最短的准双曲面齿轮直角行星减速机，带有法兰输出轴和空心轴

我们的 **WPSFN** 凭借其标准法兰接口，可以特别轻松迅速地集成到系统里，而且具备很高的抗扭刚度。它凭借准双曲面齿轮、斜齿行星级、以及优化的同步，达到最佳的表面质量。最短的直角高精度行星减速机，集成了空心轴的1级设计，为您提供了新的设计解决方案。

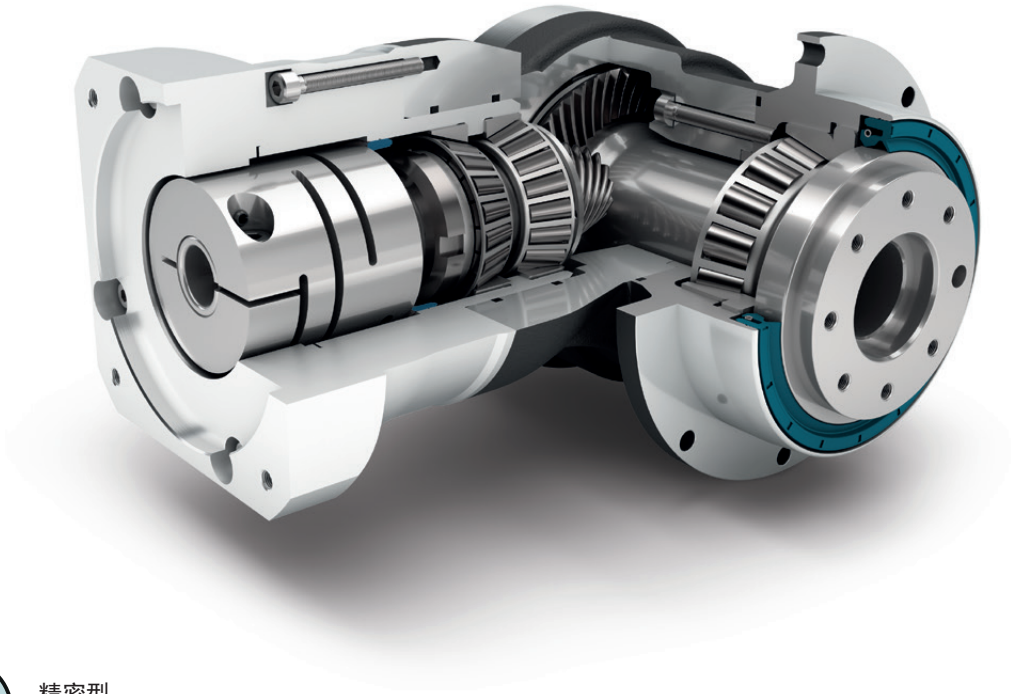
The shortest hypoid-toothed right angle gearbox with flange output shaft and hollow shaft

Our **WPSFN** is particularly easy and quick to integrate thanks to its standardized flange interface and offers high torsional rigidity. With its hypoid gearing, as well as the helical-toothed planetary stage, it achieves optimal synchronization for best surface qualities. The shortest right-angle precision gearbox, in a single-stage design with integrated hollow shaft, offers you new design solutions.

额定扭矩 Nominal output torque	**22 - 625 Nm**
径向力 Radial force	**2150 - 12000 N**
轴向力 Axial force	**4200 - 9500 N**
回程间隙 Torsional backlash	**3 - 5 arcmin**
防护等级 Protection class	**IP65**

结构尺寸
Frame sizes

64 **90** **110** **140**



精密型
Precision Line

直角型减速机
Right angle gearbox

旋转方向 反方向
Counterdirectional rotation

准双曲面齿轮 直角箱
Hypoid gear right angle stage

圆形特大号输出法兰
Extra large round type output flange

配有预紧的角接触滚子轴承
Preloaded angular contact roller bearings

径向轴密封
Rotary shaft seal

法兰输出轴（按 ISO 9409-1 标准）
Flange output shaft (ISO 9409-1)

空心轴（1级）
Hollow shaft (1-stage)

可选：降低回程间隙（2级）
Option: Reduced backlash (2-stage)

可选：装有小齿轮的高精度减速机 132页
Option: Planetary gearbox with mounted pinion on page 132

技术特点的详细解释，请从第173页读起。
Detailed explanations of the technical features starting on page 173.

