



星型圈

1. 特点

具有四唇密封截面的密封元件，可以替代大部分 O 型圈场合。又被称为 X 型圈。

2. 材质

材料： 丁腈橡胶 NBR 或氟橡胶 FKM，
或三元乙丙橡胶 EPDM

3. 特性

在静密封环境下，星型圈和与其相同规格的 O 型圈是可以通用互换的。和 O 型圈不同的是，星形圈的结构使他更适合当动密封使用。

- 在沟槽中不产生扭曲。因其特殊星型截面，使其在往复运动时不会在沟槽内滚动。
- 摩擦力小。其需要的径向预压缩相对比 O 型圈要小，就使其具有较小的摩擦力，产生的磨损也比较小。
- 相比 O 型圈，其截面上有较好的压力分布，可获得很好的密封效果。
- 星型圈密封唇之间形成了润滑容腔，改善了启动状况，更适合动密封。

4. 1 应用范围

		动密封		静密封
		往复运动	旋转运动	
压力 (Mpa)	无挡圈	5	-	5
	有挡圈	30	15	40
速度(m/s)		0.5	2.0	-
温度		-30℃~+110℃(一般场合)		
		-60℃~+200℃(特殊场合)		
		-30℃~+80℃(旋转场合)		

4. 2 表面粗糙度

径向动密封

表面	Rmax(um)	Ra(um)
配合表面	1.0-2.5	0.1-0.4
沟槽表面	≤ 10	≤ 1.6

径向静密封,轴向静密封

表面	Rmax(um)	Ra(um)
配合表面	≤ 10	≤ 1.6
沟槽表面	≤ 16	≤ 3.2

径向静密封,轴向静密封 (压力脉动场合)

