MECHANICAL POWER TRANSMISSION

Dodge® UC mounted ball bearing catalog

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In illustrations throughout this catalog, safety guards have been removed for photographic purposes.

Warning: Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed: Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. Proper guards and other suitable safety devices or procedures as may be described or as may be specified in safety codes should be provided, and are neither provided by Dodge nor are the responsibility of Dodge. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a holding device must be an integral part of the driven equipment beyond the speed reducer output shaft.

Dodge® UC mounted ball bearings

Setscrew

Table of contents

Features and benefits

Dodge® UC setscrew ball bearings

Dodge experience coupled with The Japanese Industrial Standard

Customers need a bearing that is dependable for a wide variety of applications. Dodge provides a solution with its UC ball bearing line. It is equipped with set screw mounting, an effective nitrile lip seal, in a globally accepted dimensional standard.

Easy to Install

The Dodge UC bearing line combines Dodge experience and The Japanese Industrial Standard (JIS) dimensions to meet the specific needs of customers. The bearing is interchangeable with leading brands that follow JIS dimensions without modifications to equipment. This competitive line is easy to install and is equipped with set screw mounting and engineered for standard duty applications. The line offers popular housing styles with a full-bore range to meet the needs of global markets and its purgeable seal is designed to prevent contamination in industrial environments.

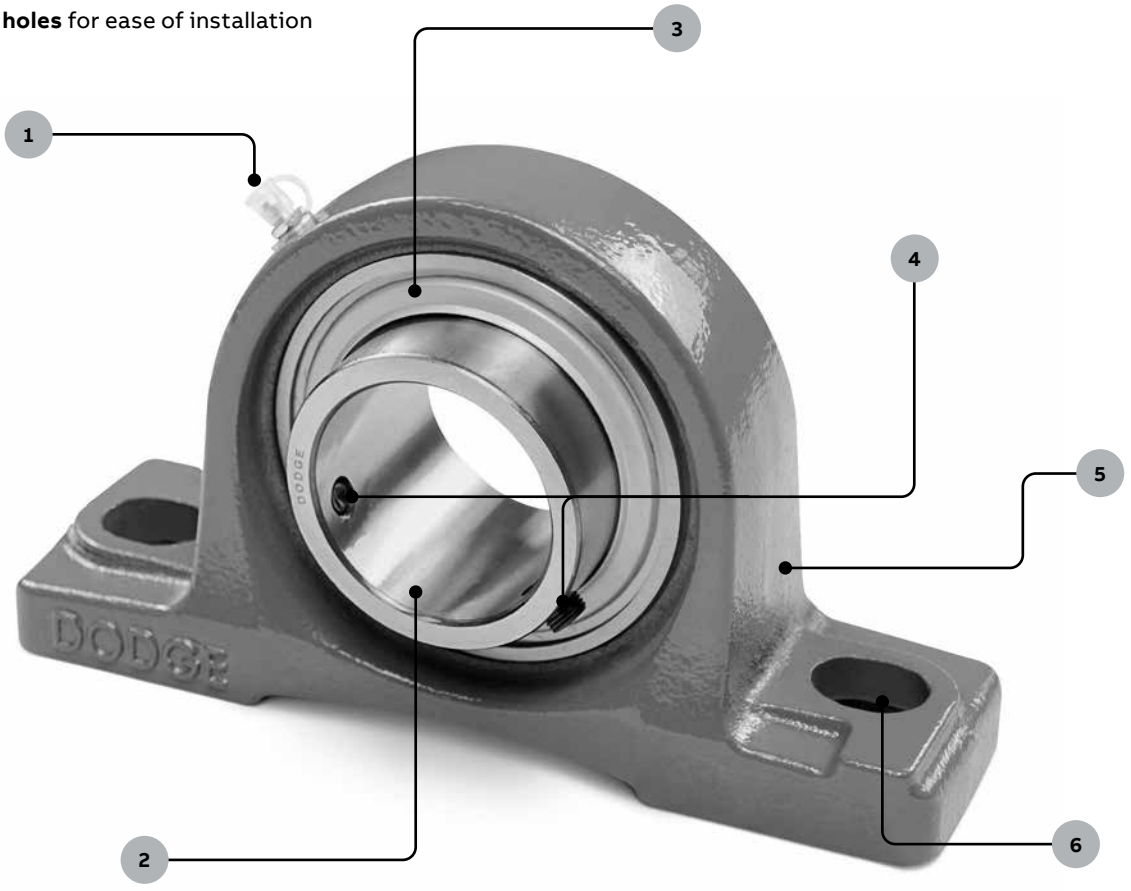
Industries:

- Material handling
- Warehousing
- Food and beverage
- Tobacco
- Paper and printing
- Agriculture
- Chemical

Product scope

Housing style	Bore range
Insert only	20 mm - 90 mm
Pillow Block	20 mm - 90 mm
2-bolt flange	20 mm - 90 mm
4-bolt flange	20 mm - 90 mm
Piloted flange	20 mm - 90 mm
Take-up	20 mm - 60 mm

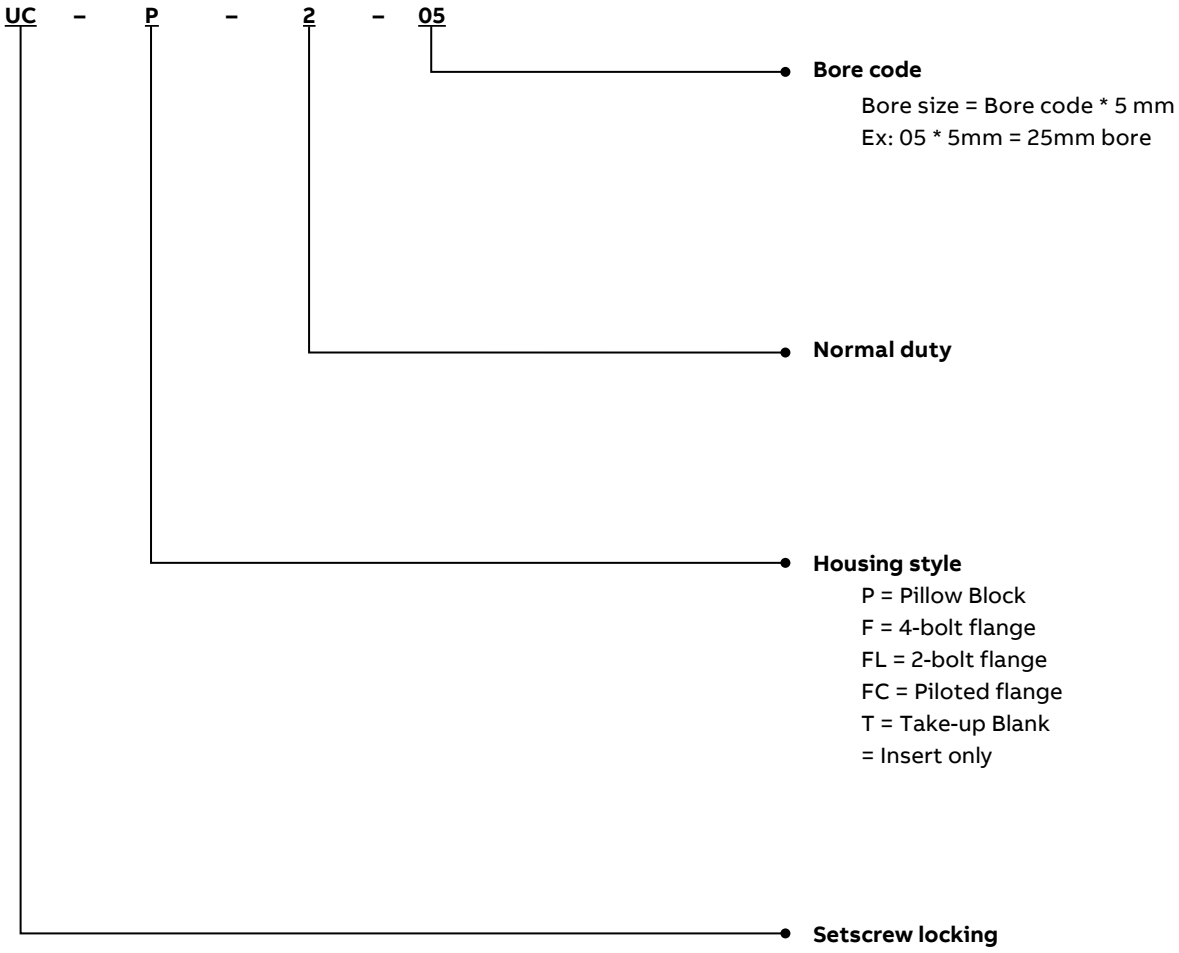
1. **Grease fitting for relubrication**
2. **Wide inner ring**
3. **Mechanically retained lip seal**
4. **Set screw locking mechanism**
5. **Cast iron housing for industrial applications**
6. **Slotted mounting holes** for ease of installation



