

## Roller chain idler sprocket units Idler pulley units

# Roller chain idler sprocket units, idler pulley units

	Page
<b>Product overview</b>	Roller chain idler sprocket units, idler pulley units ..... 334
<b>Features</b>	Roller chain idler sprocket units ..... 335
	Idler pulley units..... 335
	Operating temperature ..... 336
	Designation structure ..... 336
	Material codes..... 336
<b>Design and safety guidelines</b>	Roller chain idler sprocket units ..... 337
	Idler pulley units..... 338
<b>Accuracy</b>	Tolerances of radial insert ball bearing bore ..... 339
	Radial internal clearance ..... 339
<b>Dimension tables</b>	Roller chain idler sprocket units..... 340
	Idler pulley units..... 344

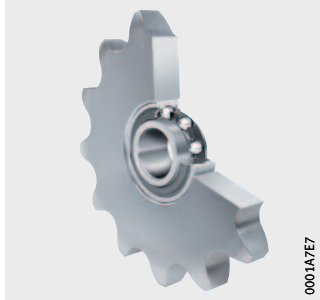


# Product overview **Roller chain idler sprocket units, idler pulley units**

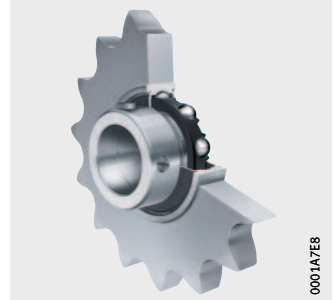
## Roller chain idler sprocket units

Sprocket made from steel or sintered iron

KSR..-L0

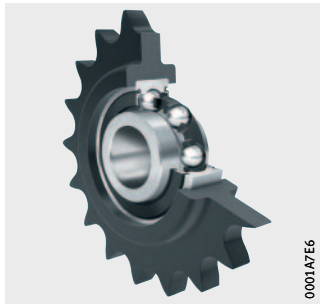


KSR..-B0



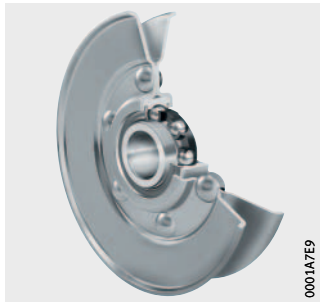
Sprocket made from plastic

KSR..-L0..-22

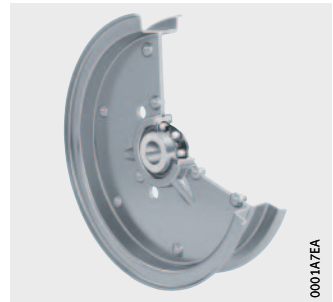


## Idler pulley units

RSRA..-L0, RSRA..-K0



RSRB..-L0



RSRD..-L0



# Roller chain idler sprocket units, idler pulley units

**Features** Roller chain idler sprocket units and idler pulley units are robust, economical tensioning elements. These proven machine elements are available in various series and are suitable for a wide range of diverse applications.

## Roller chain idler sprocket units

Roller chain idler sprocket units are guidance and return units for roller bush chains and roller chains. They can compensate for chain stretch resulting from operation and give smoother system running under high loads and speeds.

The ready-to-fit units comprise sprockets and deep groove ball bearings or radial insert ball bearings. The sprockets are made from high strength steel, sintered iron or plastic (polyamide). Sprockets made from plastic give particularly smooth running and generate very little noise. Since the inner ring of the deep groove ball bearing is extended on both sides, no additional spacer rings are required.

In series KSR...-B0, the inner ring is located on the shaft by means of a locking collar. The bearing bore of this series has a plus tolerance. As a result, unmachined shafts up to tolerance class h9  $\oplus$  can be used under moderate loads and speeds.

**Sealing** The deep groove ball bearings are sealed on both sides.

**Lubrication** They are greased using a lithium soap grease to GA13 and are maintenance-free.

## Idler pulley units

Idler pulley units are tensioning systems for belt drives and idler units:

- They increase the wrap angle in belt drives and can therefore support higher power levels or allow smaller units to be used.
- They compensate for belt stretch resulting from operation.
- They allow shorter centre distances.
- They reduce the wear on the belt drive.

The ready-to-fit units comprise deep drawn, profiled sheet steel pulley halves riveted together and deep groove ball bearings. Pulleys of larger diameters are additionally welded together. A lead chamfer on the pulley profile prevents damage to the belt. Due to the sheet steel construction, the additional rotating masses and the unbalance masses generated are low.

