP 5	13
	PLN 115			OP 7	13
	PLN 142			OP 8	13
	PLN 190			OP 14	14
				OP 16	77
				OP 17	77
				OP 18	77
WPLN					
	WPLN 70	4 – 100	(制造商-型号)	OP 2	24
	WPLN 90		*(manufacturer-type)*	OP 5	25
	WPLN 115			OP 7	25
	WPLN 142			OP 8	25
				OP 14	26
				OP 16	77
				OP 17	77
PLFN					
	PLFN 64	4 – 100	(制造商-型号)	OP 2	36
	PLFN 90		*(manufacturer-type)*	OP 16	77
	PLFN 110			OP 17	77
	PLFN 140			OP 18	77
PLE					
	PLE 40	3 – 512	(制造商-型号)	OP 1	50
	PLE 60; PLE 60/70		*(manufacturer-type)*	OP 2	52
	PLE 80, PLE 80/90			OP 6	77
	PLE 120, PLE 120/115			OP 12	77
	PLE 160			OP 16	77
				OP 17	77
WPLE					
	WPLE 40	3 – 512	(制造商-型号)	OP 2	66
	WPLE 60		*(manufacturer-type)*	OP 6	77
	WPLE 80, WPLE 80/90			OP 12	77
	WPLE 120, WPLE 120/115			OP 16	77
				OP 17	77
PLFE					
	PLFE 64	3 – 64	(制造商-型号)	OP 2	74
	PLFE 90		*(manufacturer-type)*	OP 12	77
	PLFE 110			OP 16	77
				OP 17	77

OP 1:	任意输入轴(1)	***OP 1:***	***free input shaft (1)***
OP 2:	电机装配	***OP 2:***	***motor mounting***
OP 5:	花键轴(1)	***OP 5:***	***spline shaft (1)***
OP 6:	光轴 无螺纹孔，无键，无键槽的型号	***OP 6:***	***smooth output shaft*** *Version without threaded bore, without parallel key, and without parallel key groove*
OP 7:	带键的输出轴DIN 6885 T1(1)	***OP 7:***	***output shaft with key DIN 6885 T1 (1)***
OP 8:	特殊输出轴(1)	***OP 8:***	***special shaft (1)***
OP 12:	**ATEX**(1) 认证由ATEX 94/9 EG II的 2G/3G 温度等级: T4 X 特性表将按照附加参数表而变动	***OP 12:***	***ATEX (1)*** *qualified after ATEX 94/9 EG for group II category 2G/3G* *temperature class: T4 X* *power data will change ask for separate data sheet!*
OP 14:	(W)PLS系列减速器输出轴尺寸	***OP 14:***	***dimensions for the (W)PLS output***
OP 16:	食品润滑 用于有特殊的卫生规定时的润滑	***OP 16:***	***Food-grade lubrication*** *special lubrication for application with special hygiene regulations*
OP 17:	低温润滑 用于极度低温时的润滑，注意特殊条件	***OP 17:***	***Low temperature lubrication*** *special lubrication for application at extremely low temperatures; observe special conditions*
OP 18:	降低的扭转间隙	***OP 18:***	***reduced backlash***
其他选项请联系确认		***other options on inquiry***	

(1) 请联系确认

(1) *on inquiry*

转换表格	1 mm	0.0394 in
	1 N	0.225 lb_f
	1 kg	2.205 lb
	1 Nm	8.85 in lb
	1 kgcm^2	8.85 x 10^{-4} in lb s^2

conversion table	*1 mm*	*0.0394 in*
	1 N	*0.225 lb_f*
	1 kg	*2.205 lb*
	1 Nm	*8.85 in lb*
	1 kgcm^2	*8.85 x 10^{-4} in lb s^2*

1) 需求减速机扭矩比率

应用详细数据可否获得?
(加速度- 减速扭矩， 负载和电机惯量， 速度， 周期， 等.)

