Product Release Brief

STÖBER Gear racks ZS
Generation 0

Product management, System Support

May 2024

Version 1.1

STÖBER

Contents

1. Intention

As part of STOBER's system strategy, from now on gear racks will be a useful addition to the product portfolio, rounding it off together with the existing rack and pinion drives. This enables us to expand our product range to include another important component in the whole drive system and allowing us to generate additional sales. Like all of our products, the gear racks stand for quality and generate recognizable added value for the customer due to their specific properties.

ATLANTA was personally informed in advance about this addition to our product portfolio.

2. Product Launch

2.1. Timeline

- Available from 30.04.2024
  - Press release “Gear racks“
- Available from 01.05.2024
  - Homepage
  - Catalog
  - STOBER-Configurator (GOC)
  - Option to choose in SAP
- Available from 02.05.2024
  - Sales presentation
  - Newsletter
  - Announcement to existing customers via
- Scheduled for a later date
  - Insight STÖBER newsletter
  - SPS Nürnberg Trade Show November 2024
  - Sales training SDI

The sales training for the European area have already taken place.

- First draw delivery to SAT: End of July / Beginning of August

2.2. Documentations and Tools

- Catalog (For more information, see chapter 11.1 Catalogs)
- Operating Manual and Assembly Instructions
- STOBER Configurator (GOC) (For more information, see chapter 11.2 Internet/Intranet)
- Homepage (For more information, see chapter 11.2 Internet/Intranet)
- SAP-Configurator
- CAD download
- Training presentation
- Sales presentation
- SERVOsoft (For more information, see chapter 11.3 SERVOsoft)

3. Marketing & Publications

Publication schedules for marketing initiatives (press, website, social media and email marketing)

MARKETINGPLAN

PRODUKT	Zahnstangen	START	01.02.2024
PROJEKTMANAGER	Tiffany	DEADLINE	01.05.2024
KATEGORIE	3 (Aktive Vermarktung durch Presse + Webseite + Social Media)		

AUFGBENBEREICH	AUFGABE	ZUSÄTZLICHE INFORMATIONEN	PLANUNG			
			Erforderlich?	Verantwortlich	Status	Deadline
	ONLINE					
Content						
Informationsbeschaffung & Definition	USPs und Don'ts recherchieren und definieren (interene Klärung Entwicklung) Zwischen Key-Features und System-Features differenzieren	(Erarbeitung von Service-Angeboten)	Ja	Claudia	Abgeschlossen	Abgeschlossen
	Slogan definieren		Ja	Claudia	Abgeschlossen	Abgeschlossen
	Brainstorming zu visuellem Content (wie wird Contentmaterial aufbereitet für optimale Produktvorstellung?)		Ja	Claudia	Abgeschlossen	01.04.2024
Contenterstellung	Erstellen von Presseinfos, Fachberichten und Portraits	Presseinfo notwendig, geplant im Juli - Portrait M. Eberle	Ja	Claudia	Abgeschlossen	Abgeschlossen
	Contenterstellung für diverse Bereiche (Website, GOC, etc.)		Ja	Claudia	Abgeschlossen	04.04.2024
	Anfordern und Zusammenstellen von visuellem Content (Bild/ Video)		Ja	Claudia	in Abstimmung	30.04.2024
Umsetzung	Befüllen einer Produktseite / Landingpage bzw. Überarbeitung bestehender		Ja	Claudia	Abgeschlossen	23.04.2024
	Vetriebspräsentation erstellen & zugänglich machen		Ja	Tiffany	in Arbeit	30.04.2024
Website						

4. Description

4.1. Overview gear racks ZS

Our precision gear racks are available in various lengths and modules - for the highest demands on smooth running and positioning accuracy.