Type A is suitable for vee belts, type B for flat, vee and round belts, type D for round belts, steel cables and hemp ropes.

**Sealing** The deep groove ball bearings are sealed on both sides.

**Lubrication** They are greased using a lithium soap grease to GA13 and are maintenance-free.



# Roller chain idler sprocket units, idler pulley units

## Operating temperature

Roller chain idler sprocket units with steel or sintered iron sprockets are suitable for operating temperatures from  $-20\text{ }^{\circ}\text{C}$  to  $+120\text{ }^{\circ}\text{C}$ .

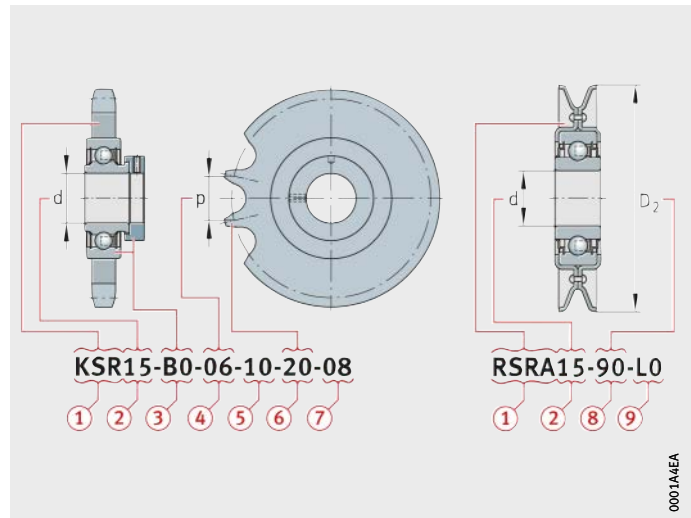
Roller chain idler sprocket units with plastic sprockets are suitable for operating temperatures from  $-20\text{ }^{\circ}\text{C}$  to  $+80\text{ }^{\circ}\text{C}$ .

Idler pulley units are suitable for operating temperatures from  $-20\text{ }^{\circ}\text{C}$  to  $+120\text{ }^{\circ}\text{C}$ , limited by the grease and seal material.

## Designation structure

Units with the suffix L0 contain deep groove ball bearings with inner rings extended on both sides. Units with the suffix B0 contain radial insert ball bearings RAE...NPP with eccentric locking collars, *Figure 1*.

- ① Design (KSR or RSR)
- ② Bore diameter of bearing
- ③ Radial insert ball bearing with eccentric locking collar
- ④ Pitch  $p$  of sprocket in  $1/16''$ , code
- ⑤ Chain number in accordance with DIN ISO 606
- ⑥ Number of teeth  $z$
- ⑦ Material code, see table
- ⑧ Outside diameter of pulley
- ⑨ Inner ring extended on both sides



*Figure 1*  
Structure of the designation

## Material codes

The materials used for the sprockets are classified by means of material codes, see table.

## Classification of materials

Code	Material	Hardness to DIN EN ISO 6506-1	
		from	to
08	Sintered iron C 10	40 HBW	60 HBW
09	Sintered iron D 39	90 HBW	120 HBW
15	Steel St 52	–	–
16	Steel C 45	45 HRC	55 HRC
		Tooth flanks hardened	
22	Plastic PA	–	–

## Design and safety guidelines

### Roller chain idler sprocket units

The chapter Technical principles brings together the essential guidelines on the design of bearing arrangements, lubrication, mounting and dismantling and the operation of bearings, see page 32.

Roller chain idler sprocket units should always be mounted on the slack side of the chain, *Figure 2*.

The wrap angle on the idler sprocket unit should be selected such that at least three teeth are engaged simultaneously.

