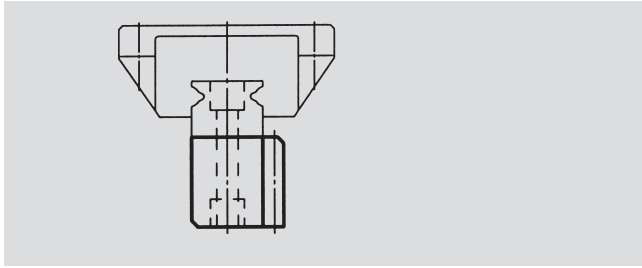


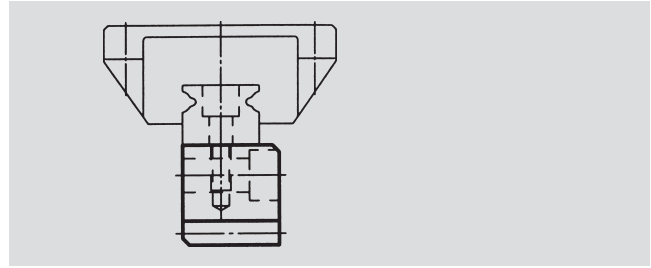


90°-安装 / 90° arrangement



- 不必再调整齿条和导轨
- 节省空间和最佳性能的设计可以实现
- 不同型号的组合齿条达到最优的性价比
- 可以在装机前装配齿条和导轨
- 现场安装组合齿条和导轨相应的建议
- 组合齿条沿着导轨连续拼接
- 额外需求：90° 安装导轨上要有螺纹安装孔。

180°-安装 / 180° arrangement



- Adjusting between rack and rail not necessary
- Space-saving and performance-optimized design can be realized
- Different types of integrated racks allows best price-performance-ratio
- Allows assembling of integrated rack and rail outside the machine
- On-site mounting of integrated rack and rail with corresponding device
- Continuous linking of the integrated rack with rails
- Additional demand: threads in the rail for the 90° arrangement

斜齿齿条和导轨组合概述 / Survey of helical integrated rack to rail





类别	精度等级	模数	节距误差	齿厚公差	长度	单齿接触 驱动力/尺宽	应用领域 (案例)
Class	Quality	Module	total pitch error	Tooth thickness tolerance	max. length	Feed force per pinion contact/ tooth wide	Applications (examples)
			(µm/m)	(µm)	(mm)	kN/(宽/width)	
HPIR-高精度组合齿条 High Precision Integrated Rack	6	2	36	-37	960	6,8/24	机床, 木材, 塑料加工机床 Machine tools, wood, plasticworking machines
		3	36	-37	960	12,0/29	
		4	36	-37	960	23,5/39	
BIR-基础精度组合齿条 Basic Integrated Rack	9	2	150	-110	1920	1,8/25	拾取应用 Pick and place applications
		3	150	-110	1920	3,0/30	
		4	150	-110	1920	5,0/40	

直齿组合齿条安装导轨概述 / Survey of straight integrated rack to rail

类别	精度等级	模数	节距误差	齿厚公差	长度	单齿接触 驱动力/尺宽	应用领域 (案例)
Class	Quality	Module	total pitch error	Tooth thickness tolerance	max. length	Feed force per pinion contact/ tooth wide	Applications (examples)
			(µm/m)	(µm)	(mm)	kN/(宽/width)	
HPIR-高精度组合齿条 High Precision Integrated Rack	6	5	36	-37	960	5/24	机床, 木材, 塑料加工机床 Machine tools, wood, plasticworking machines
		10	36	-37	960	12/29	
		13,33	36	-37	960	23/39	
BIR-基础精度组合齿条 Basic Integrated Rack	9	5	150	-110	1920	1,5/25	拾取应用 Pick and place applications
		10	150	-110	1920	5,5/30	
		13,33	150	-110	1920	6,5/40	






	系列 Series	直齿/斜齿 straight/helical	模数 Module	精度等级 Quality	页 Page
HPIR	49	斜齿 ¹⁾ helical ¹⁾	2; 3; 4	6	ZC-4/5
	49	直齿 straight	5, 10, 13,33 mm 节距系列	6	ZC-8/9
BIR	49	斜齿 ¹⁾ helical ¹⁾	2; 3; 4	9	ZC-6/7
	49	直齿 straight	5, 10, 13,33 mm 节距系列	9	ZC-10/11
   	90° 安装指导 Mounting guide for 90° version				ZC-12
	180° 安装指导 Mounting guide for 180° version				ZC-13
	选型负载表 Selection and load tables				ZC-15-20
	电控润滑器, 润滑油刷和连接软管 Electronically controlled lubricators, sliding-type lubricating brushes and hose-connection sets				ZE-2-6
	毛毡齿轮和安装轴 Felt gear and mounting shaft				ZE-7-8
安装 Mounting				ZF-9	

1) 我们所有的斜齿齿条都是右旋的, 齿条安装块是左旋的!

1) All our helical racks are right hand toothed, except the companion racks, which are left hand toothed!





	系列 Series	节距 Pitch	精度等级 Tolerance of teeth	页 Page
	24 ...	5, 10, 13,33	6 e 25	ZC-14
	07 ...	5, 10	8 e 25	ZC-14
	选型负载表 Selection and load tables			ZC-15-20
	电控润滑器, 润滑油刷和连接软管 Electronically controlled lubricators, sliding-type lubricating brushes and hose-connection sets			ZE-2-6
	毛毡齿轮和安装轴 Felt gear and mounting shaft			ZE-7-8
	安装 Mounting			ZF-9

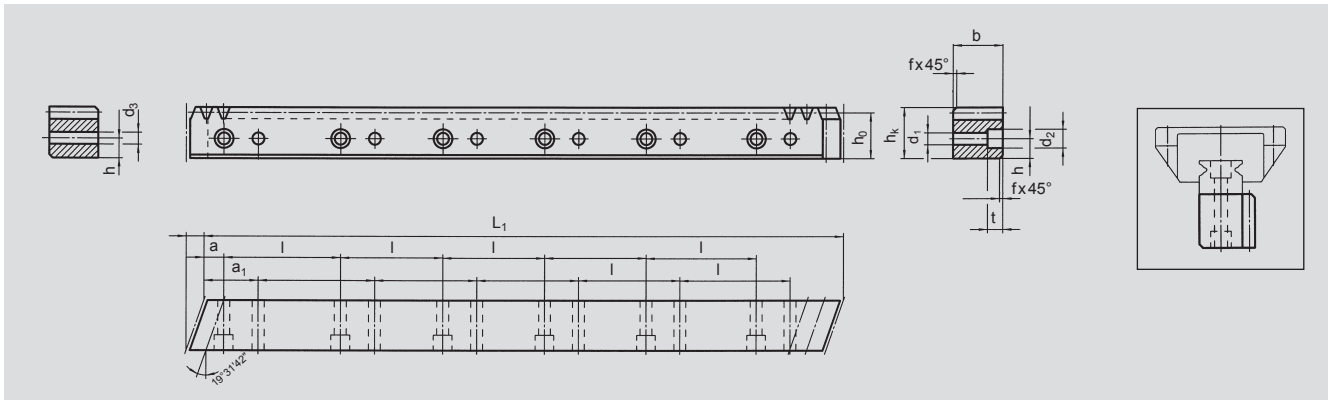
合适的斜齿齿轮在ZA-14页。
Suitable helical pinions are shown at page ZA -14 and following pages.





