

This series consists of a matched set of 9200UPDT and 7200PDT flush ground bearings having a 40° contact angle. One-piece, land guided, machined brass cages are standard for this series.

These bearings are mounted in pairs in applications where substantial thrust loads are present. This arrangement divides the thrust load in one direction while accommodating reversing thrust load. To increase thrust capacity in one direction additional bearings may be mounted in tandem.

For proper mounting orientation refer to page 239

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius ¹⁾				Basic Radial Load Rating ²⁾				Speed Rating ³⁾	
	d mm	in	mm	in	mm	in	ra mm	in	rb mm	in	Dynamic C ⁴⁾		Static C ₀		Grease RPM	Oil RPM
											N	lbf	N	lbf		
97207UP2	35	1.3780	72	2.8346	34	1.3386	1.0	.040	.60	.024	47 500	10 700	39 000	8 770	6 300	8 500
97208UP2	40	1.5748	80	3.1496	36	1.4173	1.0	.040	.60	.024	52 700	11 800	45 000	10 100	5 600	7 500
97209UP2	45	1.7717	85	3.3465	38	1.4961	1.0	.040	.60	.024	62 400	14 000	55 000	12 400	5 300	7 000
97210UP2	50	1.9685	90	3.5433	40	1.5748	1.0	.040	.60	.024	65 000	14 600	60 000	13 500	4 800	6 300
97211UP2	55	2.1654	100	3.9370	42	1.6535	1.5	.060	1.0	.040	79 300	17 800	75 000	16 900	4 500	6 000
97212UP2	60	2.3622	110	4.3307	44	1.7323	1.5	.060	1.0	.040	95 600	21 500	91 600	20 600	4 000	5 300
97213UP2	65	2.5591	120	4.7244	46	1.8110	1.5	.060	1.0	.040	104 000	23 400	100 000	22 500	3 600	4 800
97214UP2	70	2.7559	125	4.9213	48	1.8898	1.5	.060	1.0	.040	112 000	25 200	112 000	25 200	3 400	4 500
97215UP2	75	2.9528	130	5.1181	50	1.9685	1.5	.060	1.0	.040	117 000	26 300	120 000	27 000	3 200	4 300
97216UP2	80	3.1496	140	5.5118	52	2.0472	2.0	.080	1.0	.040	135 000	30 300	140 000	31 500	3 000	4 000
97217UP2	85	3.3465	150	5.9055	56	2.2047	2.0	.080	1.0	.040	156 000	35 100	166 000	37 300	2 800	3 800
97218UP2	90	3.5433	160	6.2992	60	2.3622	2.0	.080	1.0	.040	178 000	40 000	190 000	42 700	2 600	3 600
97219UP2	95	3.7402	170	6.6929	64	2.5197	2.0	.080	1.0	.040	199 000	44 700	220 000	49 500	2 400	3 400
97220UP2	100	3.9370	180	7.0866	68	2.6772	2.0	.080	1.0	.040	212 000	47 700	250 000	56 200	2 200	3 200
97221UP2	105	4.1339	190	7.4803	72	2.8346	2.0	.080	1.0	.040	229 000	51 500	260 000	58 500	2 000	3 000
97222UP2	110	4.3307	200	7.8740	76	2.9921	2.0	.080	1.0	.040	251 000	56 400	310 000	69 700	1 900	2 800
97224UP2	120	4.7244	215	8.4646	80	3.1496	2.0	.080	1.0	.040	270 000	60 700	325 000	73 100	1 700	2 400
97226UP2	130	5.1181	230	9.0551	80	3.1496	2.5	.10	1.0	.040	302 000	67 900	390 000	87 700	1 700	2 400
97228UP2	140	5.5118	250	9.8425	84	3.3071	2.5	.10	1.0	.040	319 000	71 700	430 000	96 700	1 600	2 200
97230UP2	150	5.9055	270	10.6299	90	3.5435	2.5	.10	1.0	.040	351 000	78 900	520 000	117 000	1 500	2 000
97232UP2	160	6.2992	290	11.4173	96	3.7795	2.5	.10	1.0	.040	390 000	87 700	560 000	126 000	1 300	1 700
97234UP2	170	6.6929	310	12.2047	104	4.0945	3.0	.12	1.0	.040	436 000	98 000	655 000	147 000	1 200	1 500
97236UP2	180	7.0866	320	12.5984	104	4.0945	3.0	.12	1.0	.040	449 000	101 000	710 000	160 000	1 100	1 500