是 → I: 需求减速机扭矩比率

$T_{RGRT} = T_{MAT}$ (最大应用扭矩)

否 ↓

一些基本应用数据可否获得?
(电机峰值扭力，负载和电机惯量或惯量配比率)

是 → II: 需求减速机扭矩比率

$T_{RGRT} = [(T_{Mpeak}-T_{LR}) * (1-k)+T_{LR}] * i$

否 ↓

选型仅仅依据电机扭矩
(峰值扭矩， 额定扭矩)

A → A: 选择减速机可能被选小

$T_{RGRT} = T_{Mpeak} * i$

B → B: 选择减速机可能被选小

$T_{RGRT} = T_{Mcont} * i$

C: 减速机选型充分， 减低减速机选小的可能性

$T_{RGRT} = T_{Mcont} * 2,5 * i$

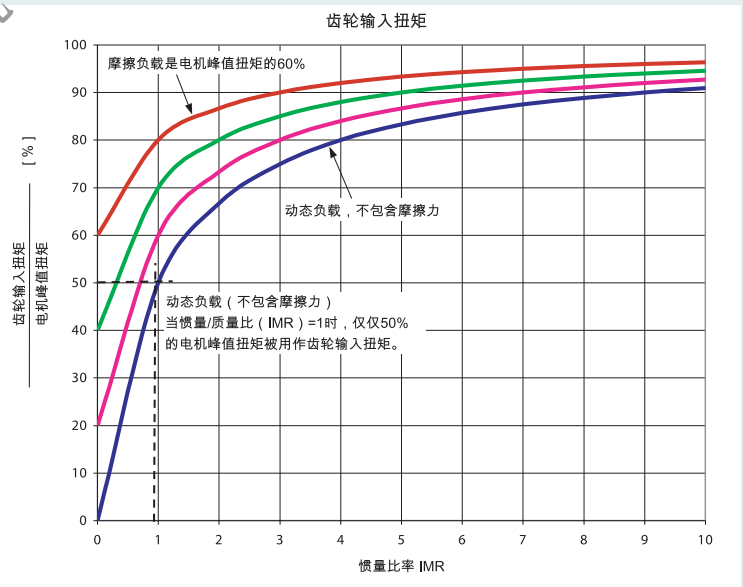
依据标准选择减速机

$T_{RGRT} \leq T_{2N}$ (2)

(1) 推荐编译日期和使用选型方案 I 或 II

(2) 短的运转时间和低的运转率选择减速机能够依据 $T_{RGRT} < 1,6 * T_{2N}$. 也可以寻求Neugart寻求帮助。

T_{RGRT}	- 减速机需求扭矩评估
T_{MAT}	- 峰值应用扭矩
T_{Mpeak}	- 电机峰值扭矩
T_{Mcont}	- 电机额定扭矩
T_{2N}	- 减速机评估扭矩
i	- 减速比
T_L	- 摩擦力负载（不含动态负载）
T_{LR}	- $T_{LR} = T_L / i$ 输入负载扭矩
J_M	- 电机惯量
J_L	- 负载惯量
J_{LR}	- $J_{LR} = J_L / i^2$ 负载惯量参考输入
k	- $k = J_M / (J_{LR} + J_M)$ 惯量参数
IMR	- $IMR = J_{LR} / J_M$ 惯量匹配率；与惯性参量紧密地相关 $(k = 1 / (IMR+1)$



2) 检查电机 / 选择减速机可能安装尺寸

- 电机轴径 <= 最大可能输入轴径 (太阳轮) 孔?
- 允许电机重量 / 支撑需求?

3) 检查输出轴径向力和轴向力的负载能力 / 输出轴承寿命 (如果可能)

4) 检查应用 / 周围的环境 - 不用置疑的联系Neugart寻求帮助

- IP等级是否适当?
- 是否意味输入速度比推荐值更高?
- 检查工作温度是否比推荐值更高?

1) required gearhead torque rating

detailed application data available? (acceleration- deceleration- torques, load and - motor inertias, speeds, cycle times, etc.)

yes → I: required gearhead torque rating

$T_{RGRT} = T_{MAT}$ (Max. Applikationsmoment)

no ↓

some basic application data available? (motor peak torque, load and motor inertia or inertia match ratio)

yes → II: required gearhead torque rating

$T_{RGRT} = [(T_{Mpeak} - T_{LR}) * (1-k) + T_{LR}] * i$

no ↓

selection only based on motor torque (peak-torque, continuous duty torque)