精度 6 – 90° 安装

Quality 6 – 90° version



订购代码 Order code	模数 Module	L ₁	齿数		b	h _k	h _o	f	a	l	孔数 N° of holes		h	d ₁	d ₂	t	a ₁	d ₃	kg
49 29 197	2	960	6,70	144	19	19,50	17,50	1	10	60	16	7,5	4,5	7,5	5,3	30	4,5	2,7	
49 29 397	2	480	6,70	72	19	19,50	17,50	1	10	60	8	7,5	4,5	7,5	5,3	30	4,5	1,3	
49 29 187	2	960	8,50	144	24	24,50	22,50	1	10	60	16	10,0	6,0	9,5	8,5	30	6,0	4,2	
49 29 387	2	480	8,50	72	24	24,50	22,50	1	10	60	8	10,0	6,0	9,5	8,5	30	6,0	2,1	
49 39 197	3	960	10,30	96	29	29,75	26,75	2	10	60	16	11,5	7,0	11,0	9,0	30	7,0	5,6	
49 39 397	3	480	10,30	48	29	29,75	26,75	2	10	60	8	11,5	7,0	11,0	9,0	30	7,0	2,8	
49 49 197	4	960	13,83	72	39	39,75	35,75	2	20	80	12	14,0	10,0	15,0	9,0	40	10,0	10,5	
49 49 397	4	480	13,83	36	39	39,75	35,75	2	20	80	6	14,0	10,0	15,0	9,0	40	10,0	5,2	
49 49 177	4	960	13,83	72	39	48,75	44,75	2	20	80	12	17,0	10,0	15,0	9,0	40	10,0	13,0	
49 49 377	4	480	13,83	36	39	48,75	44,75	2	20	80	6	17,0	10,0	15,0	9,0	40	10,0	6,5	
49 49 887	4	840	17,38	63	49	58,00	54,00	2	30	105	8	22,5	14,0	20,0	13,0	60	14,0	17,3	

整体齿节线误差 $GT_f/1000 \leq 0,036 \text{ mm}$.

Total pitch error $GT_f/1000 \leq 0,036 \text{ mm}$

- 感应淬火并磨削
- 材料C45钢
- 淬火后磨削各面

- Teeth induction-hardened and ground
- material C45E
- ground on all sides after hardening

齿条安装参考ZF-2.

Mounting racks, see page ZF-2.

为了达到齿条的高精度装配，我们推荐我们的专利安装工具，参考ZF-4.

To achieve precision rack joints, we recommend our patented rack assembly kit, see page ZF-4.

齿轮和齿条的润滑，我们建议使用我们的电控润滑系统，参考ZE-1.

For lubrication of racks & pinions, we recommend our automatic lubrication systems, see page ZE-1.

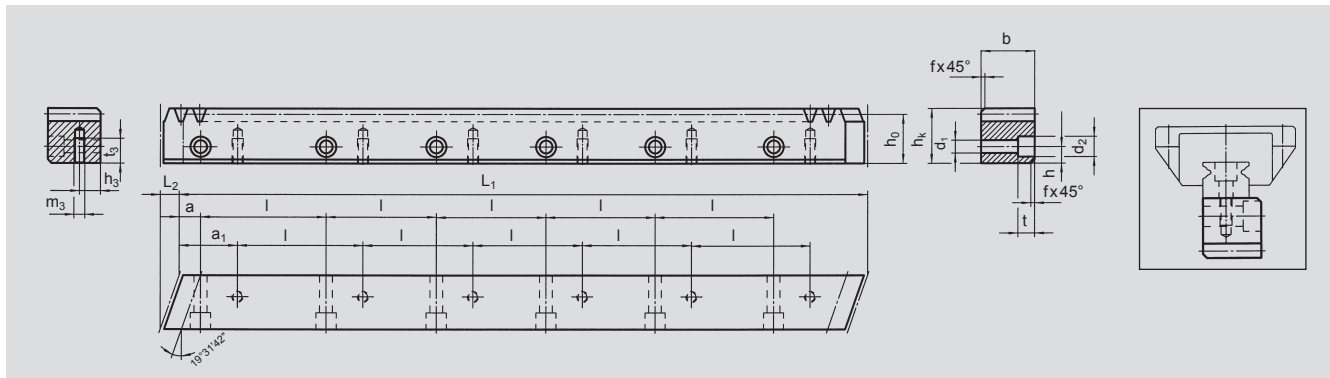
关于齿轮齿条传动系统的计算和选型的例子，参考ZD-1.

For the calculation and selection of the rack & pinion drive, see page ZD-1.



精度 6 – 180° 安装

Quality 6 – 180° version



订购代码 Order code	模数 Module	L ₁	L ₂	齿数 N° of teeth	b	h _k	h ₀	f	a	l	孔数 N° of holes	h	d ₁	d ₂	t	a ₁	m ₃	h ₃	t ₃	kg
49 29 107	2	960	6,70	144	19	19,50	17,50	1	10	60	16	7,5	5,8	10	6	30	M4	7,5	8,0	2,7
49 29 117	2	960	8,50	144	24	24,50	22,50	1	10	60	16	10,0	7,0	11	7	30	M5	10,0	11,0	4,2
49 39 107	3	960	10,30	96	29	29,75	26,75	2	10	60	16	11,5	10,0	15	9	30	M6	11,5	13,5	5,6
49 49 107	4	960	13,83	72	39	39,75	35,75	2	20	80	12	14,0	12,0	18	12	40	M8	14,0	16,0	10,5
49 49 127	4	960	13,83	72	39	48,75	44,75	2	20	80	12	17,0	12,0	18	12	40	M8	17,0	16,0	13,0
49 49 807	4	840	17,38	63	49	58,00	54,00	2	30	105	8	22,5	14,0	20	13	60	M12	22,5	25,0	17,3

整体齿节线误差 $GT_f/1000 \leq 0,036$ mm.

Total pitch error $GT_f/1000 \leq 0,036$ mm

- 感应淬火并磨削
- 材料C45钢
- 淬火后磨削各面

- Teeth induction-hardened and ground
- material C45E
- ground on all sides after hardening

齿条安装参考ZF-2

Mounting racks, see page ZF-2.

为了达到齿条的高精度装配，我们推荐我们的专利安装工具，参考ZF-4

To achieve precision rack joints, we recommend our patented rack assembly kit, see page ZF-4.

齿轮和齿条的润滑，我们建议使用我们的电控润滑系统，参考ZE-1

For lubrication of racks & pinions, we recommend our automatic lubrication systems, see page ZE-1.

关于齿轮齿条传动系统的计算和选型的例子，参考ZD-1

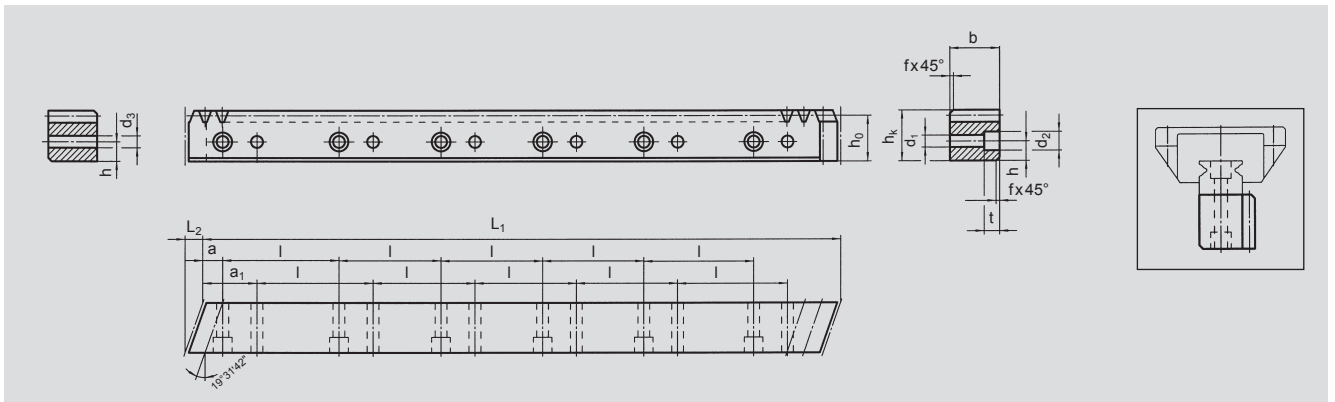
For the calculation and selection of the rack & pinion drive, see page ZD-1.





精度 9 – 90° 安装

Quality 9 – 90° version



订购代码 Order code	模数 Module	齿数 N° of teeth		孔数 N° of holes										kg				
		L ₁	L ₂	b	h _k	h ₀	f	a	l	N° of holes	h	d ₁	d ₂	t	a ₁	d ₃		
49 29 292	2	1920	7,10	288	20	19,50	17,50	1	10	60	32	7,5	4,5	7,5	5,3	30	4,5	5,4
49 29 282	2	1920	8,90	288	25	24,50	22,50	1	10	60	32	10,0	6,0	9,5	8,5	30	6,0	8,4
49 39 292	3	1920	10,60	192	30	29,75	26,75	2	10	60	32	11,5	7,0	11,0	9,0	30	7,0	11,2
49 49 292	4	1920	14,20	144	40	39,75	35,75	2	20	80	24	14,0	10,0	15,0	9,0	40	10,0	21,5
49 49 272	4	1920	14,54	144	41	48,75	44,75	2	20	80	24	17,0	10,0	15,0	9,0	40	10,0	29,9

整体齿节线误差 $GT_f/1000 \leq 0,150$ mm.