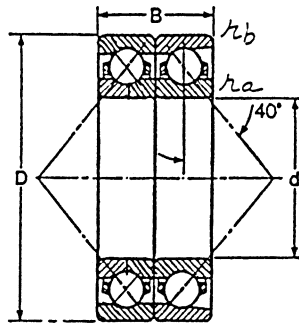
¹⁾ Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

²⁾ For thrust rating multiply C by 1.76 and C₀ by 3.86.

³⁾ Listed values are for machined brass cage.

Values have been determined through historical application and practice.

⁴⁾ Rating for one million revolutions or 500 hours at 33 1/3 rpm.



This series consists of a matched set of 9300UPDT and 7300PDT flush ground bearings having a 40° contact angle. One-piece, land guided, machined brass cages are standard for this series.

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MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius ¹⁾				Basic Radial Load Rating ²⁾				Speed Rating ³⁾	
	d mm	in	mm	in	mm	in	ra		rb		Dynamic C _d ⁴⁾		Static C ₀		Grease RPM	Oil RPM
							mm	in	mm	in	N	lbf	N	lbf		
97307UP2	35	1.3780	80	3.1496	42	1.6535	1.5	.06	1.0	.040	63 700	14 300	49 000	11 000	6 000	8 000
97308UP2	40	1.5748	90	3.5433	46	1.8110	1.5	.06	1.0	.040	76 100	17 100	61 000	13 700	5 300	7 000
97309UP2	45	1.7717	100	3.9370	50	1.9685	1.5	.06	1.0	.040	97 500	21 900	80 000	18 000	4 800	6 300
97310UP2	50	1.9685	110	4.3307	54	2.1260	2.0	.08	1.0	.040	112 000	25 200	104 000	23 400	4 300	5 600
97311UP2	55	2.1654	120	4.7244	58	2.2835	2.0	.08	1.0	.040	130 000	29 200	112 000	25 200	3 800	5 000
97312UP2	60	2.3622	130	5.1181	62	2.4409	2.0	.08	1.0	.040	148 000	33 300	129 000	29 000	3 600	4 800
97313UP2	65	2.5591	140	5.5118	65	2.5984	2.0	.08	1.0	.040	165 000	37 100	160 000	36 000	3 200	4 300
97314UP2	70	2.7559	150	5.9055	70	2.7559	2.0	.08	1.0	.040	190 000	42 700	186 000	41 800	3 000	4 000
97315UP2	75	2.9528	160	6.2992	74	2.9134	2.0	.08	1.0	.040	208 000	46 800	200 000	45 000	2 800	3 800
97316UP2	80	3.1496	170	6.6929	78	3.0709	2.0	.08	1.0	.040	225 000	50 600	220 000	49 500	2 600	3 600
97317UP2	85	3.3465	180	7.0866	82	3.2283	2.5	.10	1.0	.040	238 000	53 500	245 000	55 100	2 400	3 400
97318UP2	90	3.5433	190	7.4803	86	3.3858	2.5	.10	1.0	.040	255 000	57 300	270 000	60 700	2 200	3 200
97319UP2	95	3.7402	200	7.8740	90	3.5433	2.5	.10	1.0	.040	276 000	62 000	300 000	67 400	2 000	3 000
97320UP2	100	3.9370	215	8.4646	94	3.7008	2.5	.10	1.0	.040	307 000	69 000	380 000	85 400	1 900	2 800
97321UP2	105	4.1339	225	8.8583	98	3.8583	2.5	.10	1.0	.040	325 000	73 100	390 000	87 700	1 800	2 600
97322UP2	110	4.3307	240	9.4488	100	3.9370	2.5	.10	1.0	.040	345 000	77 600	455 000	102 000	1 700	2 400
97324UP2	120	4.7244	260	10.2362	110	4.3307	2.5	.10	1.0	.040	390 000	87 700	530 000	119 000	1 600	2 200
97326UP2	130	5.1181	280	11.0236	116	4.5669	3.0	.12	1.0	.040	449 000	101 000	610 000	137 000	1 500	2 000
97328UP2	140	5.5118	300	11.8110	124	4.8819	3.0	.12	1.0	.040	488 000	110 000	695 000	156 000	1 400	1 900
97330UP2	150	5.9055	320	12.5984	130	5.1181	3.0	.12	1.0	.040	540 000	121 000	780 000	175 000	1 200	1 700
97332UP2	160	6.2992	340	13.3858	136	5.3543	3.0	.12	1.0	.040	553 000	124 000	850 000	191 000	1 200	1 600
97334UP2	170	6.6929	360	14.1732	144	5.6693	3.0	.12	1.0	.040	605 000	136 000	965 000	217 000	1 000	1 500
97336UP2	180	7.0866	380	14.9606	150	5.9055	3.0	.12	1.0	.040	650 000	146 000	1 100 000	247 000	950	1 400