Nomenclature

Dodge® UC setscrew ball bearings

Nomenclature



Selection

Dodge® UC setscrew mounted ball bearings

Dodge® mounted ball bearings are primarily designed for radial loading. However, they have the capacity to carry thrust loads and combined radial/thrust loads. The maximum recommended load which can be applied is limited by various components in the system, such as bearing, housing, shaft attachments, speed and life requirements as listed in this catalog.

L_{10} Hours Life – the life which may be expected for at least 90% of a given group of bearings operating under identical conditions.

Heavy service – For heavy shock loads, frequent shock loads or severe vibrations, add up to 50% (according to severity of conditions) to the Equivalent Radial Load to obtain a Modified Equivalent Radial Load.

A maximum thrust load value of C/10 is recommended as a guide for general applications and will give adequate L_{10} life. If the thrust load exceeds this limit, it is advisable to use auxiliary thrust carrying devices, such as a shaft shoulder, snap ring, or a thrust collar. Where substantial radial load pulls the housing away from the mounting base, both the hold-down bolts and housing must be of adequate strength. Auxiliary load carrying devices, such as shear bars, are advisable for side or end-loading of pillow blocks and radial loads for flange units.

To determine the L_{10} life the following equation may be used:

$$L_{10} = \left(\frac{C}{p}\right)^3 \left(\frac{16.667}{n}\right)$$

Where:
L_{10}= Life, hours
C = Dynamic Capacity, N
P = Equivalent Radial Load, N
n = Revolutions per minute

When the load on a ball bearing is solely a radial load with no thrust (axial) load, the Equivalent Radial Load (P) is equal to the actual radial load. However, when a thrust (axial) load is applied, the radial and thrust loads applied must be converted into an Equivalent Radial Load. Use X (radial factor) and Y (thrust factor) from page 5 to convert the actual applied thrust and radial loads to an Equivalent Radial Load which has the same effect on the life of a bearing as a radial load of this magnitude.

$$P = XF_R + YF_A$$

Where:

P = Equivalent Radial Load, lbs.

F_R= Radial load, N

F_A= Thrust load, N

e = Thrust load to radial load factor (Page 5)

X = Radial load factor (Page 5)

Y = Thrust Factor (Page 5)

C_0= Basic static capacity (below)

To find X and Y, first calculate F_A/C_0 to determine e. Calculate F_A/F_R and compare to e to determine the X and Y factors to use from Page 5.

Substitute all known values into the Equivalent Radial Load equation. The Equivalent Radial Load (P) thus determined can be used in the L_{10} life formula.

If calculated value of P is less than F_R, use $P=F_R$.

Bearing capacity

Ring size	Shaft size (mm)	Dynamic capacity C (N)	Static capacity C_0 (N)
204	20	12.800	6.650
205	25	14.000	7.880
206	30	19.500	11.200
207	35	25.700	15.200
208	40	29.600	18.200
209	45	31.850	20.800
210	50	35.100	23.200
211	55	43.550	29.200
212	60	47.800	32.800
213	65	54.000	37.000
214	70	60.800	45.000
215	75	66.000	49.500
216	80	71.500	54.200
217	85	80.000	60.000
218	90	95.900	71.500

Dodge® UC setscrew mounted ball bearings

Shaft tolerances and maximum speed rating

Series	d (mm)	Recommended shaft tolerances h7 (mm)	Speed limit (RPM)
204	20	+0,000 -0,021	4.800
205	25		4.000
206	30		3.400
207	35	+0,000 -0,025	3.000
208	40		2.600
209	45		2.400
210	50		2.200
211	55	+0,000 -0,030	2.000
212	60		1.800
213	65		1.700
214	70		1.600
215	75		1.500
216	80		1.400
217	85	+0,000 -0,035	1.300
218	90		1.200