- Modul: 2-6mm
- Max. feed force: 12,6-83,1kN
- Feed force screw connection: 8-192,5kN
- Helical, hardened and smoothed
- Gearing quality 6 according to DIN 3962-1
- Length: 500mm and 1000mm

Module	Helical Angle	Material	Heat Treatment	Length	Bores for Screws DIN912	Bores for Pin DIN7979	Quality
m	ß			L	Quantity x Size	Quantity x Size	DIN3962-1
2	19°31´42´´	High Tensile Steel	Ind. Hardened Scanning	0,5m / 1m	7/15 x M6	2 x Ø5,7	6
3	19°31´42´´	High Tensile Steel	Ind. Hardened Scanning	0,5m / 1m	7/15 x M8	2 x Ø7,7	6
4	19°31´42´´	High Tensile Steel	Ind. Hardened Scanning	0,5m / 1m	7/15 x M10	2 x Ø9,7	6
5	19°31´42´´	High Tensile Steel	Ind. Hardened Scanning	0,5m / 1m	7/15 x M12	2 x Ø11,7	6
6	19°31´42´´	High Tensile Steel	Ind. Hardened Scanning	0,5m / 1m	7/15 x M16	2 x Ø15,7	6

4.2. Overview Rack & Pinion Drives

ZV highest flexibility

ZR highest speed

ZTR high feed forces

ZTRS highest feed forces

												
Type	ZVP	ZVPE	ZVKS	ZVKL	ZVK	ZRPH	ZTRPH	ZTRPHV	ZTRSPH	ZTRSPHQ	ZTRSPHV	
BG	3 – 7	3 – 5	4 – 7	1 – 2	1 – 4	3 – 7	4 – 10	9 – 10	7 – 9	10	9	
m_n	2 – 4	2 – 3	2 – 4	2	2 – 4	2 – 4	2 – 8	5 – 8	3 – 8	8	5 – 8	[mm]
z	16 – 25	16 – 25	18 – 25	16 – 20	18 – 25	26 – 45	12 – 32	12 – 19	15 – 32	19	15 – 20	
F_{f2acc}	2 – 15	2 – 6,3	4,2 – 11	1,3 – 2,9	2,8 – 15	2,1 – 15	5,8 – 67	56 – 67	20 – 79	124	67 – 77	[kN]
$v_{f2maxZB}$	0,14 – 5,30	0,11 – 4,50	0,07 – 3,00	0,33 – 2,80	0,06 – 3,80	0,23 – 6,70	0,09 – 4,70	0,19 – 0,39	0,2 – 4,70	0,06 – 1,10	0,21 – 0,49	[m/s]
Δs	8 – 44	40 – 83	31 – 44	99 – 123	12 – 111	10 – 56	4 – 44	42 – 44	8 – 56	70	15 – 56	[µm]
Lineares Spiel	★★★★★	★★☆☆☆	★★★☆☆	★☆☆☆☆	★★★☆☆	★★★★★	★★★★★	★★★★☆	★★★★★	★★★★☆	★★★★☆	
Preisklasse	€€	€	€€€	€	€	€€€	€€€€	€€€€	€€€€€	€€€€€	€€€€€	

4.3. Combinations

Module	ZVP	ZVPE	ZVKS	ZVKL	ZVK
2	X	X	X	X	X
3	X	X	X	-	X
4	X	-	X	-	X
5	-	-	-	-	-
6	-	-	-	-	-

Module	ZRPH	ZTRPH	ZTRPHV	ZTRSPH	ZTRSPHQ	ZTRSPHV
2	X	X	-	X	-	-
3	X	X	-	X	-	-
4	X	X	-	X	-	-
5	-	X	X	X	-	X
6	-	X	X	X	-	X
8		1)	1)	1)	1)	1)