Total pitch error $GT_f/1000 \leq 0,150$ mm

- 铣削齿面
- 材料C45钢
- 冷拔钢材

- Milled teeth
- material C45E
- bright steel

齿条安装参考ZF-2

Mounting racks see page ZF-2.

为了达到齿条的高精度装配，我们推荐我们的专利安装工具，参考ZF-4

To achieve precision rack joints, we recommend our patented rack assembly kit, see page ZF-4.

齿轮和齿条的润滑，我们建议使用我们的电控润滑系统，参考ZE-1

For lubrication of racks & pinions, we recommend our automatic lubrication systems, see page ZE-1.

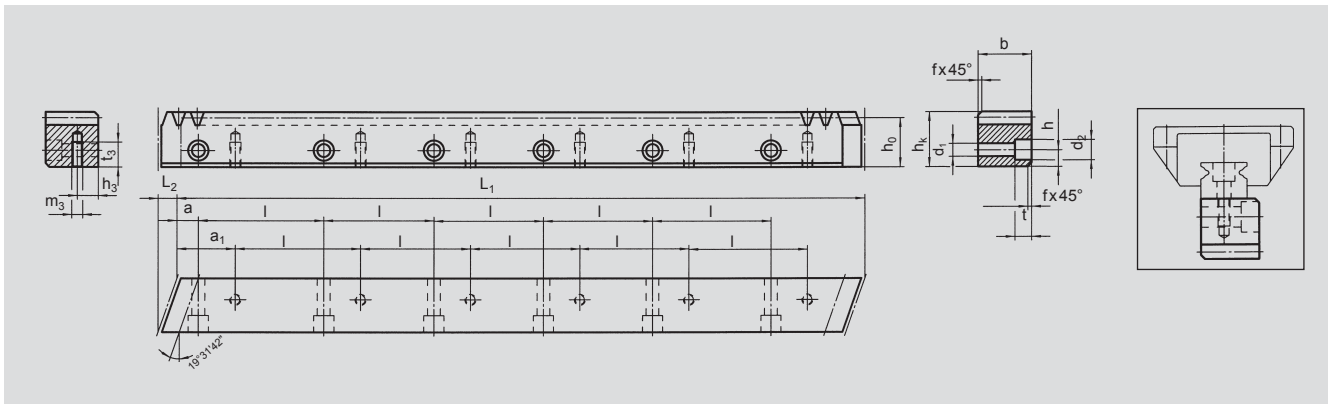
关于齿轮齿条传动系统的计算和选型的例子，参考ZD-1

For the calculation and selection of the rack & pinion drive, see page ZD-1.



精度 9 – 180° 安装

Quality 9 – 180° version



订购代码. Order code	模数 Module	齿数 N° of teeth		孔数. N° of holes																	kg
		L ₁	L ₂	b	h _k	h _o	f	a	l	h	d ₁	d ₂	t	a ₁	m ₃	h ₃	t ₃				
49 29 202	2	1920	7,1	288	20	19,50	17,50	1	10	60	32	7,5	5,8	10	6	30	M4	7,5	8,0	5,4	
49 29 212	2	1920	8,9	288	25	24,50	22,50	1	10	60	32	10,0	7,0	11	7	30	M5	10,0	11,0	8,4	
49 39 202	3	1920	10,6	192	30	29,75	26,75	2	10	60	32	11,5	10,0	15	9	30	M6	11,5	13,5	11,2	
49 49 202	4	1920	14,2	144	40	39,75	35,75	2	20	80	24	14,0	12,0	18	12	40	M8	14,0	16,0	21,5	

整体齿节线误差 $GT_f/1000 \leq 0,150$ mm.

Total pitch error $GT_f/1000 \leq 0,150$ mm

- 铣削齿面
- 材料C45钢
- 冷拔钢材

- Milled teeth
- material C45E
- bright steel

齿条安装参考ZF-2

Mounting racks see page ZF-2.

为了达到齿条的高精度装配，我们推荐我们的专利安装工具，参考ZF-4

To achieve precision rack joints, we recommend our patented rack assembly kit, see page ZF-4.

齿轮和齿条的润滑，我们建议使用我们的电控润滑系统，参考ZE-1

For lubrication of racks & pinions, we recommend our automatic lubrication systems, see page ZE-1.

关于齿轮齿条传动系统的计算和选型的例子，参考ZD-1

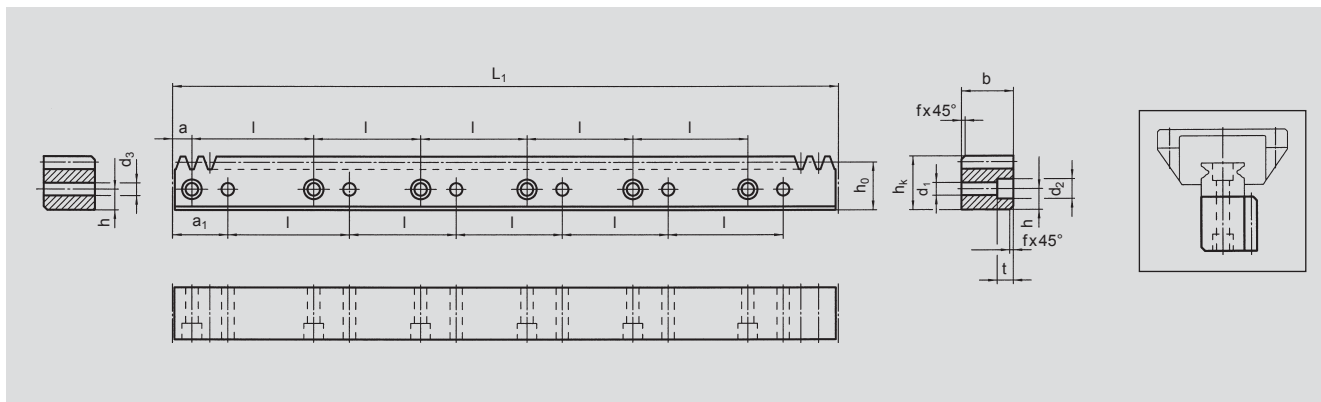
For the calculation and selection of the rack & pinion drive, see page ZD-1.





精度 6 – 90° 安装

Quality 6 – 90° version



订购代码 Order code	节距 Pitch	L ₁	齿数 N° of teeth		h _k	h _o	f	a	l	孔数 N° of holes		h	d ₁	d ₂	t	a ₁	d ₃	kg
49 77 197	5	960	192	19	19,50	17,91	1	10	60	16	7,5	4,5	7,5	5,3	30	4,5	2,7	
49 77 187	5	960	192	24	24,50	22,91	1	10	60	16	10,0	6,0	9,5	8,5	30	6,0	4,2	
49 97 197	10	960	96	29	29,75	26,57	2	10	60	16	11,5	7,0	11,0	9,0	30	7,0	5,6	
49 47 197	13,33	960	72	39	39,75	35,50	2	20	80	12	14,0	10,0	15,0	9,0	40	10,0	10,5	

整体齿节线误差 $GT_f/1000 \leq 0,036$ mm.

Total pitch error $GT_f/1000 \leq 0,036$ mm.

- 感应淬火并磨削
- 材料C45钢
- 淬火后磨削各面

- Teeth induction-hardened and ground
- material C45E
- ground on all sides after hardening

齿条安装参考ZF-2和ZF-4~5

Mounting racks see page ZF-2 and ZF-4-5.