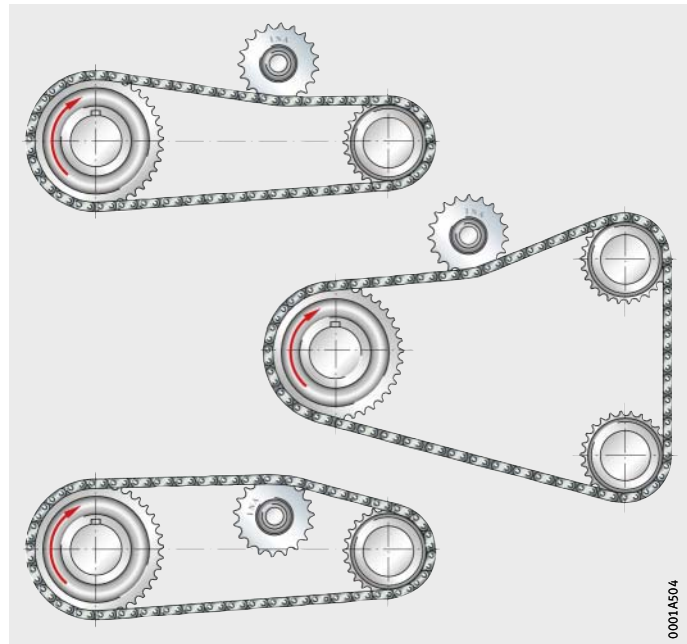
For grease lubrication, a grease with good adhesion characteristics should be used.

Roller chain idler sprocket units of bore  $d = 16$  mm are toleranced so that they can be fitted using fixing screws M16.



The minimum press-out force of the deep groove ball bearings is 700 N. This value must not be exceeded during operation.

The preload on the slack side should not be less than 1% of the tractive force on the taut side.



*Figure 2*  
Arrangement  
on slack side of chain drive

# Roller chain idler sprocket units, idler pulley units

## Idler pulley units

Idler pulley units should only be positioned on the slack side of the drive, *Figure 3*.

For normal loads, a light fit for the inner ring combined with axial clamping is sufficient.

If idler pulley units with a flat profile are to be used for tensioning via the back of a vee belt, check the suitability of the vee belt for this arrangement.



The permissible belt speed of 40 m/s must not be exceeded.

Check the permissible belt tension and operating life of the ball bearing for each individual application.

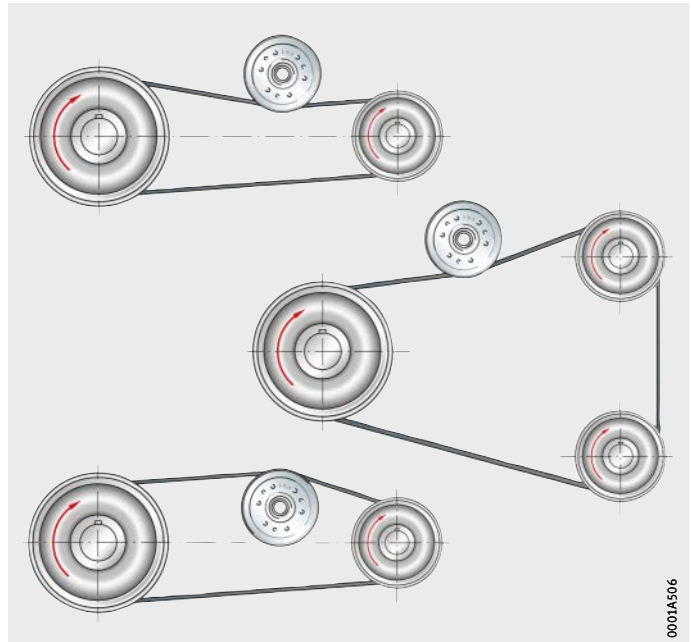
## Preload force

The following is an approximate guide value for the preload force  $S_v$  between the shafts:

- for flat belts  $S_v = 2$  to  $3 \times F_u$  (circumferential force)
- for vee belts  $S_v = 1,7$  to  $2,5 \times F_u$  (circumferential force).

## Checking of belt tension

Measure the speed ratio without load at low speed. Then measure the speed ratio at operating speed and under operating load. If the difference in speed due to slippage is  $> 2\%$ , retension the belt.



*Figure 3*  
Arrangement on slack side of belt  
drive

0001A506

### Accuracy

In the case of idler pulley units for vee belts, the groove angles are slightly larger due to the small wrap than recommended according to DIN 2211 and DIN 2217.

### Tolerances of radial insert ball bearing bore

The tolerances of the inner ring bore of roller chain idler sprocket units KSR...-L0 are dependent on the diameter, see table.

The inner ring bore of roller chain idler sprocket units KSR...-B0 has a plus tolerance to allow easier mounting of the bearing, see dimension table.