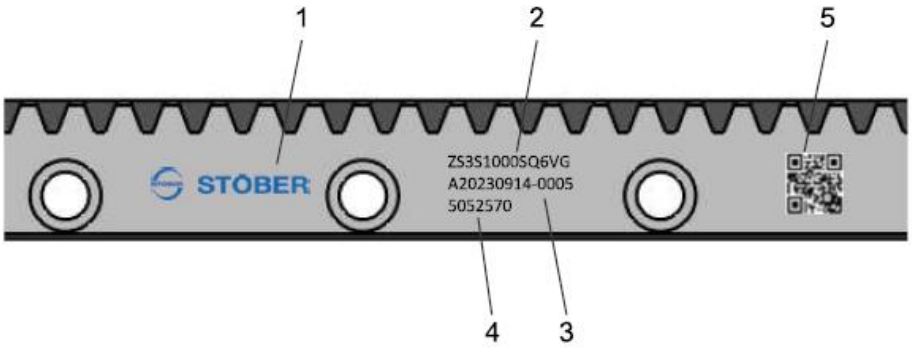
X = Catalog variant

- = cannot be combined

1) Module 8 with appropriate potential on request

4.4. Type code

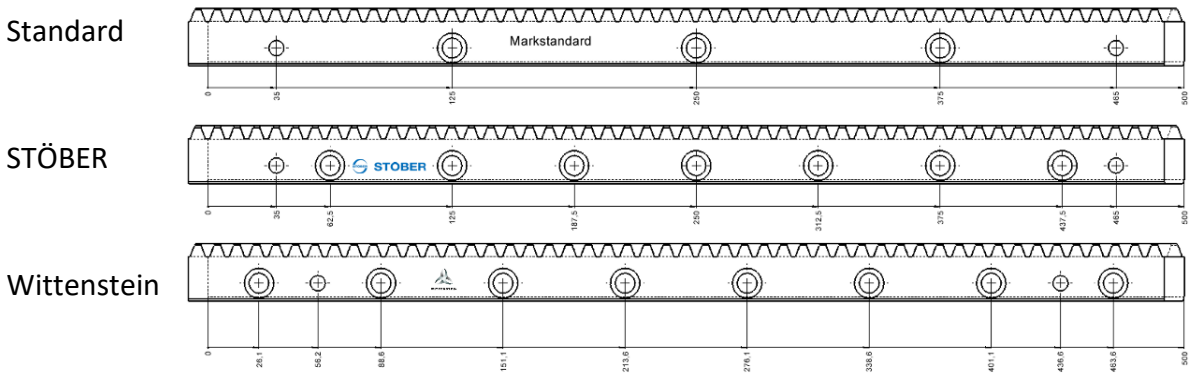
Code	Description	Design
ZS	**Type**	Gear rack
4	**Module**	M_n = 4 mm
S	**Toothing**	Helical (left-hand 19° 31)
0500 1000	**Length**	500, 1000 mm
S	**Fastening bore**	standard
Q6	**Gearing quality**	quality 6 according to DIN 3962-1
V	Material	High tensile steel according to STÖBER specifi-cation
G	**Heat treatment**	hardened



Code	Description
1	Name of manufacturer
2	Type description
3	Serial number of the gear rack
4	Item number
5	QR-Code (link to product information)

4.5. Technical design / Double-Bore-Design (DBD)

Compared to the market standard, the STÖBER gear racks are designed with a hole spacing of 62.5mm. Only three manufacturers offer this solution: STÖBER, GÜDEL (STÖBER compatible) and Wittenstein (not market standard compatible, changed drilling pattern and one more screw hole).



The STOBER drilling pattern is compatible with the market standard. When replacing a market standard gear rack with a STÖBER gear rack, every second screw hole remains unused. These holes can be closed with sealing plugs if needed.

- Due to the double number of screw connections, pinning can be neglected in some cases. This eliminates the need for machining during assembly and prevents consequential damage caused by leftovers from the machining process.
  Time savings while assembling (approx. 30-45 minutes saved per rack)

- By using the pin holes in the STÖBER gear racks, the safety can be increased, and multiple tooth engagement can be achieved.

5. Technical data

5.1. General

Since the big advantage of the STOBER precision gear rack is the double bore design, the max. forces of the screws and pin connections are also shown in the selection table. The data is tailored to the lengths of 500mm and 1000mm.