A → A: selected gearhead could be oversized

$T_{RGRT} = T_{Mpeak} * i$

B → B: selected gearhead could be undersized

$T_{RGRT} = T_{Mcont} * i$

C: gearhead selection adequate, slight probability of gearhead under-sizing[1]

$T_{RGRT} = T_{Mcont} * 2,5 * i$

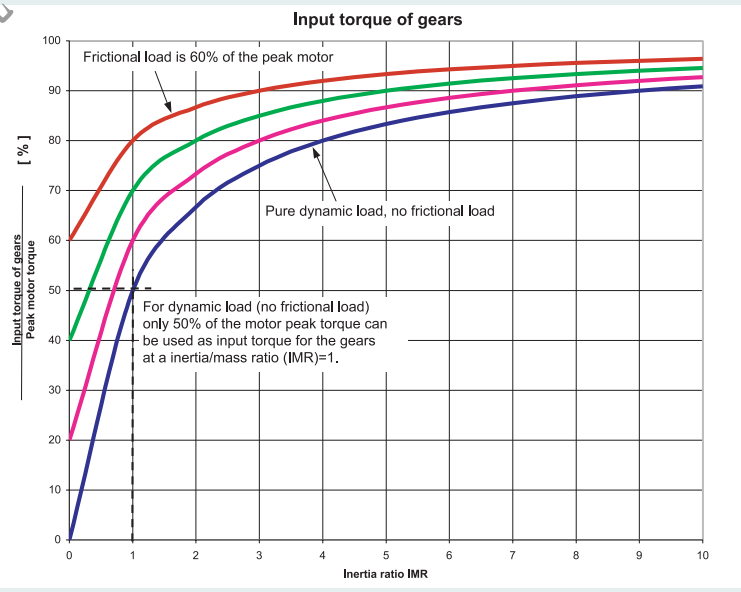
select gearhead size based on the criteria:

$T_{RGRT} \leq T_{2N}$ [2]

[1] it is recommended to compile date and use selection method I or II

[2] short cycle times and low cycle rates application gearhead can be perhaps selected based on $T_{RGRT} < 1,6 * T_{2N}$. Contact Neugart for assistance.

T_{RGRT}	- required gearhead torque rating
T_{MAT}	- peak application torque
T_{Mpeak}	- peak motor torque
T_{Mcont}	- continuous duty motor torque
T_{2N}	- gearhead rated torque
i	- ratio
T_L	- friction load (non-dynamic load)
T_{LR}	- $T_{LR} = T_L / i$ load torque at the input
J_M	- motor inertia
J_L	- load inertia
J_{LR}	- $J_{LR} = J_L / i^2$ reflected load inertia to the input
k	- $k = J_M / (J_{LR} + J_M)$ inertia parameter
IMR	- $IMR = J_{LR} / J_M$ inertia match ratio; is closely related to inertia parameter ($k = 1 / (IMR+1)$)



2) check motor / selected gearhead geometrical compatibility

- motor shaft diameter <= max possible input pinion (sun-gear) bore?
- motor weight permissible / support required?

3) check output shaft radial and axial load ability / output shaft bearing life (if applicable)

4) check application / ambient conditions – In doubt please contact Neugart for assistance

- Is IP class adequate?
- Is mean input speed higher than the recommended?
- Is operating temperature higher than recommended?

Neugart 行星减速机针对标称转矩（T_{2N}）设计，
具备性能稳定的特点。只要应用转矩不超过标称转矩，
就无需重新进行计算调整。
但在出现短暂转矩峰值或在长时间断续运转过程中，
仍可能产生更高的应用转矩。
通过图1可以进行大致估算。

At T_{2N} (nominal torque), Neugart's planetary gearboxes are designed for high-cycle operation, in other words if the application torques are always less than the nominal torque, no recalculation is necessary.
However, it is possible to transfer higher application torques in the case of short torque peaks or long periods of intermittent duty.
Figure 1 serves as guideline.