### Bore tolerances

Series	Bore d mm	Deviation mm
KSR...-L0	16,2	+0,1 0
	20	0 -0,01
	25	0 -0,01
RSR...-L0	13	+0,08 -0,05
	15	+0,08 -0,05
	16	+0,26 +0,13
	17	0 -0,008
	25	0 -0,01

### Radial internal clearance

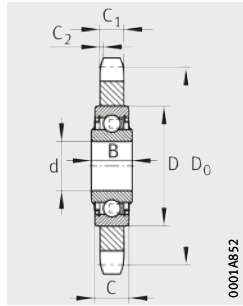
The radial internal clearance of mounted roller chain idler sprocket units corresponds to Group 5 in accordance with ISO 5753-1.



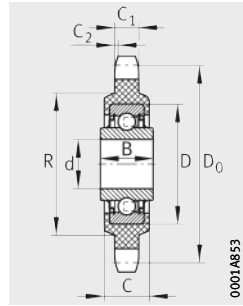


# Roller chain idler sprocket units

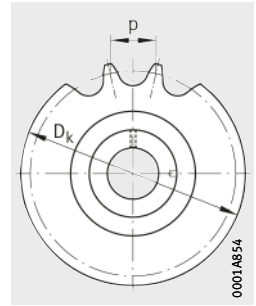
With extended inner ring



KSR..-L0



KSR..-L0..-22



**Dimension table** - Dimensions in mm

Tooth set		Designation <sup>1)</sup>	Mass m ≈ kg	Dimensions										Chain to DIN ISO 606	
p <sup>2)</sup> "	z <sup>3)</sup>			d <sup>4)</sup>	C <sub>1</sub>	D <sub>0</sub>	D <sub>k</sub>	C <sub>2</sub> min.	D	B	C	R	ISO chain	ANSI chain	
3/8	20	KSR16-L0-06-10-20-08	0,14	16,2	5,2	60,9	65	0,8	40	18,3	12	-	■	-	
1/2	16	KSR16-L0-08-10-16-08	0,16	16,2	7	65,1	70,5	1,1	40	18,3	12	-	■	-	
		KSR16-L0-08-10-16-08-AH02	0,23	15	7	65,1	70,5	1,1	40	17	12	-	■	-	
		KSR16-L0-08-10-16-15	0,14	16,2	7	65,1	70,5	1,1	40	18,3	12	-	■	■	
		KSR16-L0-08-10-16-22	0,1	16,2	7	65,1	70,5	1,1	40	18,3	18,1	48	■	■	
	18	KSR16-L0-08-10-18-08	0,21	16,2	7	73,1	78,6	1,1	40	18,3	12	-	■	-	
		KSR16-L0-08-10-18-09	0,21	16,2	7	73,1	78,6	1,1	40	18,3	12	-	■	■	
		KSR16-L0-08-10-18-16	0,21	16,2	7	73,1	78,6	1,1	40	18,3	12	-	■	■	
		KSR16-L0-08-10-18-22	0,23	16,2	7	65,1	70,5	1,1	40	18,3	18	48	■	■	
5/8	14	KSR16-L0-10-10-14-08	0,21	16,2	8,7	71,3	78	1,3	40	18,3	12	-	■	■	
		KSR16-L0-10-10-14-08-FA101	0,21	16,2	8,7	71,3	78	1,3	40	18,3	12	-	■	■	
		KSR16-L0-10-10-14-08-L091	0,24	16,2	8,7	71,3	78	1,3	40	18,3	12	-	■	■	
	17	KSR16-L0-10-10-17-08	0,32	16,2	8,7	86,4	93,1	1,3	40	18,3	12	-	■	■	
		KSR16-L0-10-10-17-09	0,32	16,2	8,7	86,4	93,1	1,3	40	18,3	12	-	■	■	
		KSR16-L0-10-10-17-22	0,26	16,2	8,7	86,4	93,1	1,3	40	18,3	18	48	■	■	
	19	KSR16-L0-10-10-19-15-FA101	0,45	16,2	9,15	96,4	103,5	1,5	40	18,3	12	-	■	-	
	3/4	13	KSR16-L0-12-10-13-08	0,33	16,2	10,5	79,6	87	1,5	40	18,3	12	-	■	■
			KSR16-L0-12-10-13-16	0,33	16,2	10,5	79,6	87	1,5	40	18,3	12	-	■	■
15		KSR16-L0-12-10-15-08	0,42	16,2	10,5	91,6	99,2	1,5	40	18,3	12	-	■	■	
		KSR16-L0-12-10-15-09	0,42	16,2	10,5	91,6	99,2	1,5	40	18,3	12	-	■	-	
		KSR16-L0-12-10-15-22	0,36	16,2	10,5	91,6	99,2	1,5	40	18,3	18	48	■	■	
17		KSR16-L0-12-10-17-15	0,58	16,2	10,5	103,7	111,4	1,5	40	18,3	12	-	■	■	
		KSR16-L0-12-10-17-16	0,58	16,2	10,5	103,7	111,4	1,5	40	18,3	12	-	■	■	
20		KSR16-L0-12-10-20-15	0,86	16,2	10,5	121,7	130	1,5	40	18,3	12	-	■	-	
1		12	KSR20-L0-16-10-12-15	0,7	20	15,3	98,1	107,6	2	47	17,7	14	-	■	■
			KSR20-L0-16-10-12-16	0,7	20	15,3	98,1	107,6	2	47	17,7	14	-	■	-
1 1/4	9	KSR25-L0-20-10-09-16	0,8	25	17,6	92,8	103	2,5	52	21	15	-	■	■	
		KSR25-L0-20-10-13-15	1,6	25	17,6	132,7	144	2,5	52	21	15	-	■	■	