Code	减速机参数	Gearbox characteristics			WPSFN064	WPSFN090	WPSFN110	WPSFN140	p[1]
	使用寿命 (L_{10h})	Service life (L_{10h})	t_L	h	20.000				
	T_{2N} x 0,88 时的使用寿命	Service life at T_{2N} x 0,88			30.000				
	满载时效率[2]	Efficiency at full load[2]	η	%	94				1
					93				2
	最低工作温度	Min. operating temperature	T_{min}	°C	-25				
	最高工作温度	Max. operating temperature	T_{max}		90				
	防护等级	Protection class			IP65				
S	标准润滑	Standard lubrication			润滑油(终生润滑) / Oil (lifetime lubrication)				
F	食品级润滑	Food grade lubrication			润滑油(终生润滑) / Oil (lifetime lubrication)				
	安装位置	Installation position			任意 / Any				
S	标准回程间隙	Standard backlash	j_t	arcmin	< 5				
R	降低回程间隙	Reduced backlash			-				1
					< 3				2
	抗扭刚度[2]	Torsional stiffness[2]	c_g	Nm / arcmin	1,9 - 2,6	4,0 - 5,5	10,1 - 13,5	26,0 - 34,5	1
					5,3 - 6,9	15,3 - 20,5	33,5 - 44,0	85,0 - 111,0	2
	减速机重量[2]	Gearbox weight[2]	m_G	kg	3,5 - 3,6	6,6 - 7,0	11,6 - 11,7	25,4 - 26,0	1
					3,9 - 4,0	5,6 - 5,7	9,0 - 9,3	19,2 - 19,7	2
S	标准的箱体表面	Standard surface			直角箱体: 铝 – 阳极氧化处理 (黑色) Right angle housing: Aluminum – anodized (black)				
	运行噪音[3]	Running noise[3]	Q_g	dB(A)	66	67	68	70	
	基于减速机输入法兰的最大弯矩[4]	Max. bending moment based on the gearbox input flange[4]	M_b	Nm	12	25,5	53	120	1
					12	12	25,5	53	2

输出轴载荷	Output shaft loads			WPSFN064	WPSFN090	WPSFN110	WPSFN140	p[1]
20,000 h 径向力[5][6]	Radial force for 20,000 h[5][6]	$F_{r\,20.000\,h}$	N	2400	4400	5500	12000	1
				2150	3950	4900	12000	2
20,000 h 轴向力[5][6]	Axial force for 20,000 h[5][6]	$F_{a\,20.000\,h}$		4200	7200	9500	8500	1
				4300	8200	9500	8500	2
30,000 h 径向力[5][6]	Radial force for 30,000 h[5][6]	$F_{r\,30.000\,h}$		2100	3900	4800	11000	1
				1900	3500	4350	11000	2
30,000 h 轴向力[5][6]	Axial force for 30,000 h[5][6]	$F_{a\,30.000\,h}$		3700	6300	8400	7500	1
				3800	7200	8400	7500	2
最大径向力[7][6]	Maximum radial force[7][6]	$F_{r\,Stat}$		2400	4400	5500	12000	1
				2150	3950	4900	12000	2
最大轴向力[7][6]	Maximum axial force[7][6]	$F_{a\,Stat}$		4200	7200	9500	8500	1
				4300	8200	9500	8500	2
20,000 h 倾斜力矩[5][7]	Tilting moment for 20,000 h[5][7]	$M_{K\,20.000\,h}$	Nm	200	484	689	1989	1
				132	326	475	1030	2
30,000 h 倾斜力矩[5][7]	Tilting moment for 30,000 h[5][7]	$M_{K\,30.000\,h}$		175	429	601	1823	1
				117	289	422	944	2