为了达到齿条的高精度装配，我们推荐我们的专利安装工具，参考ZF-4

To achieve the precision of racks, also at the joint, we recommended our patented assembly kit, see page ZF-4

齿轮和齿条的润滑，我们建议使用我们的电控润滑系统，参考ZE-1

For lubrication of racks & pinions we recommend our automatic lubrication systems, see page ZE-1

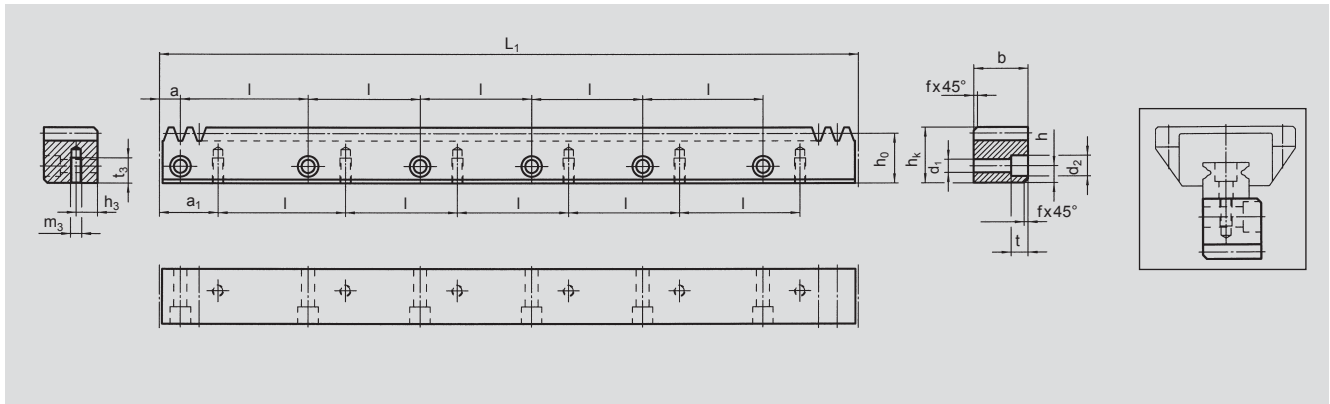
关于齿轮齿条传动系统的计算和选型的例子，参考ZD-1

For the calculation and selection of the rack and pinion drives see calculation sample page ZD-1



精度 6 – 180° 安装

Quality 6 – 180° version



订购代码 Order code	节距 Pitch	L_1	齿数 N° of teeth	b	h_k	h_o	f	a	l	孔数 N° of holes	h	d_1	d_2	t	a_1	d_3	kg		
49 77 107	5	960	192	19	19,50	17,91	1	10	60	16	7,5	5,8	10	6	30	M4	7,5	8,0	2,7
49 77 117	5	960	192	24	24,50	22,91	1	10	60	16	10,0	7,0	11	7	30	M5	10,0	11,0	4,2
49 97 107	10	960	96	29	29,75	26,57	2	10	60	16	11,5	10,0	15	9	30	M6	11,5	13,5	5,6
49 47 107	13,33	960	72	39	39,75	35,50	2	20	80	12	14,0	12,0	18	12	40	M8	14,0	16,0	10,5

整体齿节线误差 $GT_f/1000 \leq 0,036$ mm.

Total pitch error $GT_f/1000 \leq 0,036$ mm.

- 感应淬火并磨削
- 材料C45钢
- 淬火后磨削各面

- Teeth induction-hardened and ground
- material C45E
- ground on all sides after hardening

齿条安装参考ZF-2和ZF-4~5

Mounting racks see page ZF-2 and ZF-4-5.

为了达到齿条的高精度装配，我们推荐我们的专利安装工具，参考ZF-4

To achieve the precision of racks, also at the joint, we recommended our patented assembly kit, see page ZF-4

齿轮和齿条的润滑，我们建议使用我们的电控润滑系统，参考ZE-1

For lubrication of racks & pinions we recommend our automatic lubrication systems, see page ZE-1

关于齿轮齿条传动系统的计算和选型的例子，参考ZD-1

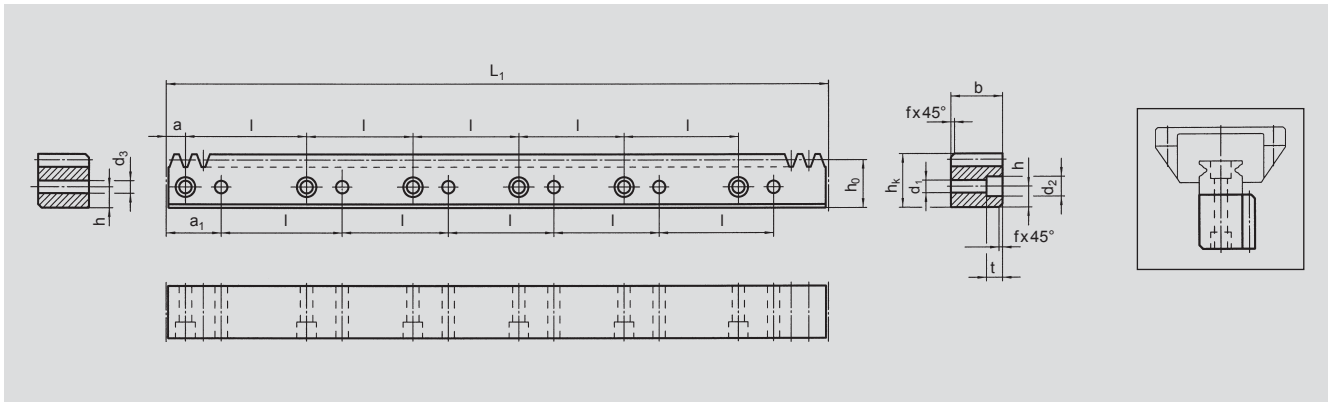
For the calculation and selection of the rack and pinion drives see calculation sample page ZD-1





精度 9 – 90° 安装

Quality 9 – 90° version



订购代码 Order code	节距 Pitch	L ₁	齿数		h _k	h _o	f	a	l	孔数		d ₁	d ₂	t	a ₁	d ₃	kg
			N° of teeth	b						N° of holes	h						
49 77 292	5	1920	384	20	19,50	17,91	1	10	60	32	7,5	4,5	7,5	5,3	30	4,5	5,4
49 77 282	5	1920	384	25	24,50	22,91	1	10	60	32	10,0	6,0	9,5	8,5	30	6,0	8,4
49 97 292	10	1920	192	30	29,75	26,57	2	10	60	32	11,5	7,0	11,0	9,0	30	7,0	11,2
49 47 292	13,33	1920	144	40	39,75	35,50	2	20	80	24	14,0	10,0	15,0	9,0	40	10,0	21,5

整体齿节线误差 $GT_f/1000 \leq 0,150$ mm.

Total pitch error $GT_f/1000 \leq 0,150$ mm.

- 铣削齿面
- 材料C45钢
- 冷拔钢材

- Milled teeth
- material C45E
- bright steel

齿条安装参考ZF-2和ZF-4~5

Mounting racks see page ZF-2 and ZF-4-5.

为了达到齿条的高精度装配，我们推荐我们的专利安装工具，参考ZF-4

To achieve precision rack joints, we recommend our patented rack assembly kit, see page ZF-4.

齿轮和齿条的润滑，我们建议使用我们的电控润滑系统，参考ZE-1

For lubrication of racks & pinions, we recommend our automatic lubrication systems, see page ZE-1.

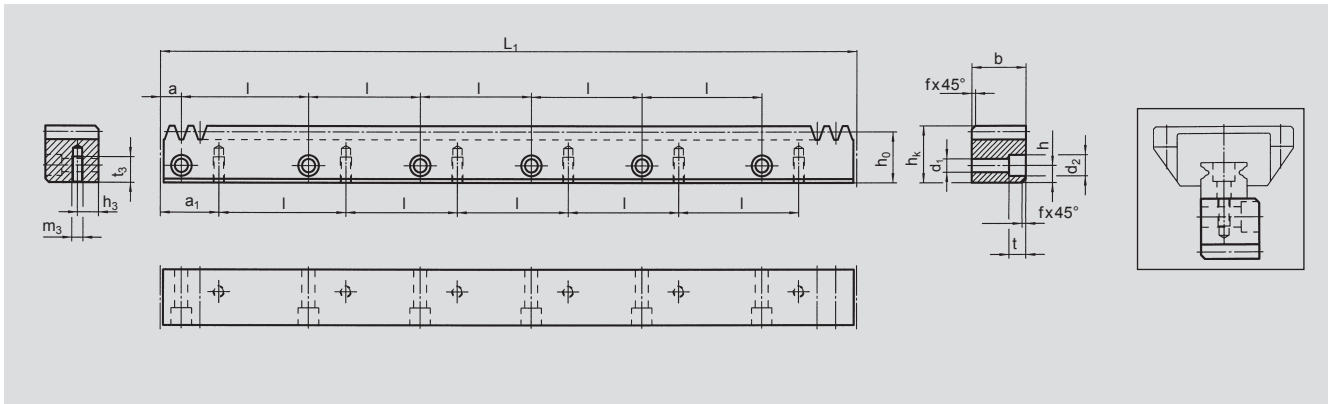
关于齿轮齿条传动系统的计算和选型的例子，参考ZD-1

For the calculation and selection of the rack & pinion drive, see page ZD-1.