表面	Rmax(um)	Ra(um)
配合表面	≤ 6.3	≤ 0.8
沟槽表面	≤ 10	≤ 1.6

4. 3 径向间隙和挡圈

需要在 6.1 安装参数表中给出的径向间隙值下设计使用星型圈。如果间隙过大，密封会被挤出，导致星型圈损坏。

安装挡圈可以防止星型圈挤到密封间隙。在以下情况下，推荐使用挡圈：

- 高压，超过 5Mpa
- 被密封部件之间公差或间隙很大
- 在压力作用时部件膨胀，有高温或温度波动
- 系统严重污染

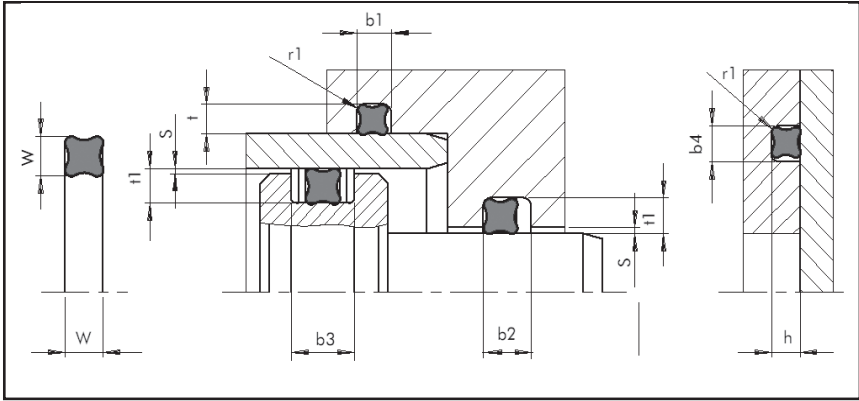
星型圈单向受压时，在远离压力端安装挡圈。双向受压时，则需在两侧都安装挡圈。

5 订货示例

Q04365 - 177.17x5.33 / N70

型号	_____
规格	_____
标准材料	_____

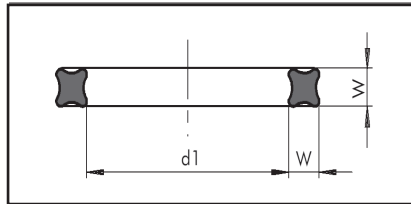
6. 安装示例



6.1 安装参数表

截面 直径 W	径向安装					径向初始压缩		圆角 r1	径向 间隙 S _{max}
	沟槽深度		沟槽宽度			动密封	静密封		
	动密封 t ₁ +0.05	静密封 t/h+0.05	b ₁ ,b ₄ +0.2	b ₂ +0.2	b ₃ +0.2	$\frac{\max}{\min}$	$\frac{\max}{\min}$		
1.02	0.80	0.75	1.20	-	-	0.30/0.115	0.35/0.165	0.10	0.03
1.27	1.00	0.90	1.40	-	-	0.33/0.145	0.43/0.245	0.10	0.03
1.52	1.25	1.15	1.70	-	-	0.35/0.165	0.45/0.265	0.22	0.04
1.78	1.50	1.40	2.00	3.40	4.80	0.36/0.175	0.46/0.275	0.22	0.05
2.62	2.30	2.25	3.00	4.40	5.80	0.40/0.215	0.45/0.265	0.30	0.08
3.53	3.20	3.10	4.00	5.40	6.80	0.43/0.205	0.53/0.305	0.40	0.08
5.33	4.90	4.75	6.00	7.70	9.40	0.56/0.250	0.71/0.40	0.40	0.10
7.00	6.40	6.20	8.00	10.50	13.00	0.70/0.35	0.95/0.60	0.60	0.10

7. 产品规格表



订货号	规格 (d1 x W)	订货号	规格 (d1 x W)
Q04001	0.74x1.02	Q04002	1.07x1.27
Q04003	1.42x1.52	Q04004	1.78x1.78
Q4005A	2.00x1.50	Q04005	2.57x1.78
Q04006	2.90x1.78	Q04007	3.68x1.78
Q04008	4.47x1.78	Q04009	5.28x1.78
Q04010	6.07x1.78	Q04011	7.65x1.78
Q4012A	8.20x1.78	Q04012	9.25x1.78
Q04013	10.82x1.78	Q04014	12.42x1.78
Q04015	14.00x1.78	Q04016	15.60x1.78
Q04017	17.17x1.78	Q04018	18.77x1.78
Q04019	20.35x1.78	Q04020	21.59x1.78
Q04021	23.52x1.78	Q04022	25.12x1.78
Q04023	26.70x1.78	Q04024	28.30x1.78
Q04025	29.87x1.78	Q04026	31.47x1.78
Q04027	33.05x1.78	Q04028	34.65x1.78
Q04029	37.82x1.78	Q04030	41.00x1.78
Q04031	44.17x1.78	Q04032	47.35x1.78
Q04033	50.52x1.78	Q04034	53.70x1.78
Q04035	56.87x1.78	Q04036	60.05x1.78
Q04037	63.22x1.78	Q04038	66.40x1.78
Q04039	69.57x1.78	Q04040	72.75x1.78
Q04041	75.92x1.78	Q04042	82.27x1.78
Q04043	88.62x1.78	Q04044	94.97x1.78
Q04045	101.32x1.78	Q04046	107.67x1.78
Q04047	114.02x1.78	Q04048	120.37x1.78
Q04049	126.72x1.78	Q04050	133.07x1.78
Q04102	1.24x2.62	Q04103	2.06x2.62
Q04104	2.84x2.62	Q04105	3.63x2.62
Q04106	4.42x2.62	Q04107	5.23x2.62
Q04108	6.02x2.62	Q04109	7.59x2.62
Q04110	9.19x2.62	Q4111A	10.20x2.62
Q04111	10.77x2.62	Q04112	12.37x2.62
Q04113	13.94x2.62	Q04114	15.54x2.62
Q4114A	14.70x2.62	Q4114B	14.80x2.62
Q4115A	16.20x2.62	Q04115	17.12x2.62
Q04116	18.72x2.62	Q04117	20.29x2.62
Q04118	21.89x2.62	Q04119	23.47x2.62
Q04120	25.07x2.62	Q04121	26.64x2.62