转动惯量	Moment of inertia			WPSFN064	WPSFN090	WPSFN110	WPSFN140	p[1]
转动惯量[2]	Mass moment of inertia[2]	J	$kgcm^2$	0,502 - 0,672	1,046 - 1,591	4,857 - 6,435	15,220 - 21,693	1
				0,497 - 0,642	0,497 - 0,659	1,015 - 1,452	4,810 - 6,449	2

(1) 减速机级数
(2) 传动比相关的数值可在 Tec Data Finder 中检索 – www.neugart.com
(3) 距离减速机1 m 时: 在输入转速为 n_1=3000 min^{-1} 且无负荷时测得; i=5
(4) 最大电机重量* (单位 : kg) = 0.2 x M_b / 电机长度 (单位: m)
* 电机重量对称分布
* 水平和固定的安装位置
(5) 数据以 n_2=100 min^{-1} 的输出轴转速为准。
(6) 以输出轴中心为准
(7) 更改 T_{2N}, F_r, F_a 以及周期和轴承使用寿命时, 数值存在偏差(部分较高)。利用 NCP 针对应用进行专门设计 – www.neugart.com

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(4) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(5) These values are based on an output shaft speed of n_2=100 rpm
(6) Based on the end of the output shaft
(7) Other (sometimes higher) values following changes to T_{2N}, F_r, F_a, cycle, and service life of bearing. Application specific configuration with NCP – www.neugart.com

输出扭矩	Output torques			WPSFN064	WPSFN090	WPSFN110	WPSFN140	i[1]	p[2]
额定输出扭矩[3]	Nominal output torque[3]	T_{2N}	Nm	45	90	160	320	4	1
				42	75	140	280	5	
				28	51	91	189	7	
				27	50	90	180	8	
				22	40	75	160	10	
				62	130	310	625	16	2
				62	130	300	560	20	
				60	120	255	540	25	
				62	112	204	364	28	
				62	108	200	360	32	
				60	123	255	455	35	
				60	123	250	450	40	
				60	110	200	375	50	
				37	78	175	355	70	
				28	59	140	305	100	
最大输出扭矩[4]	Max. output torque[4]	T_{2max}	Nm	72	144	256	512	4	1
				67	120	224	448	5	
				45	82	145	302	7	
				43	80	144	288	8	
				35	64	120	256	10	
				99	210	502	1003	16	2
				99	210	480	896	20	
				96	197	408	864	25	
				99	180	328	580	28	
				99	172	320	576	32	
				96	197	410	725	35	
				96	197	400	720	40	
				96	175	320	600	50	
				59	125	280	568	70	
				45	94	224	488	100	

(1) 传动比 ($i=n_1/n_2$)
(2) 减速机级数
(3) 利用 NCP 针对应用进行专门设计 – www.neugart.com
(4) 允许输出轴转动30.000转; 参见第 166 页

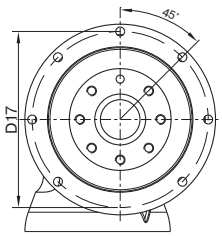
(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) 30,000 rotations of the output shaft permitted; see page 167

输出扭矩	Output torques			WPSFN064	WPSFN090	WPSFN110	WPSFN140	i[1]	p[2]
急停扭矩[3]	Emergency stop torque[3]	T_{2Stop}	Nm	100	200	400	800	4	1
				100	200	400	800	5	
				75	150	300	700	7	
				75	150	300	700	8	
				75	150	300	700	10	
				150	300	650	1600	16	2
				150	300	650	1600	20	
				150	300	650	1650	25	
				150	300	600	1200	28	
				150	300	600	1200	32	
				150	300	650	1500	35	
				150	300	650	1500	40	
				150	300	650	1500	50	
				80	175	340	1300	70	
				90	200	480	600	100	