放大系数与输出轴转速之间的关系

Increase factor depending on the number of output shaft rotations

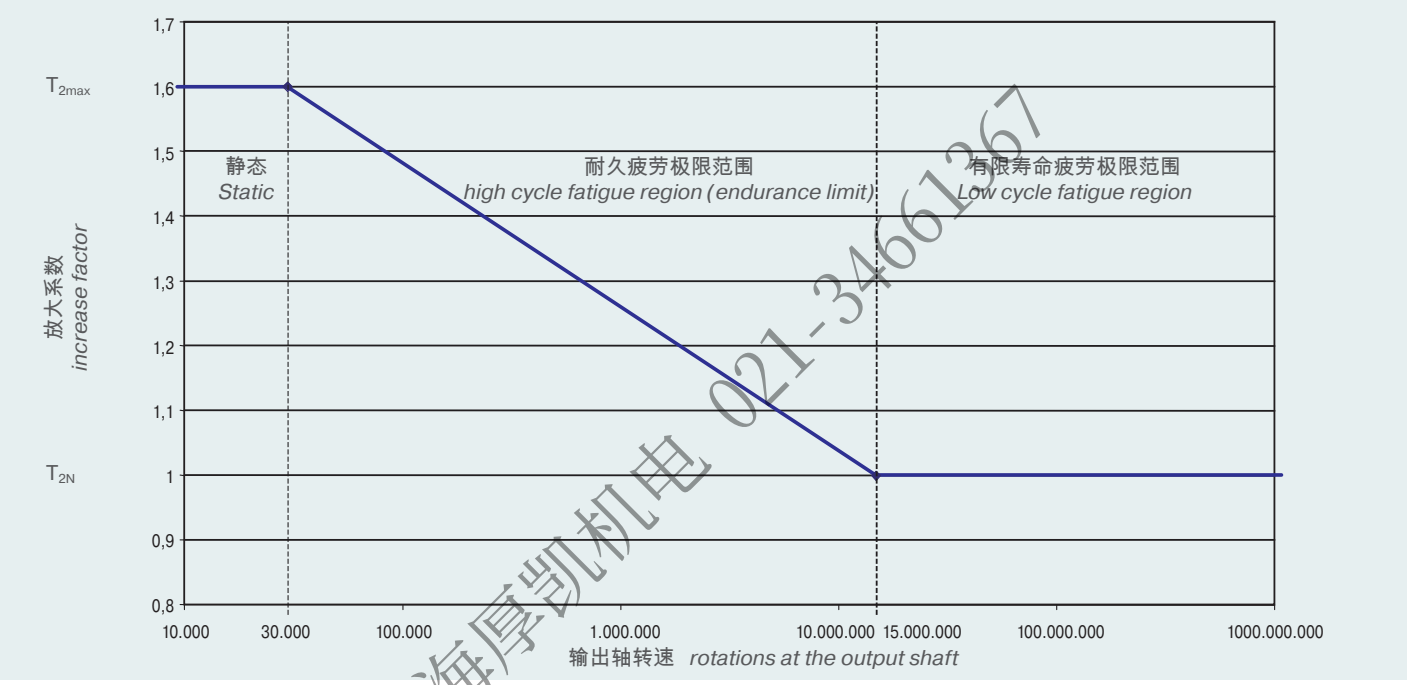


图 1

最大应用转矩不得超过1.6 x T2N。
输出轴在最大应用转矩下的转速可以通过计算得出。
如果转速（no.）大于15000000，
减速机只能承受标称转矩。
如果转速小于15000000，
可以用下面的公式计算出放大系数：

figure 1

*The max. application torque must not exceed 1.6*T_{2N}.
The number of rotations of the output shaft at the max. torque has to be calculated. If the number of rotations (no.) is larger than 15,000,000, the gearbox may only be subjected to the nominal torque of the gearbox. If the number of rotations is smaller than 15,000,000, the increase factor can be calculated by means of the following formula:

$$f = -0{,}1039 \times \ln\left(\frac{10^5}{30000} \times No.\right) + 2{,}79$$

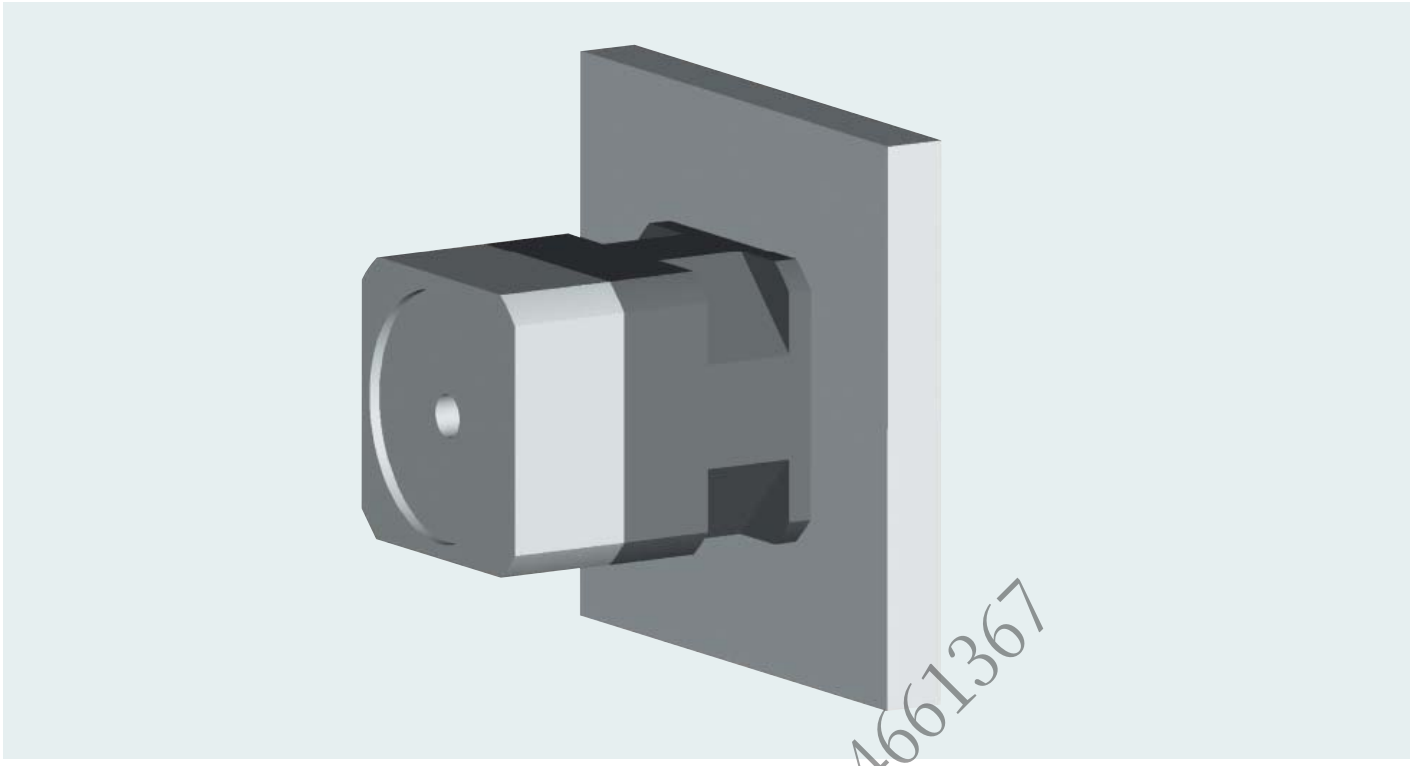
$$f = -0{,}1039 \times \ln\left(\frac{10^5}{30000} \times No.\right) + 2{,}79$$

如果 f>1.6，则应将f设为1.6。
如果f<1.0，则应将f设为1.0。

If f>1.6; f is set to f=1.6
If f<1.0; f is set to f=1.0

减速机最大可传递转矩（T_{2max}）的计算方法为：
$T_{2max} = f \times T2N$
最大应用转矩不得超过计算得出的减速机最大输出转矩。$T_{2max} \leq T_{2application}$

The max. transferable torque T_{2max} of the gearbox is then calculated by means of: $T_{2max} = f * T_{2N}$
The max. application torque must not exceed the calculated max. output torque of the gearbox:
$T_{2max} \leq T_{2application}$



计算平均速度

$$n_m = \frac{n_1 \cdot t_1 + \ldots + n_x \cdot t_x}{t_1 + \ldots + t_x}$$

假设周围环境:

- 电机不会使减速机温升
- 安装面尺寸 (方形) = 2*减速机尺寸
- 安装面材质: 钢
- 传导不受损失 (无减速机直接散热)
- 环境温度: 30°C
- 安装面直接与机床连接: 机床温度 (30°C)