Combined load factors

F_A/C_o	e	Radial/thrust factors			
		$F_a/F_r \leq e$		$F_a/F_r > e$	
		X	Y	X	Y
0,025	0,31	1	0	0,46	1,75
0,040	0,33	1	0	0,46	0,62
0,070	0,36	1	0	0,46	1,46
0,130	0,41	1	0	0,46	1,30
0,250	0,46	1	0	0,46	1,14

Dodge® UC setscrew ball bearings Recommended torque and lubrication

Misalignment

Dodge ball bearings are designed to allow a maximum of ±2º static misalignment. These bearings are not suitable for dynamic misalignment. To ensure good alignment, mounting surfaces must be checked for flatness and must lie in the same plane. When tightening base bolts, each bolt should be alternately tightening in incremental torque values until full torque is achieved to prevent the angular shifting of the housing that occurs when one bolt is tightened to its full torque. Shimming may be required to minimize misalignment.

Mounting bolt torque

Bolt size	Grade 8.8 (N·m)
M10	44
M12	79
M14	128
M16	196
M20	373
M22	500

Setscrew torque

Bearing series	Set screw size	Torque max (N·m)
204		
205	M6*1	4,9
206		
207		
208	M8*1	8,0
209		
210		
211	M10*1	16,8
213		
214		
215		
216	M12*1,5	27,1
217		
218		

Lubrication

High Speed Operation

In the higher speed ranges, too much grease will cause over-heating. The amount of grease that the bearing will take for a particular high speed application can only be determined by experience. If excess grease in the bearing causes overheating, it will be necessary to remove the grease fitting to permit excess grease to escape. The bearing has been greased at the factory and is ready to run. When establishing a relubrication schedule, note that a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals.

◆ **Note:** Dodge does not recommend the use of oils or locking agents on setscrew threads.