■ suitable

1) Composition of designation, see page 336.

2) p = pitch.

3) z = number of teeth.

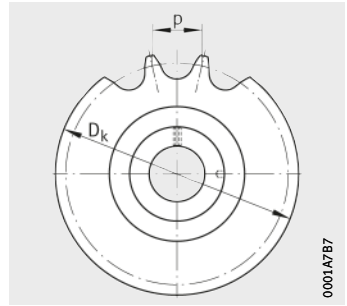
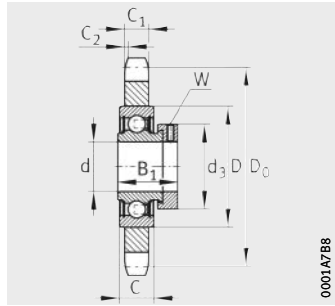
4) Tolerance of bore d, see page 339.

Inner rings of d = Ø16,2 are designed for fixing holes M16.



# Roller chain idler sprocket units

With eccentric locking collar



KSR...B0

**Dimension table** - Dimensions in mm

Tooth set		Designation <sup>1)</sup>	Mass m ≈ kg	Dimensions				
p <sup>2)</sup> "	z <sup>3)</sup>			d <sub>+0,018</sub> 0	C <sub>1</sub>	D <sub>0</sub>	D <sub>k</sub>	C <sub>2</sub> min.
3/8	20	<b>KSR15-B0-06-10-20-08</b>	0,18	<b>15</b>	5,2	60,9	65	0,8
	1/2	16	<b>KSR15-B0-08-10-16-08</b>	0,21	<b>15</b>	7	65,1	70,5
<b>KSR15-B0-08-10-16-08-AH01</b>			0,22	<b>15</b>	7	65,1	70,5	1,1
18		<b>KSR20-B0-08-10-18-08</b>	0,32	<b>20</b>	7	73,1	78,6	1,1
		<b>KSR20-B0-08-10-18-15</b>	0,32	<b>20</b>	7	73,1	78,6	1,1
19		<b>KSR25-B0-08-10-19-08</b>	0,29	<b>25</b>	7	77,1	82,5	1,1
5/8	14	<b>KSR15-B0-10-10-14-08</b>	0,26	<b>15</b>	8,7	71,3	78	1,3
	17	<b>KSR20-B0-10-10-17-15</b>	0,41	<b>20</b>	8,7	86,3	93,1	1,3
3/4	13	<b>KSR15-B0-12-10-13-08</b>	0,4	<b>15</b>	10,5	79,6	87	1,5
	15	<b>KSR20-B0-12-10-15-16</b>	0,47	<b>20</b>	10,5	91,6	99,2	1,5
1	10	<b>KSR20-B0-16-10-10-15</b>	0,5	<b>20</b>	15,3	82,3	89,4	2
	15	<b>KSR30-B0-16-10-15-15</b>	1,34	<b>30</b>	15,3	122,2	131	2

■ suitable

<sup>1)</sup> Composition of designation, see page 336.

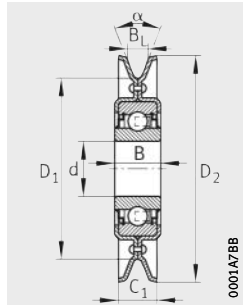
<sup>2)</sup> p = pitch.

<sup>3)</sup> z = number of teeth.