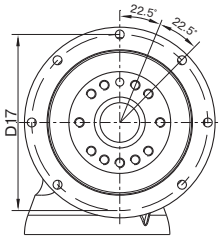
输入转速	Input speeds			WPSFN064	WPSFN090	WPSFN110	WPSFN140	i[1]	p[2]
T_{2N} 和 S1 时的平均热输入转速[4][5]	Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	min^{-1}	1850[6]	1650[6]	1100[6]	1000[6]	4	1
				2050[6]	1900[6]	1200[6]	1100[6]	5	
				2450[6]	2350[6]	1450[6]	1300[6]	7	
				2500[6]	2400[6]	1450[6]	1300[6]	8	
				2650[6]	2550[6]	1500[6]	1400[6]	10	
				2250[6]	2100[6]	1750[6]	1400[6]	16	2
				2400[6]	2300[6]	2000[6]	1350[6]	20	
				2500[6]	2600[6]	2300[6]	1450[6]	25	
				2550[6]	2650[6]	2400[6]	1650[6]	28	
				2550[6]	2700[6]	2450[6]	1650[6]	32	
				2750[6]	2850[6]	2450[6]	1650[6]	35	
				2800[6]	2750[6]	2500[6]	1650[6]	40	
				2750[6]	2900[6]	2650[6]	1750[6]	50	
				3000[6]	3300[6]	3000[6]	1950[6]	70	
				3050[6]	3600[6]	3300[6]	2150[6]	100	
最高机械输入转速[4]	Max. mechanical input speed[4]	n_{1Limit}	min^{-1}	16000	14000	9500	8000		1
				16000	16000	14000	9500		2

(1) 传动比 ($i=n_1/n_2$)
(2) 减速机级数
(3) 允许 1000 次
(4) 利用 NCP 针对应用设计转速 – www.neugart.com
(5) 定义请参见第 166 页
(6) 在 50% T_{2N} 输出和 S1 模式下 的平均热输入转速

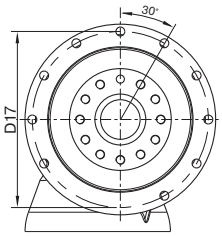
(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Permitted 1000 times
(4) Application-specific speed configurations with NCP – www.neugart.com
(5) See page 167 for the definition
(6) Average thermal input speed at 50% T_{2N} and S1



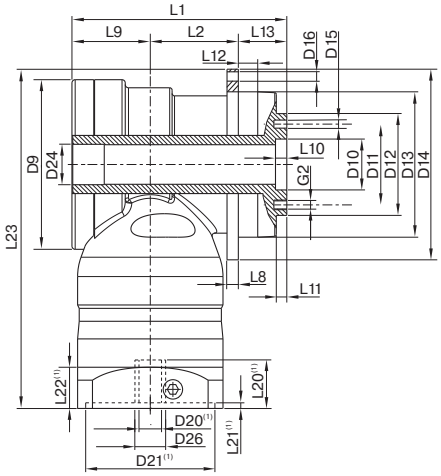
WPSFN064
WPSFN090

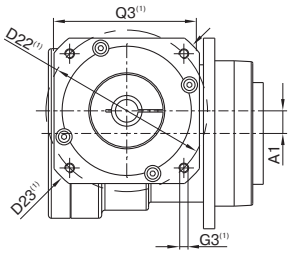


WPSFN110



WPSFN140





图示为带平键的 WPLN090 / 1 级 / 光滑输出轴 / 19 mm 锁紧系统 / 适配电机法兰 – 2 件式 – 圆形通用法兰 / B5 电机法兰类型
Drawing corresponds to a WPSFN090 / 1-stage / flange hollow output shaft / 19 mm clamping system / motor adaptation – 2-part – round universal flange / B5 flange type motor