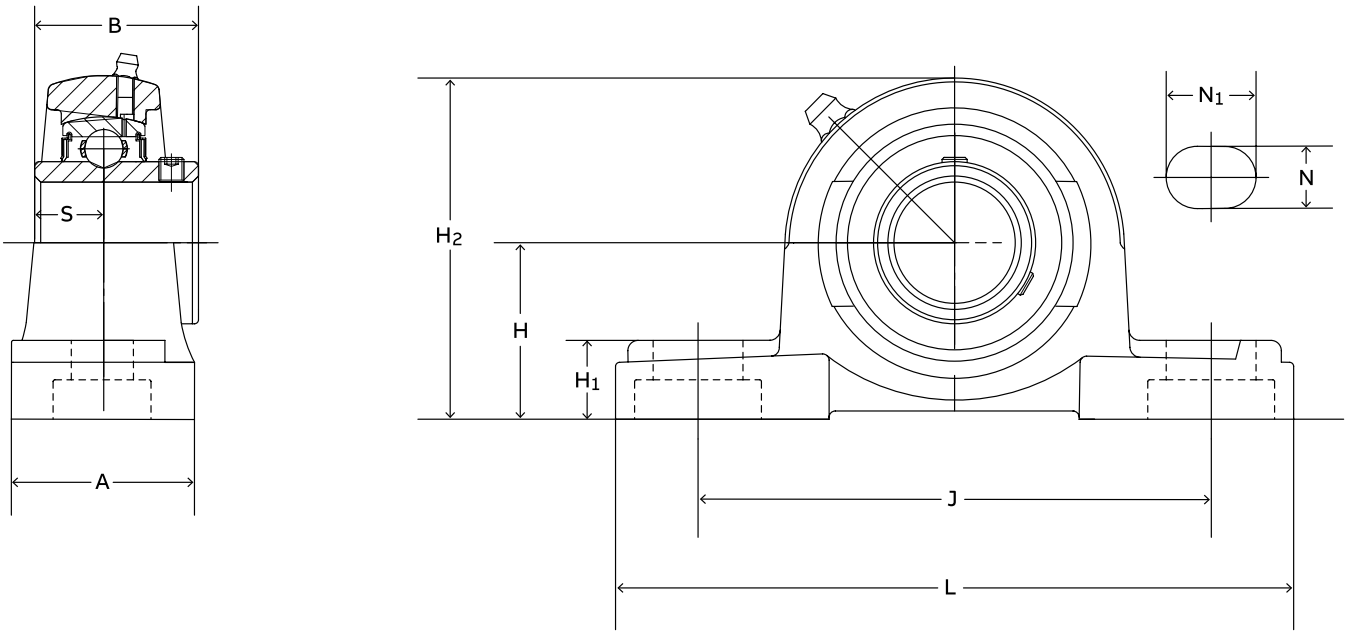
Lubrication guide

Suggested lubrication period in weeks

						Use a No.2 lithium complex base grease		
Hours run per day	1 to 250 RPM	251 to 500 RPM	501 to 750 RPM	751 to 1000 RPM	1001 to 1500 RPM	1501 to 2000 RPM	2001 to 2500 RPM	2501 to 3000 RPM
8	12	12	10	7	5	4	3	2
16	12	7	5	4	2	2	1	1
24	10	5	3	2	1	1	1	1

Dimensions

Dodge® Setscrew ball bearings
UCP



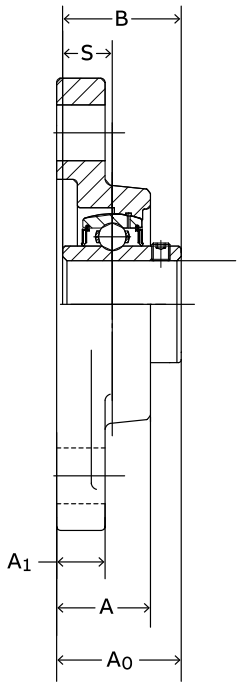
Shaft dia. (mm)	Part number	A	B	H	H_1	H_2	J	L	N	N_1	S (mm)	Bolt size
20	UCP204	38	31,0	33,3	14	65	95	127	13	19	12,7	M10
25	UCP205	38	34,1	36,5	16	71	105	140	13	19	14,3	M10
30	UCP206	48	38,1	42,9	18	83	121	165	17	21	15,9	M14
35	UCP207	48	42,9	47,6	18	94	126	167	17	21	17,5	M14
40	UCP208	54	49,2	49,2	19	100	137	184	17	21	19,0	M14
45	UCP209	54	49,2	54,0	20	108	146	190	17	21	19,0	M14
50	UCP210	60	51,6	57,2	22	114	159	206	20	25	19,0	M16
55	UCP211	60	55,6	63,5	23	126	171	219	20	25	22,2	M16
60	UCP212	70	65,1	69,8	25	138	184	241	20	25	25,4	M16
65	UCP213	70	65,1	76,2	27	150	203	265	25	28	25,4	M20
70	UCP214	72	74,6	79,4	27	156	210	266	25	30	30,2	M20
75	UCP215	74	77,8	82,6	28	163	217	275	25	30	33,3	M20
80	UCP216	78	82,6	88,9	30	175	232	292	25	31	33,3	M20
85	UCP217	83	85,7	95,2	32	187	247	310	25	31	34,1	M20
90	UCP218	88	96,0	101,6	34	200	262	326	27	33	39,7	M22