5.2. Feed forces - screws & pin connections

m_n	l_{zs}	Type	$F_{f,max}$	F_{sv}			m
				LA125PIN	LA62,5	LA62,5PIN	
[mm]	[mm]		[kN]	[kN]	[kN]	[kN]	[kg]
2	500.00	ZS2S0500SQ6VG	12.6	8.5	8.0	12.5	1.9
2	1000.00	ZS2S1000SQ6VG	12.6	13.5	18.0	22.0	3.9
3	500.00	ZS3S0500SQ6VG	22.5	16.0	15.5	23.0	2.7
3	1000.00	ZS3S1000SQ6VG	22.5	25.0	33.5	41.0	5.4
4	506.67	ZS4S0500SQ6VG	38.7	31.0	25.0	42.0	5.1
4	1000.00	ZS4S1000SQ6VG	38.7	45.5	55.0	71.5	10
5	500.00	ZS5S0500SQ6VG	60.0	38.5	38.5	55.0	5.8
5	1000.00	ZS5S1000SQ6VG	60.0	61.0	83.0	99.5	12
6	500.00	ZS6S0500SQ6VG	83.1	72.5	75.0	105.5	8.5
6	1000.00	ZS6S1000SQ6VG	83.1	116.0	163.0	192.5	17

$F_{svLA125PIN}$ Transmittable feed force of the screw connection with hole distance 125 mm pinned
$F_{svLA62,5}$ Transmittable feed force of the screw connection with hole distance 62,5 mm
$F_{svLA62,5PIN}$ Transmittable feed force of the screw connection with hole distance 62,5 mm pinned

- With the market standard (125mm + pins), the max. gearing forces can only be transmitted at $l_{ZS} \geq 1m$.
- With the STÖBER double bore design (62.5mm without pins) the max feed forces of racks with $l_{ZS} \geq 1m$ can be transferred without pins.
- Racks with $l_{ZS} \leq 1m$ must be pinned if the rack is heavily utilized.

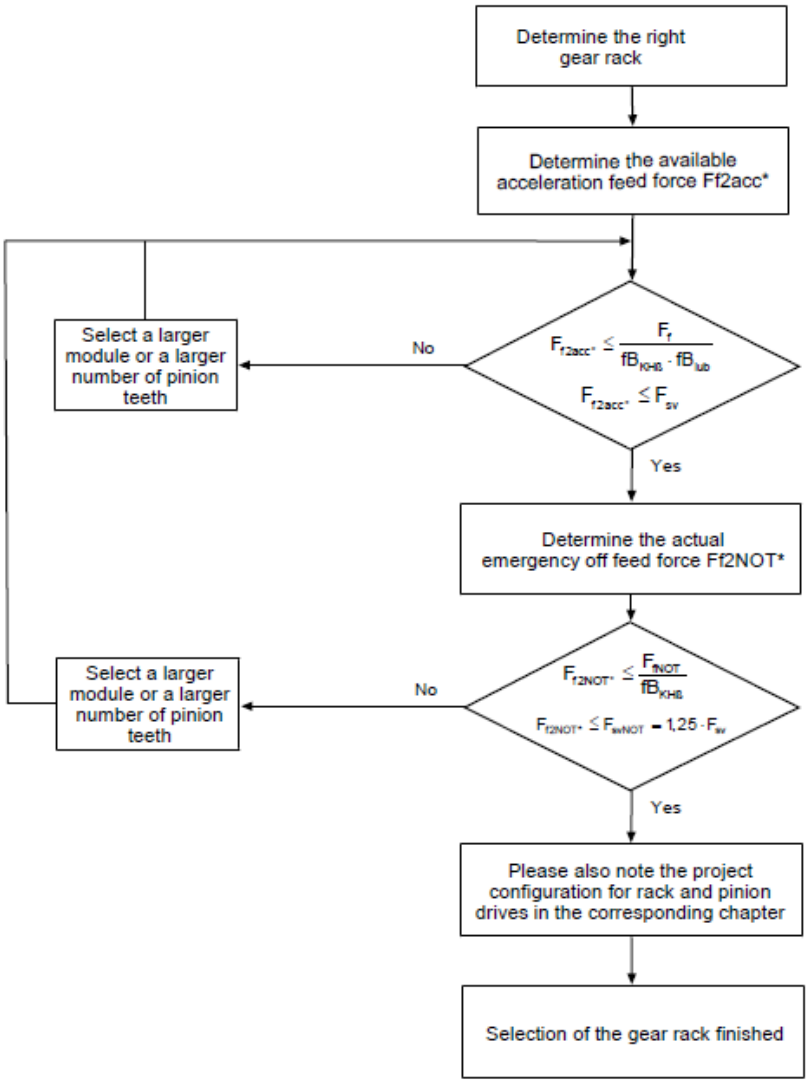
5.3. Feed forces - depending on the number of pinion teeth