订货号	规格 (d1 x W)	订货号	规格 (d1 x W)
Q04122	28.24x2.62	Q04123	29.82x2.62
Q04124	31.42x2.62	Q04125	32.99x2.62
Q04126	34.59x2.62	Q04127	36.17x2.62
Q04128	37.77x2.62	Q04129	39.34x2.62
Q04130	40.94x2.62	Q04131	42.52x2.62
Q04132	44.12x2.62	Q04133	45.69x2.62
Q04134	47.29x2.62	Q04135	48.90x2.62
Q04136	50.47x2.62	Q04137	52.07x2.62
Q04138	53.64x2.62	Q04139	55.25x2.62
Q04140	56.82x2.62	Q04141	58.42x2.62
Q04142	59.99x2.62	Q04143	61.60x2.62
Q04144	63.17x2.62	Q04145	64.77x2.62
Q04146	66.34x2.62	Q04147	67.95x2.62
Q04148	69.52x2.62	Q04149	71.12x2.62
Q04150	72.69x2.62	Q04151	75.87x2.62
Q04152	82.22x2.62	Q04153	88.57x2.62
Q04154	94.92x2.62	Q04155	101.27x2.62
Q04156	107.62x2.62	Q04157	113.97x2.62
Q04158	120.32x2.62	Q04159	126.67x2.62
Q04160	133.02x2.62	Q04161	139.37x2.62
Q04162	145.72x2.62	Q04163	152.07x2.62
Q04164	158.42x2.62	Q04165	164.77x2.62
Q04166	171.12x2.62	Q04167	177.47x2.62
Q04168	183.82x2.62	Q04169	190.17x2.62
Q04170	196.52x2.62	Q04171	202.87x2.62
Q04172	209.22x2.62	Q04173	215.57x2.62
Q04174	221.92x2.62	Q04175	228.27x2.62
Q04176	234.62x2.62	Q04177	240.97x2.62
Q04178	247.32x2.62	Q04201	4.34x3.53
Q04202	5.94x3.53	Q04203	7.52x3.53
Q04204	9.12x3.53	Q04205	10.69x3.53
Q04206	12.29x3.53	Q04207	13.87x3.53
Q04208	15.47x3.53	Q04209	17.04x3.53
Q4210A	18.20x3.53	Q04210	18.64x3.53
Q04211	20.22x3.53	Q04212	21.82x3.53
Q04213	23.39x3.53	Q04214	24.99x3.53
Q04215	26.57x3.53	Q04216	28.17x3.53
Q04217	29.74x3.53	Q04218	31.34x3.53

订货号	规格 (d1 x W)	订货号	规格 (d1 x W)
Q04219	32.92x3.53	Q04220	34.52x3.53
Q04211	36.09x3.53	Q04222	37.69x3.53
Q04223	40.87x3.53	Q04224	44.04x3.53
Q04225	47.22x3.53	Q04226	50.39x3.53
Q04227	53.57x3.53	Q04228	56.74x3.53
Q04229	59.92x3.53	Q04230	63.09x3.53
Q04231	66.27x3.53	Q04232	69.44x3.53
Q04233	72.62x3.53	Q04234	75.79x3.53
Q04235	78.97x3.53	Q04236	82.14x3.53
Q04237	85.32x3.53	Q04238	88.49x3.53
Q04239	91.67x3.53	Q04240	94.84x3.53
Q04241	98.02x3.53	Q04242	101.19x3.53
Q04243	104.37x3.53	Q04244	107.54x3.53
Q04245	110.72x3.53	Q04246	113.89x3.53
Q04247	117.07x3.53	Q04248	120.24x3.53
Q04249	123.42x3.53	Q04250	126.59x3.53
Q04251	129.77x3.53	Q04252	132.94x3.53
Q04253	136.12x3.53	Q04254	139.29x3.53
Q04255	142.47x3.53	Q04256	145.64x3.53
Q04257	148.82x3.53	Q04258	151.99x3.53
Q04259	158.34x3.53	Q04260	164.69x3.53
Q04261	171.04x3.53	Q04262	177.39x3.53
Q04263	183.74x3.53	Q04264	190.09x3.53
Q04265	196.44x3.53	Q04266	202.79x3.53
Q04267	209.14x3.53	Q04268	215.49x3.53
Q04269	221.84x3.53	Q04270	228.19x3.53
Q04271	234.54x3.53	Q04272	240.89x3.53
Q04273	247.24x3.53	Q04274	253.59x3.53
Q04275	266.29x3.53	Q04276	278.99x3.53
Q04277	291.69x3.53	Q04278	304.39x3.53
Q04279	329.79x3.53	Q04280	355.19x3.53
Q04281	380.59x3.53	Q04282	405.26x3.53
Q04283	430.66x3.53	Q04284	456.06x3.53
Q04309	10.46x5.33	Q04310	12.07x5.33
Q04311	13.64x5.33	Q04312	15.24x5.33
Q04313	16.81x5.33	Q04314	18.42x5.33
Q04315	19.99x5.33	Q04316	21.59x5.33
Q04317	23.16x5.33	Q04318	24.77x5.33