当实际需要100%的输出扭力:
如果热量产生小于平均100%扭力输出时的热容量, 减速机的温度上升时可接受的。

当实际需要50%的输出扭力:
如果热量产生小于平均50%扭力输出时的热容量, 减速机的温度上升时可接受的。

如果条件不适宜, 请降低速度或联系Neugart。

calculation of average speed:

$$n_m = \frac{n_1 \cdot t_1 + \ldots + n_x \cdot t_x}{t_1 + \ldots + t_x}$$

Assumed surrounding conditions:

- *Motor does not heat up the gearbox*
- *Plate size (square) = 2*gearbox size*
- *Plate material: steel*
- *Convection is not impaired (no housing in the direct proximity of the gearbox)*
- *Surrounding temperature: 30°C*
- *Plate connection on machine bed: one-sided (30°C)*

In the case of a required output torque of 100%:
If n_m is less than the average thermal speed at 100% load, the gearbox is thermally suitable.

In the case of a required output torque of 50%:
If n_m is less than the average thermal speed at 50% load, the gearbox is thermally suitable.

If conditions are unfavourable, please reduce the speeds or consult Neugart.

总有一款独立的解决方案。

根据客户需求的特殊解决方案有：行星变速器、正齿轮变速器以及锥齿轮变速器，也可以根据需要任意组合各种变速器。

在对驱动轴进行量体设计时，我们高素质、经验丰富的工程技术人员一直致力于将最新的研究成果和技术发展运用到设计中去。

借助现代工艺及设计工具可实现设备制造（例如打印机、操作系统、压铸机或涂装机械手设备）、医学技术及模型制造等领域中的各项应用。开创崭新的未来

Always an individual solution.

Customer-specific solutions such as planetary, spur-gear and bevel gearboxes as well as any combination of these types of gears.

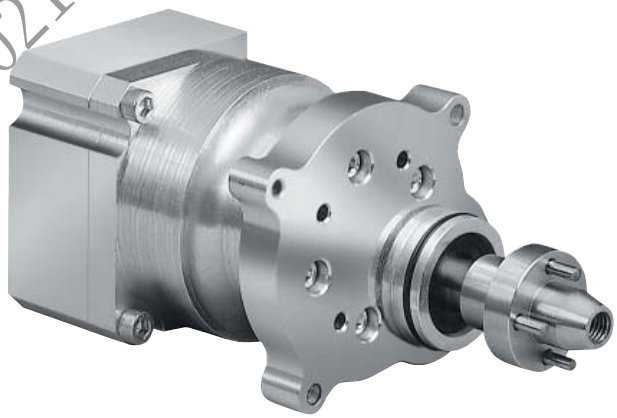
Our qualified and experienced engineering employees ensure that the latest research and developments are used in the design of customised drive solutions.

Using modern design and development tools, applications from all areas of system design (for instance, printing presses, handling systems, die-cast machines and robot painting systems), medical engineering and model building are realised. For new perspectives.

特种减速机 案例
custom made gearboxes some examples

寻找最佳点：
用于涂装机械手的行星变速器

Searching for the optimum:
Planetary offset gearbox for a painting robot



任务
在重新设计涂装机械手时，应对已有的CNC驱动轴（用于喷射头的转轴和摆轴）加以优化 – 减轻重量、缩短变速器的长度以及提高标称转矩。
同时也应简化安装及拆卸作业。

解决方案
为满足这些需求，我们在齿轮和行星档位的基础上特别研制出组合式变速器。 由此，除了可符合一般的使用寿命和荷载安全性能要求外，也可满足客户所给出的安装室尺寸限制并实现极小的转动间隙。

The task
For a redesign of a painting robot, the existing CNC drives for the rotating and swivelling axes of the spray head are to be optimised - with a weight reduction, a shortening of the gearbox and increase in the nominal torque. Simplified assembly and disassembly were also requested.

Our solution
In order to fulfill these demands, we developed a combined gearbox out of a spur-gear and planetary stage. In addition to the usual criteria such as service life and over-load safety, we were also able to realise the limited space requirements and the low backlash that the customer had specified.