精度 9 – 180° 安装

Quality 9 – 180° version



订购代码 Order code	节距 Pitch	L ₁	齿数 N° of teeth	b	h _k	h _o	f	a	l	孔数 N° of holes	h	d ₁	d ₂	t	a ₁	d ₃	kg		
49 77 202	5	1920	384	20	19,50	17,91	1	10	60	32	7,5	5,8	10	6	30	M4	7,5	8,0	5,4
49 77 212	5	1920	384	25	24,50	22,91	1	10	60	32	10,0	7,0	11	7	30	M5	10,0	11,0	8,4
49 97 202	10	1920	192	30	29,75	26,57	2	10	60	32	11,5	10,0	15	9	30	M6	11,5	13,5	11,2
49 47 202	13,33	1920	144	40	39,75	35,50	2	20	80	24	14,0	12,0	18	12	40	M8	14,0	16,0	21,5

整体齿节线误差 $GT_f/1000 \leq 0,150$ mm.

Total pitch error $GT_f/1000 \leq 0,150$ mm.

- 铣削齿面
- 材料C45钢
- 冷拔钢材

- Milled teeth
- material C45E
- bright steel

齿条安装参考ZF-2和ZF-4~5

Mounting racks see page ZF-2 and ZF-4-5.

为了达到齿条的高精度装配，我们推荐我们的专利安装工具，参考ZF-4

To achieve precision rack joints, we recommend our patented rack assembly kit, see page ZF-4.

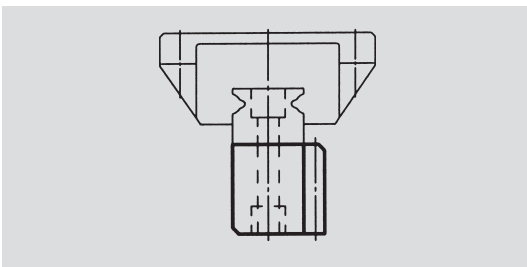
齿轮和齿条的润滑，我们建议使用我们的电控润滑系统，参考ZE-1

For lubrication of racks & pinions, we recommend our automatic lubrication systems, see page ZE-1.

关于齿轮齿条传动系统的计算和选型的例子，参考ZD-1

For the calculation and selection of the rack & pinion drive, see page ZD-1.

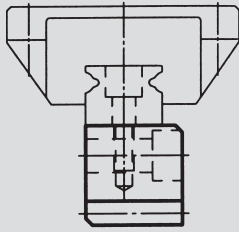




下表列出了常用的导轨型号，您可以选择合适的组合齿条。齿条的容许扭矩需要再次校核。导轨的选型请依照供应商的规格参数。

This table with the most usual rails enables (you) to select the rack suitable for the rail. The permissible feed force of the rack has to be checked, too. The rail has to be selected according to the supplier's specifications.

供应商 Racks from	90°装配 (导轨上有额外的螺纹孔) 90° assembly (Additional threads required in the rail)					
Atlanta	49 29 197	49 29 187	49 39 197	49 49 197	49 49 177	49 49 887
	49 29 292	49 29 282	49 39 292	49 49 292	49 49 377	
	49 77 197	49 77 187	49 97 197	49 47 197		
	49 77 292	49 77 282	49 97 292	49 47 292		
HIWIN	LGR 15R	LGR 20R	LGR 25R	LGR 30R	LGR 35R	LGR 45R
	AGR 15U	AGR 20R	AGR 25R	AGR 30U		
	HGR 15Z	HGR 20Z	HGR 25Z	HGR 30Z	HGR 35Z	HGR 45Z
IKO		LWL 20				
	LWH 15	LWH 20	LWH 25	LWH 30	LWH 35	LWH 45
	LRX 15	LRX 20	LRX 25	LRX 30	LRX 35	LRX 45
INA		KUSE 20	KUSE 25	KUSE 30	KUSE 35	KUSE 45
	KUVE 15	KUVE 20	KUVE 25	KUVE 30	KUVE 35	KUVE 45
	KUE 15	KUE 20	KUE 25	KUE 30	KUE 35	
NSK	L1H 15	L1H 20	L1H 25	L1H 30	L1H 35	L1H 45
	L1S 15T	L1S 20	L1S 25	L1S 30	L1S 35	
	LY 15	LY 20	LY 25	LY 30	LY 35	LY 45
			LA 25	LA 30	LA 35	LA 45
Schneeberger	BM 15	BM 20	BM 25	BM 30	BM 35	BM 45
SKF	LLBHS 15	LLBHS 20	LLBHS 25	LLBHS 30	LLBHS 35	LLBHS 45
		LLBUS 20	LLBUS 25		LLBUS 35	
Bosch Rexroth	1605-G15	1605-G20	1605-G25	1605-G30	1605-G35	1605-G45
	1646-G15	1646-G20	1646-G25	1646-G30	1646-G35	1646-G45
	1645-G15	1645-G20	1645-G25	1645-G30	1645-G35	1645-G45
THK	SSR15	SSR20	SSR25	SSR30	SSR35	
	SHS15	SHS20	SHS25	SHS30	SHS35	SHS45
	SR15	SR20	SR25	SR30	SR35	SR45
	HSR15	HSR20	HSR25	HSR30	HSR35	HSR45
	CSR15	CSR20	CSR25	CSR30	CSR35	CSR45
	GSR15	GSR20	GSR25	GSR30		
			NSR20TBC			



下表列出了常用的导轨型号，您可以选择合适的组合齿条。齿条的容许扭矩需要再次校核。导轨的选型请依照供应商的规格参数。

This table with the most usual rails enables (you) to select the rack suitable for the rail. The permissible feed force of the rack has to be checked, too. The rail has to be selected according to the supplier's specifications.

供应商 Racks from	180°装配 (导轨上有额外的螺纹孔) 180° assembly					
Atlanta	49 29 107	49 29 117	49 39 107	49 49 107	49 49 127	49 49 807
	49 29 202	49 29 212	49 39 202	49 49 202		
	49 77 107	49 77 117	49 97 107	49 47 107		
	49 77 202	49 77 212	49 97 202	49 47 202		
HIWIN	LGR 15R	LGR 20R	LGR 25R	LGR 30R	LGR 35R	LGR 45R
	AGR 15U	AGR 20R	AGR 25R	AGR 30U		
	HGR 15R	HGR 20R	HGR 25R	HGR 30R	HGR 35R	HGR 45R
IKO		LWL 20				
	LWH 15	LWH 20	LWH 25	LWH 30	LWH 35	LWH 45
	LRX 15	LRX 20	LRX 25	LRX 30	LRX 35	LRX 45
INA		KUSE 20	KUSE 25	KUSE 30	KUSE 35	KUSE 45
	KUVE 15	KUVE 20	KUVE 25	KUVE 30	KUVE 35	KUVE 45
	KUE 15	KUE 20	KUE 25	KUE 30	KUE 35	
NSK	L1H 15	L1H 20	L1H 25	L1H 30	L1H 35	L1H 45
	L1S 15T	L1S 20	L1S 25		L1S 35	
	LY 15	LY 20	LY 25	LY 30	LY 35	LY 45
			LA 25	LA 30	LA 35	LA 45
Schneeberger	BM 15	BM 20	BM 25	BM 30	BM 35	BM 45
SKF	LLBHS 15	LLBHS 20	LLBHS 25	LLBHS 30	LLBHS 35	LLBHS 45
		LLBUS 20	LLBUS 25		LLBUS 35	
Bosch Rexroth	1605-G15	1605-G20	1605-G25	1605-G30	1605-G35	1605-G45
	1646-G15	1646-G20	1646-G25	1646-G30	1646-G35	1646-G45
	1645-G15	1645-G20	1645-G25	1645-G30	1645-G35	1645-G45
THK	SSR15	SSR20	SSR25		SSR35	
	SHS15	SHS20	SHS25	SHS30	SHS35	SHS45
		SR20	SR25		SR35	SR45
	HSR15	HSR20	HSR25	HSR30	HSR35	HSR45
	CSR15	CSR20	CSR25	CSR30	CSR35	CSR45
	GSR15	GSR20	GSR25	GSR30		
		RSR20				