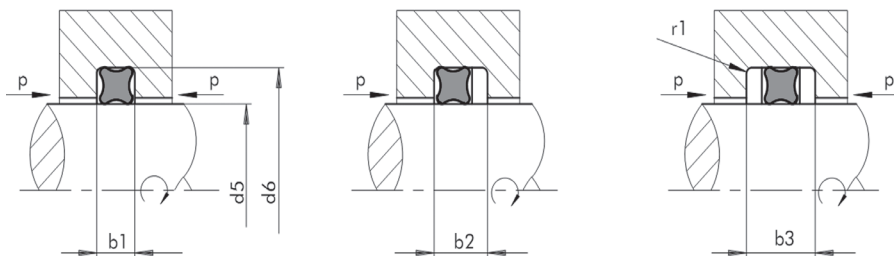
订货号	规格 (d1 x W)	订货号	规格 (d1 x W)
Q04319	26.34x5.33	Q04320	27.94x5.33
Q04321	29.51x5.33	Q04322	31.12x5.33
Q04323	32.69x5.33	Q04324	34.29x5.33
Q04325	37.47x5.33	Q4326A	39.20x5.33
Q04326	40.64x5.33	Q04327	43.82x5.33
Q4328A	45.20x5.33	Q04328	46.99x5.33
Q04329	50.17x5.33	Q04330	53.34x5.33
Q04331	56.52x5.33	Q04332	59.69x5.33
Q04333	62.87x5.33	Q04334	66.04x5.33
Q04335	69.22x5.33	Q04336	72.39x5.33
Q04337	75.57x5.33	Q04338	78.74x5.33
Q04339	81.92x5.33	Q04340	85.09x5.33
Q04341	88.27x5.33	Q04342	91.44x5.33
Q04343	94.62x5.33	Q04344	97.79x5.33
Q04345	100.97x5.33	Q04346	104.14x5.33
Q04347	107.32x5.33	Q04348	110.49x5.33
Q04349	113.67x5.33	Q04350	116.84x5.33
Q04351	120.02x5.33	Q04352	123.19x5.33
Q04353	126.37x5.33	Q04354	129.54x5.33
Q04355	132.72x5.33	Q04356	135.89x5.33
Q04357	139.07x5.33	Q04358	142.24x5.33
Q04359	145.42x5.33	Q04360	148.49x5.33
Q04361	151.77x5.33	Q04362	158.12x5.33
Q04363	164.47x5.33	Q04364	170.82x5.33
Q04365	177.17x5.33	Q04366	183.52x5.33
Q04367	189.87x5.33	Q04368	196.22x5.33
Q04369	202.57x5.33	Q04370	208.92x5.33
Q04371	215.27x5.33	Q04372	221.62x5.33
Q04373	227.97x5.33	Q04374	234.32x5.33
Q04375	240.67x5.33	Q04376	247.02x5.33
Q04377	253.37x5.33	Q04378	266.07x5.33
Q04379	278.77x5.33	Q04380	291.47x5.33
Q04381	304.17x5.33	Q04382	329.57x5.33
Q04383	354.97x5.33	Q04384	380.37x5.33
Q04385	405.26x5.33	Q04386	430.66x5.33
Q04387	456.06x5.33	Q04388	481.41x5.33
Q04389	506.81x5.33	Q04390	532.21x5.33
Q04391	557.61x5.33	Q04392	582.68x5.33

订货号	规格 (d1 x W)	订货号	规格 (d1 x W)
Q04393	608.08x5.33	Q04394	633.48x5.33
Q04395	658.88x5.33	Q04425	113.67x7.00
Q04466	116.84x7.00	Q04427	120.02x7.00
Q04428	123.19x7.00	Q04429	126.37x7.00
Q04430	129.54x7.00	Q04431	132.72x7.00
Q04432	135.89x7.00	Q04433	139.07x7.00
Q04434	142.24x7.00	Q04435	145.42x7.00
Q04436	148.59x7.00	Q04437	151.77x7.00
Q04438	158.12x7.00	Q4439A	160.50x7.00
Q04439	164.47x7.00	Q04440	170.82x7.00
Q04441	177.17x7.00	Q04442	183.52x7.00
Q04443	189.87x7.00	Q04444	196.22x7.00
Q04445	202.57x7.00	Q04446	215.27x7.00
Q04447	227.97x7.00	Q04448	240.67x7.00