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Values have been determined through historical application and practice.

⁴⁾ Rating for one million revolutions or 500 hours at 33 1/3 rpm.

*Duplex 97000 UP2 Series
40 Degree Angular Contact
Bearings*

*Dynamic and static equivalent load
and life rating*

Dynamic equivalent radial load

$$P = 1.0 F_R \quad \text{when } \frac{F_A}{F_R} \leq 1.14$$

$$P = 0.35 F_R + 0.57 F_A \quad \text{when } \frac{F_A}{F_R} > 1.14$$

P = Dynamic equivalent radial load

F_R = Radial load

F_A = Thrust load

Static equivalent radial load

$$P_0 = 1.0 F_R + 0.52 F_A$$

P₀ is always $\geq F_R$

P₀ = Static equivalent radial load

F_R = Radial load

F_A = Thrust load

Life rating

$$L_{10} = \left(\frac{C}{P}\right)^3 \quad (\text{millions of revolutions})$$

or

$$L_{10h} = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 \quad (\text{Hours})$$

C = Dynamic radial load rating

P = Dynamic equivalent radial load

n = Speed in rpm

**Dynamic equivalent radial load
and life calculation examples**

Bearing size: 97314 UP2

Speed: 1750 RPM

Rating (C) = 42700

Case 1Thrust load (F_A) = 5000

$$\frac{F_A}{F_R} > 1.14$$

$$P = 0.35 F_R + 0.57 F_A = 0.57 \times 5000$$

$$P = 2850$$

$$C = 42700$$

$$\text{Life (L10)} = \left(\frac{C}{P}\right)^3 = \left(\frac{42700}{2850}\right)^3 = 3363 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned} \text{Life (L10h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 1750} \left(\frac{42700}{2850}\right)^3 \\ &= 32030 \text{ Hours} \end{aligned}$$

Case 2Radial load (F_R) = 3000Thrust load (F_A) = 5000

$$\frac{F_A}{F_R} = 1.67$$

$$\text{Since } \frac{F_A}{F_R} > 1.14,$$

$$P = 0.35 F_R + 0.57 F_A = 0.35 \times 3000 + 0.57 \times 5000$$

$$P = 3900$$

$$C = 42700$$

$$\text{Life (L10)} = \left(\frac{C}{P}\right)^3 = \left(\frac{42700}{3900}\right)^3 = 1312 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned} \text{Life (L10h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 1750} \left(\frac{42700}{3900}\right)^3 \\ &= 12500 \text{ Hours} \end{aligned}$$