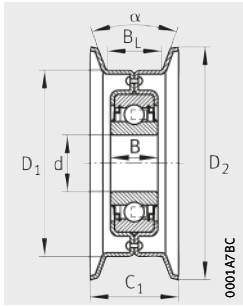
D	B <sub>1</sub>	C	d <sub>3</sub> max.	Width across flats	Chain to DIN ISO 606	
				W	ISO chain	ANSI chain
40	28,6	12	28,4	M6×0,75	■	–
40	28,6	12	28,4	M6×0,75	■	–
40	28,6	12	28,4	M6×0,75	■	–
47	31	14	33	M6×0,75	■	■
47	31	14	33	M6×0,75	■	■
52	31	15	37,3	M6×0,75	■	■
40	28,3	12	28,4	M6×0,75	■	■
47	31	14	33	M6×0,75	■	■
40	28,6	12	28,4	M6×0,75	■	■
47	31	14	33	M6×0,75	■	■
47	31	14	33	M6×0,75	■	–
62	35,7	18	44	M8×1	■	–



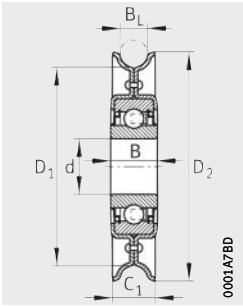
# Idler pulley units



RSRA...-L0, RSRA...-K0  
Type A



RSRB...-L0  
Type B



RSRD...-L0  
Type D

**Dimension table** - Dimensions in mm

Type	Designation	Mass m ≈ kg	Dimensions						Angle α °	Vee belt size <sup>2)</sup>	Basic load ratings <sup>3)</sup>	
			d <sup>1)</sup>	D <sub>1</sub>	D <sub>2</sub>	B	C <sub>1</sub>	B <sub>L</sub>			dyn. C <sub>r</sub> N	stat. C <sub>0r</sub> N
<b>A</b>	<b>RSRA15-90-L0</b>	0,24	<b>15</b>	61,6	90	14,4	20	12,4	32	8, 10, (12,5)	7 600	3 700
	<b>RSRA17-102-K0-AH01</b>	0,42	<b>17</b>	70,8	102	12	22,2	12,7	34	8, 10, (12,5)	9 800	4 750
	<b>RSRA13-129-L0-L114<sup>4)</sup></b>	0,56	<b>13</b>	73,7	129	18,3	32	22,1	32	13, 17, 20, 22	9 800	4 750
	<b>RSRA13-186-L0</b>	1,13	<b>13</b>	130,8	186	18,3	32	22,1	32	13, 17, 20, 22	9 800	4 750
	<b>RSRA16-129-L0</b>	0,54	<b>16</b>	73,7	129	18,3	32	22,1	32	13, 17, 20, 22	9 800	4 750
	<b>RSRA16-186-L0</b>	1,11	<b>16</b>	130,8	186	18,3	32	22,1	32	13, 17, 20, 22	9 800	4 750
<b>B</b>	<b>RSRB15-92-L0</b>	0,31	<b>15</b>	76,2	92	14,4	31	22,2	10	–	7 600	3 700
	<b>RSRB13-117-L0</b>	0,5	<b>13</b>	101	117	18,3	36	25,4	10	–	9 800	4 750
	<b>RSRB16-117-L0</b>	0,48	<b>16</b>	101	117	18,3	36	25,4	10	–	9 800	4 750
	<b>RSRB13-159-L0</b>	0,8	<b>13</b>	139,7	159	18,3	36,5	25,4	10	–	9 800	4 750
	<b>RSRB16-159-L0</b>	0,78	<b>16</b>	139,7	159	18,3	36,5	25,4	10	–	9 800	4 750
	<b>RSRB16-222-L0</b>	1,45	<b>16</b>	203	222	18,3	50	38	10	–	9 800	4 750
<b>D</b>	<b>RSRD20-160-L0</b>	0,75	<b>20</b>	136,5	155,8	17,7	17,5	13,5	–	–	12 800	6 600
	<b>RSRD25-150-L0</b>	0,83	<b>25</b>	133	154	21	24	17	–	–	14 000	7 800

1) Tolerance of bore d, see table, page 339.  
 2) Vee belt size according to DIN 2215 (ISO 1081, ISO 4183, ISO 4184) and DIN 7753-1 (ISO 4184).  
 3) Basic load rating of bearing.  
 4) The bearing is greased with L114 (GA47).