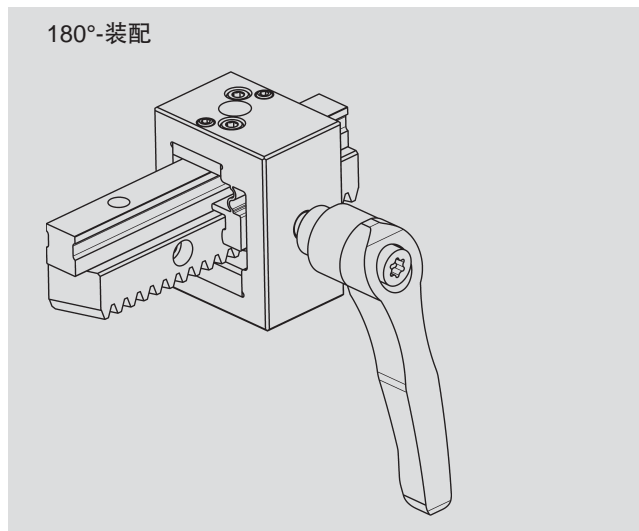
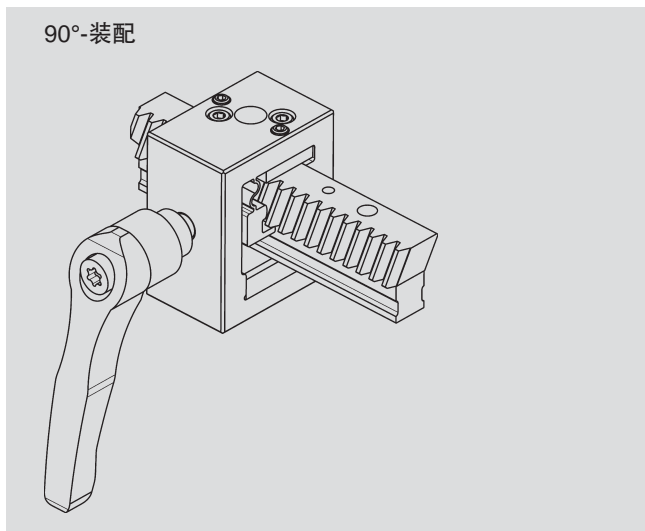
安装工具的选择分以下三个步骤:

1. 选择工具
2. 根据齿条选择板架
3. 根据导轨选择板架

The selection of the mountingtool is done in 3 steps:

1. Selection of the tool
2. Selection of the plates according to the rack
3. Selection of the plates according to the guide

1. 工具的选择 / Selection of the tool



订购代码 / Order code

49.01.1_

- 9 轨道尺寸 / Rail size:
(15, 20, 25, 30, 35, 40, 45)

订购代码 / Order code

49.01.2_

- 9 轨道尺寸 / Rail size:
(15, 20, 25, 30, 35, 40, 45)

2. 根据齿条选板架 / Selection of the plate according to the rack

90°-装配

根据齿条的精度选择

Selection is according to the quality of rack

6级精度 / Quality 6

9级精度 / Quality 9

尺寸 / Size 15-25

2.49.01.106

2.49.01.105

尺寸 / Size 30-45

2.49.01.206

2.49.01.205

180°-装配

与齿条无关

Independet of the rack

尺寸 / Size 15-25

2.49.01.310

尺寸 / Size 30-45

2.49.01.410





3. 根据导轨选择板架 / Selection of the plate according to the rail

90° 装配.-支撑架的高度由桌子高度决定。插入的高度要看齿条的宽度。

In the 90° version, the height of the support plate must be selected from the table, the height of the insert depends on the width of the rack.

180° 装配.-插入的高度取决于桌面高度，支撑架基本在10毫米 (05/09)

In the 180° version, the height of the insert must be selected from the table, the height of the support plate is always 10 mm (05/09)

生产 Producer	尺寸/Size 15		高度/Hight in mm		尺寸/Size 20		高度/Hight in mm		尺寸/Size 25		高度/Hight in mm	
	Bez./Descr.	高度/Hight in mm	90°- 支撑板 plate	180°- 支撑板 Plate	Bez./Descr.	高度/Hight in mm	90°- 支撑板 plate	180°- 支撑板 Plate	Bez./Descr.	高度/Hight in mm	90°- 支撑板 plate	180°- 支撑板 Plate
			2.49.01.3_2.49.01.1_				2.49.01.3_2.49.01.1_				2.49.01.3_2.49.01.1_	
HIWIN	LGR 15R	14	12	07	LGR 20R	15	16	11	LGR 25R	20	14	09
	AGR 15U	13,5	13	08	AGR 20R	15,5	15	10	AGR 25R	18,5	16	11
	HGR152	15	11	06	HGR 202	17,5	13	08	HGR 252	22	12	07
IKO	LWH 15	15	11	06	LWL 20	11	20	15	LWH 25	22	12	07
	LRX 15	16,5	10	05	LWH 20	18	13	08	LRX 25	24,5	10	05
					LRX 20	21	10	05				
INA	KUVE 15	15,1	11	06	KUSE 20	18	13	08	KUSE 25	21,7	12	07
	KUE 15	15	11	06	KUVE 20	17	14	09	KUVE 25	18,7	15	10
					KUE 20	16,5	14	09	KUE 25	18	16	11
NSK	L1H 15	15	11	06	L1H 20	18	13	08	L1H 25	22	12	07
	L1S 15T	12,5	14	09	L1S 20	15,5	15	10	L1S 25	18	16	11
	LY 15	14	12	07	LY 20	19	12	07	LY 25	22,5	12	07
									LA 25	22	12	07
Schneeberger	BM 15	15,7	10	05	BM 20	19	12	07	BM 25	22,7	11	06
SKF	LLRHS 15	16,3	10	05	LLRHS 20	20,75	10	05	LLRHS 25	24,45	10	05
					LLRUS 20	-----			LLRUS 25	-----		
Bosch Rexroth	1605-G15	16,3	10	05	1605-G20	20,75	10	05	1605-G25	24,45	10	05
	1646-G15	-----			1646-G20	-----			1646-G25	-----		
	1645-G15	16,2	10	05	1645-G20	20,55	10	05	1645-G25	24,25	10	05
THK	SSR15	12,5	14	09	SSR20	15,5	15	10	SSR25	18	16	11
	SHS15	13	13	08	SHS20	16,5	14	09	SHS25	20	14	09
	SR15	12,5	14	09	SR20	15,5	15	10	SR25	18	16	11
	HSR15	15	11	06	HSR20	18	13	08	HSR25	23,5	11	06
	CSR15	15	11	06	CSR20	18	13	08	CSR25	22	12	07
	GSR15	11,5	15	10	GSR20	13	18	13	GSR25	16,5	18	13
									NSR20TBC	23	11	06
min./max		11,5/16,5				11/21				16,5/24,5		