(1) 具体尺寸视电机/减速机法兰而定。可以在 www.neugart.com 下 Tec Data Finder中针对每个电机适配电机特有的输入法兰几何尺寸。
(1) The dimensions vary with the motor/gearbox flange. The input flange dimensions can be retrieved for each specific motor in Tec Data Finder at www.neugart.com

几何尺寸(2)	Geometry(2)			WPSFN064	WPSFN090	WPSFN110	WPSFN140	p(3)	Code
轴向偏差	Axis offset	A1		10	14	20	26	1	
				10	10	14	20	2	
最大直径	Max. diameter	D9		86	105	120	170	1	
				86	86	105	120	2	
输出端定位凹槽直径	Centering diameter output shaft	D10	H7	20	31,5	40	50		
输出端安装孔节圆直径	Pitch circle diameter output shaft	D11		31,5	50	63	80		
输出轴定位凸台直径	Centering diameter output shaft	D12	h7	40	63	80	100		
法兰输出轴的直径	Flange output shaft diameter	D13		64	90	110	140		
输出法兰直径	Flange diameter output	D14		86	118	145	179		
输出端安装孔直径	Mounting bore output	D16		4,5 7x45°	5,5 7x45°	5,5 7x45°	6,6 10x30°	1	
				4,5 8x45°	5,5 8x45°	5,5 8x45°	6,6 12x30°	2	
输出法兰安装孔节圆直径	Pitch circle diameter output flange	D17		79	109	135	168		
最小总长	Min. total length	L1		104,5	132	153,5	201,5	1	
				122,5	139,5	154	224	2	
箱体长度	Housing length	L2		42	53,5	68	76,5	1	
				59,5	66,5	76,5	129,5	2	
输出端法兰厚度	Flange thickness output	L8		4	7	8	10		
偏差距离	Offset length	L9		43	48,5	56,5	87	1	
				43	43	48,5	56,5	2	
输出轴定位凸台深度	Centering depth output shaft	L10		4,5	6,5	6,5	6,5		
		L11		3	6	6	6		
输出法兰定位凸台深度	Centering depth output flange	L12		10	12	12	14		
输出法兰长度	Output flange length	L13		19,5	30,0	29,0	38,0		
最小总高度	Min. overall height	L23		179	210	260	323	1	
				179	195	223,5	277	2	
电机轴直径j6/k6	Motor shaft diameter j6/k6	D20		更多信息见第 163/164 页 More information on page 163/164					
输入端锁紧系统直径	Clamping system diameter input	D26							
带有定位销孔的法兰输出轴 (ISO 9409-1)	Flange output hollow shaft with dowel hole (ISO 9409-1)								
配合销孔 x 深度	Dowel hole x depth	D15	H7	5x5	6x6	6x6	8x8	1	H
空心轴直径	Hollow shaft diameter	D24		17	25	35	50		
数量 x 螺纹 x 深度	Number x thread x depth	G2		7 x M5x7	7 x M6x10	11 x M6x12	11 x M8x15		
法兰输出轴 (相似的 ISO 9409-1)	Flange output shaft (similar ISO 9409-1)							2	D
数量 x 螺纹 x 深度	Number x thread x depth	G2		8 x M5x7	8 x M6x10	12 x M6x12	12 x M8x15		
带有配合销孔的法兰输出轴 (ISO 9409-1)	Flange output shaft with dowel hole (ISO 9409-1)			-				2	E
配合销孔 x 深度	Dowel hole x depth	D15	H7	5x5	6x6	6x6	8x8		
数量 x 螺纹 x 深度	Number x thread x depth	G2		7 x M5x7	7 x M6x10	11 x M6x12	11 x M8x15		

(2) 所有的尺寸单位为mm
(3) 减速机级数

(2) Dimensions in mm
(3) Number of stages