At this point we refer to the feed forces in the catalog.

5.4. Project configuration

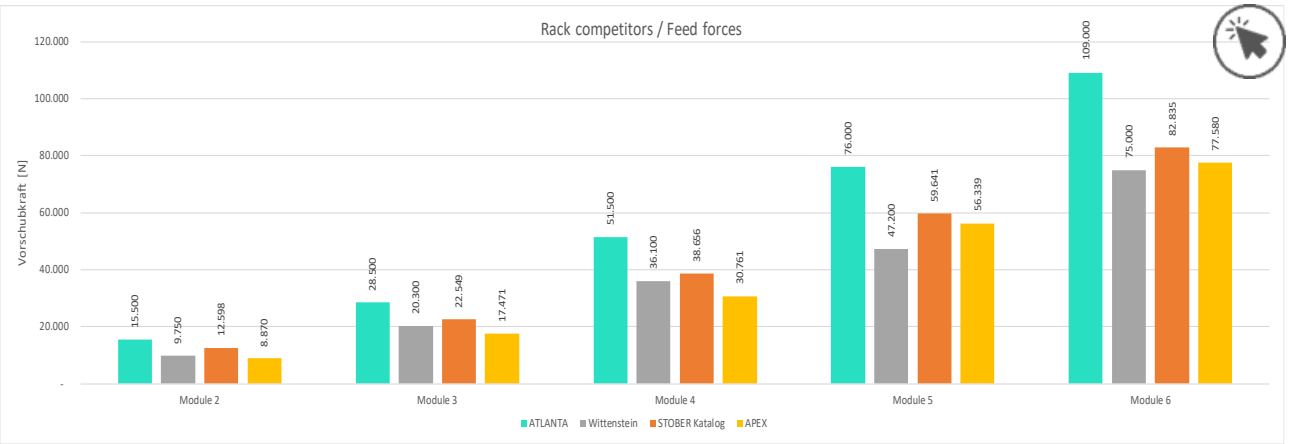
The catalog and our design software SERVOsoft serve as planning aids.

If you have any questions regarding project planning, please contact the System Support - Gear Support department (gearsupport@stoeber.de).



5.5. Competitor comparison

The STÖBER racks offer a very good combination of the required precision and price compared to the market. The following competitive comparison shows helical toothed racks made of tempered steel, inductively hardened in quality 6. This corresponds to the most common standard on the market.



The derating factors of the respective manufacturers are not considered in the overview.