订货号	规格 (d1 x W)	订货号	规格 (d1 x W)
Q04449	253.37x7.00	Q04450	266.07x7.00
Q04451	278.77x7.00	Q04452	291.47x7.00
Q04453	304.17x7.00	Q04454	316.87x7.00
Q04455	329.57x7.00	Q04456	342.27x7.00
Q04457	354.97x7.00	Q04458	367.67x7.00
Q04459	380.37x7.00	Q04460	393.07x7.00
Q04461	405.26x7.00	Q04462	417.96x7.00
Q04463	430.66x7.00	Q04464	443.36x7.00
Q04465	456.06x7.00	Q04466	468.76x7.00
Q04467	481.46x7.00	Q04468	494.16x7.00
Q04469	506.86x7.00	Q04470	532.26x7.00
Q04471	557.66x7.00	Q04472	582.68x7.00
Q04473	608.08x7.00	Q04474	633.48x7.00
Q04475	658.87x7.00		

8. 旋转动密封推荐安装尺寸

在旋转运动工况下，由于密封圈在运动中摩擦发热，而弹性体在受热的情况下会收缩（焦耳效应）。为了使密封圈能有润滑及可靠工作，需选用内径比轴径大的星型圈，一般星型圈内径应比轴径大2-5%左右。下面图表中我们将列出常用尺寸轴径选用星型圈及挡圈的推荐规格。