生产 Producer	尺寸/Size 30		高度/Hight in mm		尺寸/Size 35		高度/Hight in mm		尺寸/Size 40		高度/Hight in mm	
	Bez./Descr.	高度/Hight in mm	90°- 支撑板 plate	180°- 支撑板 Plate	Bez./Descr.	高度/Hight in mm	90°- 支撑板 plate	180°- 支撑板 Plate	Bez./Descr.	高度/Hight in mm	90°- 支撑板 plate	180°- 支撑板 Plate
			2.49.01.4_2.49.01.2_				2.49.01.4_2.49.01.2_				2.49.01.4_2.49.01.2_	
HIWIN	LGR 30R	23	15	10	LGR 35R	25	17	12	LGR 45R	32	18	13
	AGR 30U	24	14	09								
	HGR 302	26	12	07	HGR 302	29	13	08	HGR 452	38	12	07
IKO	LWH 30	25	13	08	LWH 35	28	14	09	LWH 45	34	16	11
	LRX 30	28	10	05	LRX 35	32	10	05	LRX 45	38	12	07
INA	KUVE 30	25	13	08	KUSE 35	29,7	12	07	KUSE 45	37,2	12	07
	KUVE 30	23,5	15	10	KUVE 35	27	15	10	KUVE 45	34,2	15	10
	KUE 30	21,5	17	12	KUE 35	23	19	14				
NSK	L1H 30	26	12	07	L1H 35	29	13	08	L1H 45	38	12	07
	L1S 30	23	15	10	L1S 35	27,5	14	09				
	LY 30	27,5	11	06	LY 35	31	11	06	LY 45	37,5	12	07
	LA 30	28	10	05	LA 35	30,8	11	06	LA 45	36	14	09
Schneeberger	BM 30	26	12	07	BM 35	29,5	12	07	BM 45	37	13	08
SKF	LLRHS 30	28,55	10	05	LLRHS 35	32,15	10	05	LLRHS 45	40,15	10	05
					LLRUS 35	-----						
Bosch Rexroth	1605-G30	28,55	10	05	1605-G35	32,15	10	05	1605-G45	40,15	10	05
	1646-G30	-----			1646-G35	-----			1646-G45	-----		
	1645-G30	28,35	10	05	1645-G35	31,85	10	05	1645-G45	39,85	10	05
THK	SSR30	23	15	10	SSR35	27,5	14	09				
	SHS30	23	15	10	SHS35	26	16	11	SHS45	32	18	13
	SR30	23	15	10	SR35	27,5	14	09	SR45	35,5	14	09
	HSR30	26	12	07	HSR35	29	13	08	HSR45	38	12	07
	CSR30	26	12	07	CSR35	29	13	08	CSR45	38	12	07
	GSR30	19	19	14								
min./max		19/28,55				23/32,15				32/40,15		

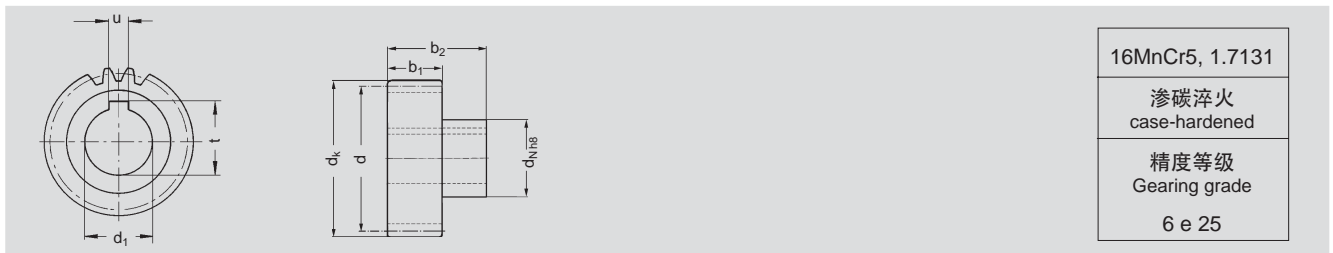
4. 通过这三步后订购 / Ordering via 3 numbers





直齿, 磨削

Straight tooth system, ground teeth

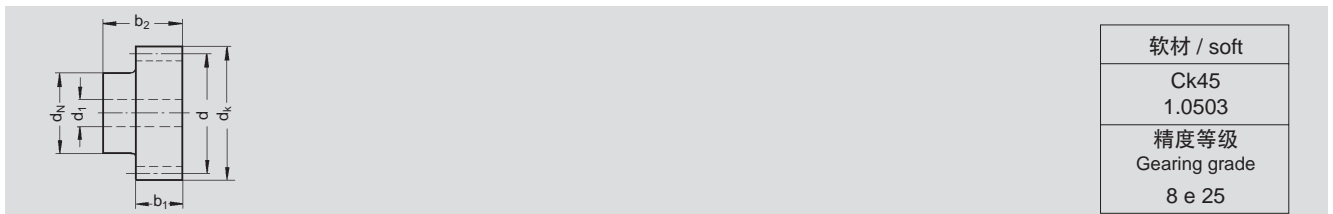


16MnCr5, 1.7131
渗碳淬火 case-hardened
精度等级 Gearing grade
6 e 25

订购代码 Order code	模数 Module	齿数 N° of teeth z	d	dk	d ₁ ^{H6}	d _N	b ₁	b ₂	u	t	kg	胀紧盘 GH-1页 shrink-disc on page GH-1
节距 / Pitch 5 mm												
24 06 425	1,591	25	39,79	42,9	16	30	25	51	5	18,3	0,31	80 83 030
24 00 430	1,591	30	47,75	50,9	22	36	25	54	6	24,8	0,43	80 84 036
24 03 440	1,591	40	63,66	66,8	25	44	25	56	8	28,3	0,78	80 80 044
节距 / Pitch 10 mm												
24 70 420	3,183	20	63,66	70,0	22	36	31	60	6	24,8	0,83	80 84 036
24 71 425	3,183	25	79,58	85,9	25	44	31	62	8	28,3	1,40	80 80 044
24 73 425	3,183	25	79,58	85,9	32	55	31	68	10	35,3	1,50	80 80 055
节距 / Pitch 13,33 mm												
24 93 420	4,244	20	84,89	93,3	32	55	40	77	10	35,3	2,00	80 80 055
24 95 425	4,244	25	106,10	114,6	40	62	40	77	12	43,3	2,90	80 86 062

直齿, 铣削

Straight tooth system, milled teeth



软材 / soft
Ck45 1.0503
精度等级 Gearing grade
8 e 25

订购代码 Order code	模数 Module m	齿数 N° of teeth z	d	dk	d ₁	d _N	b ₁	b ₂	kg
节距 / Pitch 5 mm									
07 06 012	1,591	12	19,1	22,3	6	14	12	25	0,03
07 06 015	1,591	15	23,9	27,0	6	18	12	25	0,06
07 06 018	1,591	18	28,6	31,8	8	20	12	25	0,07
07 06 020	1,591	20	31,8	35,0	8	20	12	25	0,10
07 06 025	1,591	25	39,8	43,0	8	25	12	25	0,14
07 06 030	1,591	30	47,7	50,9	10	30	12	25	0,20
07 06 040	1,591	40	63,6	66,8	10	40	12	25	0,36
07 06 050	1,591	50	79,6	82,7	12	50	12	25	0,56
07 06 060	1,591	60	95,5	98,6	12	60	12	25	0,82
节距 / Pitch 10 mm									
07 08 012	3,183	12	38,2	44,6	10	25	25	40	0,22
07 08 015	3,183	15	47,7	54,1	12	30	25	40	0,38
07 08 018	3,183	18	57,3	63,7	15	40	25	40	0,50
07 08 020	3,183	20	63,7	70,0	15	40	25	40	0,60
07 08 025	3,183	25	79,6	85,9	15	50	25	40	0,96
07 08 030	3,183	30	95,5	101,9	20	60	25	40	1,46
07 08 040	3,183	40	127,3	133,7	20	80	25	40	2,68

二次打孔, 开键槽, 攻丝都可以在很短的时间内完成。

Further finishing (turning bores, keywaying, threading, etc.) is possible within short time.