5.6. Changeover from ATLANTA racks to STOBER

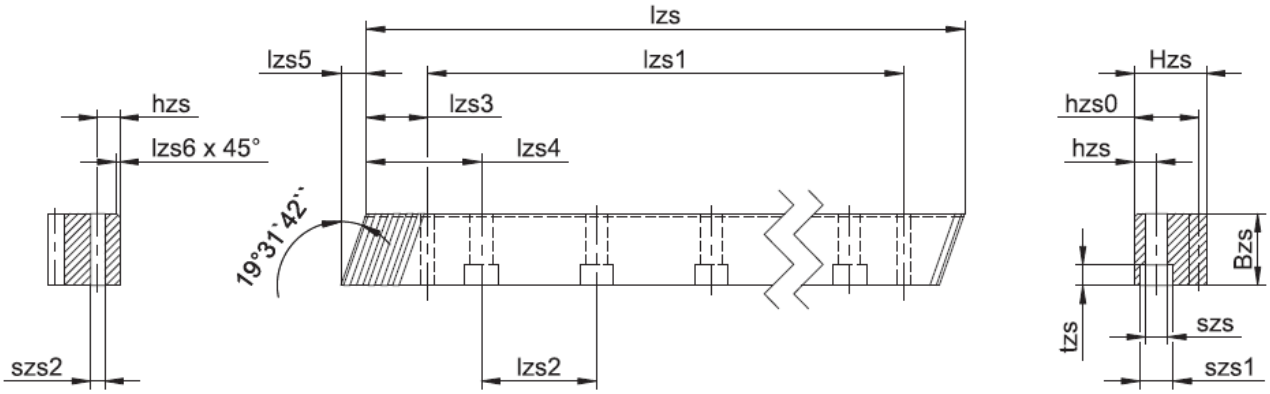
In general, with ATLANTA racks that are used in combination with a ZV or ZR pinion, there should be no problems when converting to STOBER racks. Since we were not able to check every single combination, please check the values too.

ATLANTA racks that are combined with a ZTR or ZTRS pinion must be checked more detailed. If the ATLANTA racks 29….8 (e.g. 29 30 108) former designation 39….8 or 38….0, there should be no problems because these racks are of poorer quality than the STÖBER racks. Please still check the values when making the change.

For customers who have purchased ATLANTA racks 29….0, 29….5 (used in competition comparison) or 29….7, the changeover is a bit more complex. Here the application must be discussed with the customer and a new configuration must be carried out as described in the catalog.

6. Geometrical data

- Total pitch error
  ±36 µm for rack length lzs = 1000 mm
  ±32 µm for rack length lzs = 500 mm
- Profile grounded on all sides

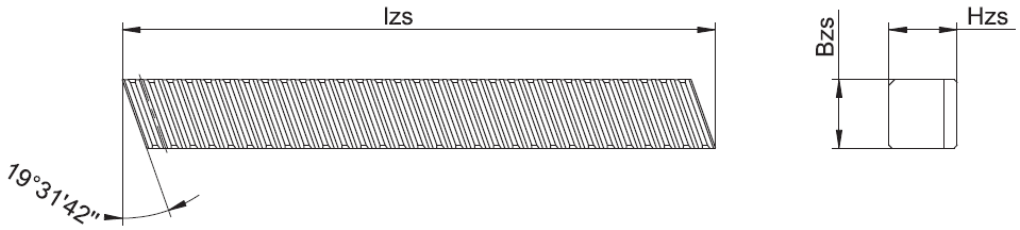


Type	mn	z	lzs	Bzs	Hzs	hzs	hzs0	lzs1	lzs2	lzs3	lzs4	lzs5	lzs6	szs	szs1	szs2	tzs
ZS2S0500SQ6VG	2	75	500.00	24	24	8	22	436.6	62.5	31.7	62.5	8.5	2	7	11	5.7	7
ZS2S1000SQ6VG	2	150	1000.00	24	24	8	22	936.6	62.5	31.7	62.5	8.5	2	7	11	5.7	7
ZS3S0500SQ6VG	3	50	500.00	29	29	9	26	430.0	62.5	35.0	62.5	10.3	2	10	15	7.7	9
ZS3S1000SQ6VG	3	100	1000.00	29	29	9	26	930.0	62.5	35.0	62.5	10.3	2	10	15	7.7	9
ZS4S0500SQ6VG	4	38	506.67	39	39	12	35	433.0	62.5	33.3	62.5	13.8	2	12	18	9.7	11
ZS4S1000SQ6VG	4	75	1000.00	39	39	12	35	933.4	62.5	33.3	62.5	13.8	2	12	18	9.7	11
ZS5S0500SQ6VG	5	30	500.00	49	39	12	34	425.0	62.5	37.5	62.5	17.4	3	14	20	11.7	13
ZS5S1000SQ6VG	5	60	1000.00	49	39	12	34	925.0	62.5	37.5	62.5	17.4	3	14	20	11.7	13
ZS6S0500SQ6VG	6	25	500.00	59	49	16	43	425.0	62.5	37.5	62.5	20.9	3	18	26	15.7	17
ZS6S1000SQ6VG	6	50	1000.00	59	49	16	43	925.0	62.5	37.5	62.5	20.9	3	18	26	15.7	17

7. Mounting gear rack

To assemble several racks together, an assembly rack with the same module as the racks is helpful. Mounting racks can be purchased as accessories from STÖBER.