推荐安装尺寸

杆径	星型圈		整体挡圈	沟槽直径	沟槽宽度			半径
	型号	尺寸	型号		$b1^{+0.2}$	$b2^{+0.2}$	$b3^{+0.2}$	
4.0	Q04008	4.47 X 1.78	BU-4.0x7.2x1.4	7.2	2.0	3.2	4.4	0.2
5.0	Q04009	5.28 X 1.78	BU-5.0x8.2x1.4	8.2	2.0	3.2	4.4	0.2
8.0	Q04012A	8.20 X 1.78	BU-8.0x11.2x1.4	11.2	2.0	3.2	4.4	0.2
10.0	Q04111	10.20 X 2.62	BU-10.0x14.8x1.4	14.8	2.8	4.0	5.2	0.3
12.0	Q04112	12.37 X 2.62	BU-12.0x16.8x1.4	16.8	2.8	4.0	5.2	0.3
15.0	Q04114	15.54 X 2.62	BU-15.0x19.8x1.4	19.8	2.8	4.0	5.2	0.3
16.0	Q04115	17.12 X 2.62	BU-16.0x20.8x1.4	20.8	2.8	4.0	5.2	0.3
18.0	Q04116	18.72 X 2.62	BU-18.0x22.8x1.4	22.8	2.8	4.0	5.2	0.3
20.0	Q04211	20.22 X 3.53	BU-20.0x26.6x1.4	26.7	3.8	5.4	7.0	0.4
22.0	Q04213	23.39 X 3.53	BU-22.0x28.6x1.4	28.7	3.8	5.4	7.0	0.4
25.0	Q04215	26.57 X 3.53	BU-25.0x31.6x1.4	31.7	3.8	5.4	7.0	0.4
28.0	Q04217	29.74 X 3.53	BU-28.0x34.6x1.4	34.7	3.8	5.4	7.0	0.4
30.0	Q04218	31.34 X 3.53	BU-30.0x36.6x1.4	36.7	3.8	5.4	7.0	0.4
32.0	Q04219	32.92 X 3.53	BU-32.0x38.6x1.4	38.7	3.8	5.4	7.0	0.4
35.0	Q04221	36.09 X 3.53	BU-35.0x41.6x1.4	41.7	3.8	5.4	7.0	0.4
36.0	Q04222	37.69 X 3.53	BU-36.0x42.6x1.4	42.7	3.8	5.4	7.0	0.4
40.0	Q04326	40.64 X 5.33	BU-40.0x49.8x1.7	49.9	6.0	8.0	10.0	0.4
42.0	Q04327	43.82 X 5.33	BU-42.0x51.8x1.7	51.9	6.0	8.0	10.0	0.4
45.0	Q04328	46.99 X 5.33	BU-45.0x54.8x1.7	54.9	6.0	8.0	10.0	0.4
48.0	Q04329	50.17 X 5.33	BU-48.0x57.8x1.7	57.9	6.0	8.0	10.0	0.4
50.0	Q04330	53.34 X 5.33	BU-50.0x59.8x1.7	59.9	6.0	8.0	10.0	0.4
52.0	Q04330	53.34 X 5.33	BU-52.0x61.8x1.7	61.9	6.0	8.0	10.0	0.4
55.0	Q04331	56.52 X 5.33	BU-55.0x64.8x1.7	64.9	6.0	8.0	10.0	0.4
56.0	Q04331	56.52 X 5.33	BU-56.0x65.8x1.7	65.9	6.0	8.0	10.0	0.4
60.0	Q04333	62.87 X 5.33	BU-60.0x69.8x1.7	69.9	6.0	8.0	10.0	0.4
63.0	Q04334	66.04 X 5.33	BU-63.0x72.8x1.7	72.9	6.0	8.0	10.0	0.4
65.0	Q04334	66.04 X 5.33	BU-65.0x74.8x1.7	74.9	6.0	8.0	10.0	0.4
70.0	Q04336	72.39 X 5.33	BU-70.0x79.8x1.7	79.9	6.0	8.0	10.0	0.4
75.0	Q04338	78.74 X 5.33	BU-75.0x84.8x1.7	84.9	6.0	8.0	10.0	0.4
80.0	Q04339	81.92 X 5.33	BU-80.0x89.8x1.7	89.9	6.0	8.0	10.0	0.4
85.0	Q04341	88.27 X 5.33	BU-85.0x94.8x1.7	94.9	6.0	8.0	10.0	0.4
90.0	Q04343	94.62 X 5.33	BU-90.0x99.8x1.7	99.9	6.0	8.0	10.0	0.4
95.0	Q04344	97.79 X 5.33	BU-95.0x104.8x1.7	104.9	6.0	8.0	10.0	0.4
100.0	Q04346	104.14 X 5.33	BU-100.0x109.8x1.7	109.9	6.0	8.0	10.0	0.4
105.0	Q04348	110.49 X 5.33	BU-105.0x114.8x1.7	114.9	6.0	8.0	10.0	0.4
110.0	Q04426	116.84 X 7.00	BU-110.0x123.2x2.5	123.3	7.7	10.2	12.7	0.6

推荐安装尺寸

杆径 d _s f7	星型圈		整体挡圈	沟槽直径 d ₆ H8	沟槽宽度			半径 r ₁
	型号	尺寸	型号		b ₁ ^{+0.2}	b ₂ ^{+0.2}	b ₃ ^{+0.2}	
115.0	Q04427	120.02 X 7.00	BU-115.0x128.2x2.5	128.3	7.7	10.2	12.7	0.6
120.0	Q04428	123.19 X 7.00	BU-120.0x135.2x2.5	135.3	7.7	10.2	12.7	0.6
125.0	Q04430	129.54 X 7.00	BU-125.0x138.2x2.5	138.3	7.7	10.2	12.7	0.6
130.0	Q04432	135.89 X 7.00	BU-130.0x143.2x2.5	143.3	7.7	10.2	12.7	0.6
140.0	Q04435	145.42 X 7.00	BU-140.0x153.2x2.5	153.3	7.7	10.2	12.7	0.6
150.0	Q04438	158.12 X 7.00	BU-150.0x163.2x2.5	163.3	7.7	10.2	12.7	0.6
160.0	Q04439	164.47 X 7.00	BU-160.0x173.2x2.5	173.3	7.7	10.2	12.7	0.6
180.0	Q04442	183.52 X 7.00	BU-180.0x193.2x2.5	193.3	7.7	10.2	12.7	0.6
200.0	Q04445	202.57 X 7.00	BU-200.0x213.2x2.5	213.3	7.7	10.2	12.7	0.6