ATLANTIS

组合齿条和齿轮驱动-计算和选型-模数 2-斜齿 Integrated rack and pinion drive – calculation and selection – module 2 – helical tooth system

齿条 / Rack	HPIR	HPIR	HPIR	BIR	BIR
精度等级 Quality	6 宽 / width 19 mm	6 宽 / width 24 mm	6 宽 / width 24 mm	9 宽 / width 20 mm	9 宽 / width 25 mm
齿条 Rack	材料 / material 16MnCr5	16MnCr5	16MnCr5	C45	C45
	热处理方式 heat treatment 感应淬火 ind. hardened	感应淬火 ind. hardened	感应淬火 ind. hardened	软材未淬火 soft	软材未淬火 soft
齿轮 Pinion	材料 / material 16MnCr5	16MnCr5	16MnCr5	C45	16MnCr5
	热处理方式 heat treatment 渗碳淬火 case hardened	渗碳淬火 case hardened	渗碳淬火 case hardened	感应淬火 ind. hardened	渗碳淬火 case hardened
齿数 No. of pinion teeth 1)	齿数 pitch circle dia.	最大驱动力 maximum feed force			
20	42,44	1,0 kN	0,8 kN	1,25 kN	1,00 kN
25	53,05	1,0 kN	0,9 kN	1,25 kN	1,10 kN
28	59,42	1,0 kN	1,0 kN	1,25 kN	1,25 kN
32	67,91	1,5 kN	1,0 kN	1,80 kN	1,25 kN
36	76,39	1,5 kN	1,0 kN	1,80 kN	1,25 kN

1) 核对可行性 (参考ZA章节) / check availability (chapter ZA)

最大容许驱动力1) 单位:kN

该值是在很好的油脂润滑的情况下 (例如: 使用电子润滑系统在ZE-2/3页, 或者每天手动涂抹润滑油脂), 速度是1.5m/s, SB=1.0, 以及线性负载分布系数为1.0。表中给出的数据是在最佳条件下的最大推荐值。任何情况下的应用和配置都需要计算。计算过程和案例, 请参考ZD-1页。

Maximum permissible feed forces¹⁾ in kN
which are achieved with good grease lubrication (i.e. use of the electronic lubricator described on page ZE-2/3 or manual lubrication at least once a day) and v=1.5 m/s, SB=1.0 as well as a linear load distribution factor L_{KHG} of 1.0.

The values in the load tables are maximum values under perfect conditions and is a guide value. A calculation of the application and configuration is in any cases needed.

Calculation and example see page ZD-1.

1) For keyway transmission make a separate calculation, torque with shrink disc see on page GH-1.

1) 对于键式连接需要一个单独的计算, 胀紧盘式传递扭矩请参考GH-1页。





ATLANTA

组合齿条和齿轮驱动-计算和选型-模数 3-斜齿
Integrated rack and pinion drive – calculation and selection – module 3 – helical tooth system

齿条 / Rack	齿条节圆 pitch circle dia.	HPIR	BIR
精度等级 Quality		6 宽 / width 29 mm	9 宽 / width 30 mm
Zahnstange 齿条	材料 / material	C45	C45
	热处理方式 heat treatment	感应淬火 induction hardened	软材 未淬火 soft
齿轮 Pinion	材料 / material	16MnCr5	C45
	热处理方式 heat treatment	渗碳淬火 case hardened	感应淬火 induction hardened
齿数 ¹⁾ No. of pinion teeth ¹⁾			
20	63,66	12,0 kN	1,5 kN
22	70,03	12,0 kN	1,5 kN
25	79,58	12,0 kN	1,5 kN
30	95,49	12,0 kN	2,0 kN

最大驱动力
maximum feed force

1) 核对可行性 (参考ZA章节) / check availability (chapter ZA)

最大容许驱动力-请参看ZC-15页说明 / Maximum permissible feed forces – description see page ZC-15



ATLANTIS

组合齿条和齿轮驱动-计算和选型-模数 4-斜齿 Integrated rack and pinion drive – calculation and selection – module 4 – helical tooth system

齿条 / Rack	HPiR	BIR	最大驱动力 maximum feed force	
精度等级 Quality	6 宽 / width 39 mm	9 宽 / width 40/41 mm		
齿条 Rack	材料 / material 热处理方式 heat treatment	C45 感应淬火 induction hardened	C45 软材未淬火 soft	
	材料 / material 热处理方式 heat treatment	16MnCr5 渗碳淬火 case hardened	16MnCr5 渗碳淬火 case hardened	
齿轮 Pinion	齿轮节圆 pitch circle dia.			
齿轮齿数 ¹⁾ No. of pinion teeth ¹⁾				
15	63,66	21,0 kN	2,5 kN	1,4 kN
20	84,88	21,0 kN	3,5 kN	2,5 kN
21	89,13	22,0 kN	3,5 kN	2,5 kN
24	101,86	22,5 kN	4,5 kN	3,0 kN
25	106,10	23,5 kN	5,0 kN	4,0 kN

1) 核对可行性 (参考ZA章节) / check availability (chapter ZA)

最大允许驱动力-请参看ZC-15页说明 / Maximum permissible feed forces – description see page ZC-15





ATLANTA

组合齿条和齿轮驱动-计算和选型-节距 5-直齿
Integrated rack and pinion drive – calculation and selection – pitch 5 – straight tooth system

齿条 / Rack	HPIR	HPIR	HPIR	BIR	BIR
精度等级 Quality	6 宽 / width 19 mm	6 宽 / width 24 mm	9 宽 / width 20 mm	9 宽 / width 2.5 mm	
齿条 Rack	材料 / material 热处理方式 heat treatment	C45 感应淬火 induction hardened	C45 感应淬火 induction hardened	C45 软材 未淬火 soft	C45 软材 未淬火 soft
齿轮 Pinion	材料 / material 热处理方式 heat treatment	16MnCr5 渗碳淬火 case hardened	16MnCr5 渗碳淬火 case hardened	C45 感应淬火 induction hardened	C45 感应淬火 induction hardened
齿数 ¹⁾ No. of pinion teeth ¹⁾	齿节圆 pitch circle dia.	最大驱动力 maximum feed force			
15	23,87	0,9 kN	0,25 kN	0,3 kN	
20	31,83	2,9 kN	0,5 kN	0,6 kN	
25	39,79	4,0 kN	0,6 kN	0,7 kN	
30	47,75	4,3 kN	0,8 kN	0,9 kN	
40	63,66	5,0 kN	1,0 kN	1,2 kN	

1) 核对可行性 (参考ZA章节) / check availability (chapter ZA)

最大容许驱动力-请参看ZC-15页说明 / Maximum permissible feed forces – description see page ZC-15



ATLANTA

组合齿条和齿轮驱动-计算和选型-节距 10-直齿 Integrated rack and pinion drive – calculation and selection – pitch 10 – straight tooth system

齿条 / Rack	HPIR	BIR	齿条未淬火 soft	
精度等级 Quality	6 宽 / width 29 mm	9 宽 / width 30 mm		
齿条 Rack	材料 / material	C45	C45	
	热处理方式 heat treatment	感应淬火 induction hardened	软材未淬火 soft	
齿轮 Pinion	材料 / material	16MnCr5	C45	C45
	热处理方式 heat treatment	渗碳淬火 case hardened	感应淬火 induction hardened	软材未淬火 soft
齿数 No. of pinion teeth ¹⁾	齿圆节距 pitch circle dia.	最大驱动力 maximum feed force		
15	47,75	2,0 kN	1,5 kN	0,5 kN
20	63,66	2,4 kN	2,0 kN	1,4 kN
25	79,58	3,5 kN	2,5 kN	2,0 kN
30	95,49	4,0 kN	3,0 kN	2,5 kN
40	127,32	5,5 kN	4,0 kN	4,0 kN

1) 核对可行性 (参考ZA章节) / check availability (chapter ZA)

最大允许驱动力-请参看ZC-15页说明 / Maximum permissible feed forces – description see page ZC-15





ATLANTA

组合齿条和齿轮驱动-计算和选型-节距 13,33 -直齿
Integrated rack and pinion drive – calculation and selection – pitch 13,33 – straight tooth system

齿条 / Rack	HPIR	BIR		
精度等级 Quality	6 宽 / width 39 mm	9 宽 / width 40 mm		
齿条 Rack	材料 / material	C45		
	热处理方式 heat treatment	感应淬火 induction hardened	软材 未淬火 soft	
齿轮 Pinion	材料 / material	16MnCr5	C45	C45
	热处理方式 heat treatment	渗碳淬火 case hardened	感应淬火 induction hardened	软材 未淬火 soft
齿轮齿数 ¹⁾ No. of pinion teeth ¹⁾	齿轮节圆 pitch circle dia.	最大驱动力 maximum feed force		
20	84,88	5,0 kN	3,5 kN	3,0 kN
25	106,10	6,5 kN	4,5 kN	4,0 kN

1) 核对可行性 (参考ZA章节) / check availability (chapter ZA)

最大容许驱动力-请参看 ZC-15 页说明 / Maximum permissible feed forces – description see page ZC-15