Further information on assembly can be found in the operating manual (443392_de_00_BAL_Zahnstangen).



Id.-Nr.	mn	lzs	z	Bzs	Hzs	m
5052582	2	200	30	24	24	0,82 kg
5052583	3	200	20	29	29	1,16 kg
5052584	4	200	15	39	39	2,13 kg
5052585	5	200	12	49	39	2,60 kg
5052586	6	200	10	59	49	3,96 kg

8. Lubrication

STÖBER recommends the following lubricants for rack and pinion drives:

- Klüber Microlube GB 0
- Klüber Structovis AHD
- Oest Langzeitfett LT 200
- BP Energrease LS EP 00
- DEA Glissando 6833 EP 00
- Fuchs Lubritech Gearmaster ZSA
- Molykote G-Rapid plus 3694

9. Pricing

Description	Material-Nr.	Module	Length	BVP
Gear rack ZS2S0500SQ6VG	5052566	2	500	129 €
Gear rack ZS2S1000SQ6VG	5052567	2	1000	184 €
Gear rack ZS3S0500SQ6VG	5052569	3	500	176 €
Gear rack ZS3S1000SQ6VG	5052570	3	1000	252 €
Gear rack ZS4S0500SQ6VG	5052572	4	506,67	256 €
Gear rack ZS4S1000SQ6VG	5052573	4	1000	366 €
Gear rack ZS5S0500SQ6VG	5052575	5	500	323 €
Gear rack ZS5S1000SQ6VG	5052593	5	1000	462 €
Gear rack ZS6S0500SQ6VG	5052595	6	500	403 €
Gear rack ZS6S1000SQ6VG	5052596	6	1000	576 €
Mounting gear rack M2 L200	5052582	2	200	27 €
Mounting gear rack M3 L200	5052583	3	200	35 €
Mounting gear rack M4 L200	5052584	4	200	59 €
Mounting gear rack M5 L200	5052585	5	200	75 €
Mounting gear rack M6 L200	5052586	6	200	92 €

10. Delivery conditions

The first draw delivery for our STOBER warehouse reaches us at the end of July / beginning of August. Since then, you can expect the following delivery conditions:

- Modules 2 to 5: Available from stock, delivery time 1-2 weeks
  - Modules 2 and 3: For orders > 20 pieces after consultation
  - Modules 4 and 5: For orders > 10 pieces after consultation
- Module 6: Produced as required, 12-to-16-week delivery time

- Assembly racks modules 2 to 5: Available from stock, delivery time 1-2 weeks
- Assembly racks Module 6: Produced as required, delivery time 12 to 16 weeks

11. Media

11.1. Catalogs

The publication date of the catalog below refers to the following languages: German, English, Italian, Japanese, Korean, Chinese and Taiwanese. The foreign language versions in Spanish and French will be available at the end of week 18.

443137_en_06_KAT_Zahnstangentriebe

01.05.2024

11.2. Internet / Intranet

- STOBER Configurator (GOC): Racks will be activated at market launch. See Chapter 2.1.

- Website: The website is finally prepared for the market launch and the sales release of the STÖBER racks. Information regarding pillar pages and advertisements on the homepage are stored in the marketing plan under Timings Go-Live. You will find a corresponding page under “Hot topics” as well as in the product area under “Rack and pinion drives”.

11.3. SERVOsoft

For project planning with SERVOsoft, a lot of things must be adjusted in the database and in the program. Since the changes are very complex, SERVOsoft will not yet be available at the start of sales. As soon as the new program version and database are available for updating, there will be an email notification via the well-known _SERVOsoftuser distribution list.

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