特种减速机 案例
custom made gearboxes some examples

非比寻常的挑战：
用于旋转门的锥齿轮变速器

An extraordinary challenge:
Bevel gears for revolving-door drives

任务
对于旋转门系列来说现今已有各种不同的变速器解决方案 – 我们的目标是研发出一种可适用于各种旋转门的万用方案。 该锥齿轮变速器的设计应平滑、噪音极低。重量也至关重要。

解决方案
一般的锥齿轮行星齿轮变速器无法满足这些需求。我们为此设计出一种带有锥齿轮的行星变速器。巨大的挑战： 它可最大程度的降低噪音、节省建筑空间并提高转矩。

输出轴一侧的冠轮啮合系统串接有2档行星变速器，它们被内置在铝制外壳内。 为避免产生噪音，所有齿轮、外壳以及电机安装系统均采用优化噪声的设计。

The task
For one revolving door model series there exist numerous gearbox solutions – thus it was our goal to develop a single gearbox solution that can operate the various revolving doors. The bevel gearbox should have a flat, low-noise design. Weight also played an important role.

Our solution
The demands did not allow for use of standardised bevel planetary gearboxes. Instead, we designed a planetary gearbox with a bevel stage. A great challenge: The operating noise should be minimised, the space requirements reduced and the torque increased.

A crown gearing with an upstream 2-stage planetary gearbox was integrated on the output side of an aluminium housing. To reduce the operating noise, all gear teeth, the housing and the motor extension were optimised for reduced noise.

齿轮
spur-toothed wheel

磨削齿轮，
表面精度可达5级，
模数 0.5-3，
最大外径 250 mm

spur-toothed wheel with grounded
and honed tooth profile up to quality 5,
module 0,5–3
max. outside diameter 250 mm

内齿轮
Internal gearing

清除/碰撞
模块0.3 – 3至质量7

broached/shaped
Module 0.3 - 3 up to quality 7

齿条
spur racks

齿条， 直齿，
可达模数4; 长度 1000mm

齿条， 斜齿，
可达模数1.25; 长度400 mm

spur racks, straight spur toothed,
up to module 4; length 1000 mm

spur racks, helical toothed,
up to module 1,25; lenght 400 mm

伞齿轮
bevel gears

伞齿轮，铣削，
直齿可达模数1.4；最大直径100mm

伞齿轮，磨削，
直齿可达模数2；最大直径120mm

bevel gears, milled, straight spur toothed
up to module 1,4; max. diameter 100 mm

bevel gears, planed, straight spur toothed,
up to module 2; max. diameter 120 mm

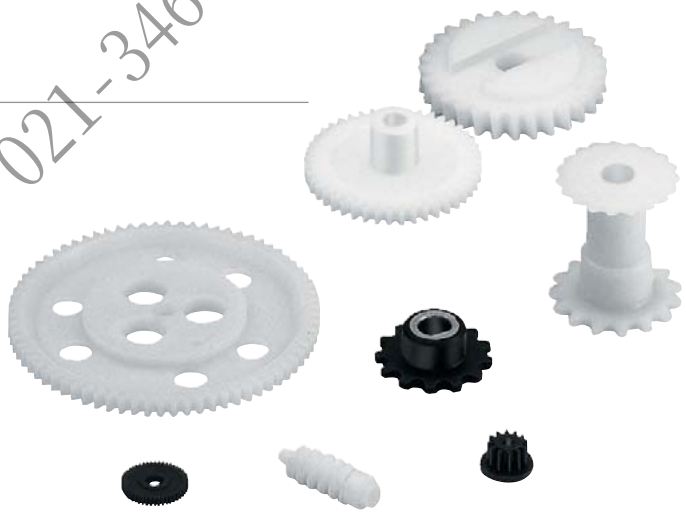
特殊部件
customer-specific parts

- 个性化的产品结构
- 专业的支持在结构设计到最终的产品

材料
- 尼龙
- 聚乙烯
- 塑料
- PEEK

- *individual tool construction*
- *specialized support in the construction phase to end product*

our material
- *Polyamide*
- *Polyethylene*
- *Teflon*
- *PEEK*



蜗轮和蜗杆
worm and thread shafts

蜗轮和蜗杆，
精密铣削可达模数2

worm and thread shafts, precision-milled
up to module 2