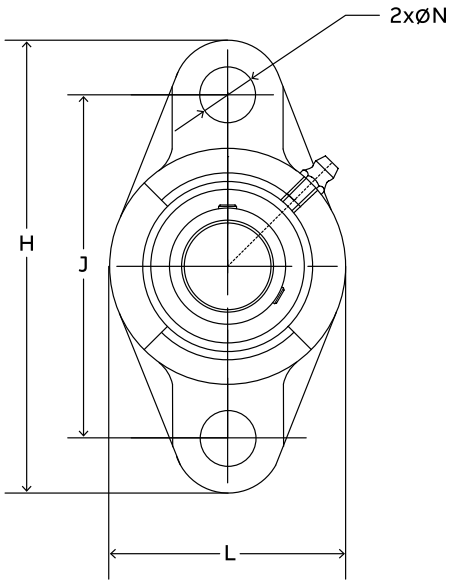
Lube Fitting Thread –

204-210 Series: M6-1

211-218 Series: M8-1

Dodge® Setscrew ball bearings
UCFL





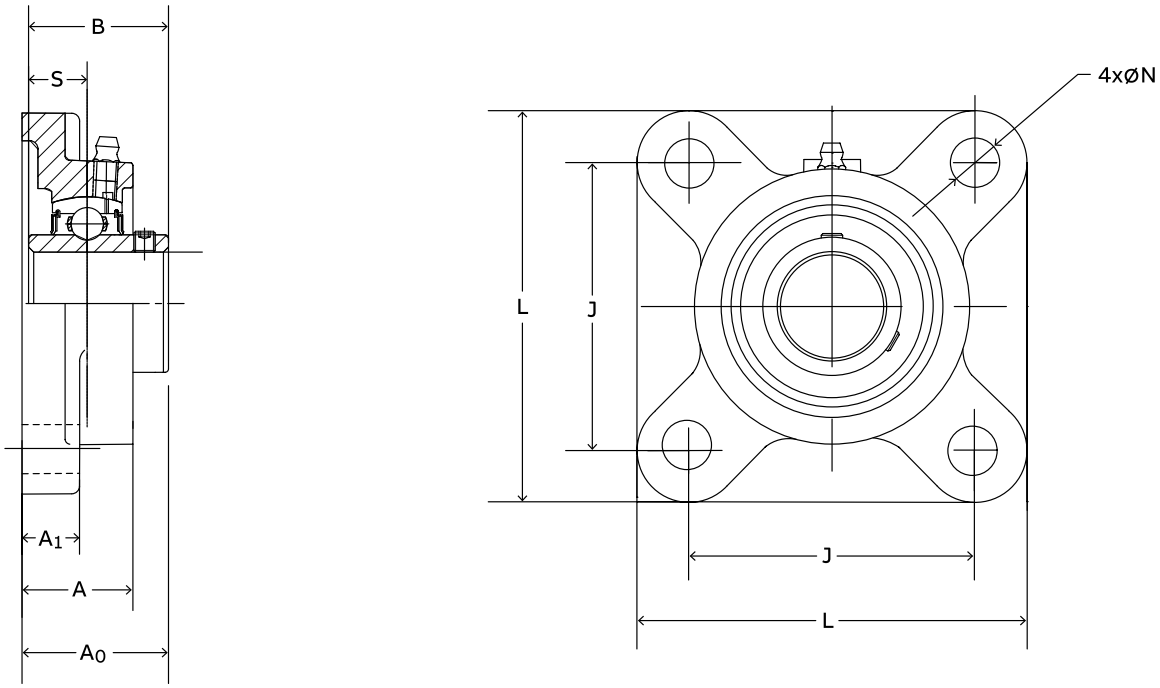
Shaft dia. (mm)	Part number	A	A_0	A_1	B	H	J	L	N	S (mm)	Bolt size
20	UCFL204	25.5	33.3	12	31.0	113	90	60	12	12,7	M10
25	UCFL205	27.0	35.8	14	34.1	130	99	68	16	14,3	M14
30	UCFL206	31.0	40.2	14	38.1	148	117	81	16	15,9	M14
35	UCFL207	34.0	44.4	16	42.9	161	130	91	16	17,5	M14
40	UCFL208	36.0	51.2	17	49.2	175	144	100	16	19,0	M14
45	UCFL209	38.0	52.2	18	49.2	188	148	108	19	19,0	M16
50	UCFL210	40.0	54.6	18	51.6	198	157	116	19	19,0	M16
55	UCFL211	43.0	58.4	20	55.6	224	184	130	19	22,2	M16
60	UCFL212	48.0	68.7	20	65.1	250	202	140	23	25,4	M20
65	UCFL213	54.0	69.7	24	65.1	258	210	155	23	25,4	M20
70	UCFL214	54.0	75.4	24	74.6	265	216	160	23	30,2	M20
75	UCFL215	57.0	79.0	25	77.8	275	225	165	23	33,3	M20
80	UCFL216	59.0	83.8	25	82.6	290	233	180	25	33,3	M20
85	UCFL217	63.0	87.6	26	85.7	305	248	190	25	34,1	M20
90	UCFL218	68.0	98.3	26	96.0	320	265	205	25	39,7	M20

Lube Fitting Thread –

204-210 Series: M6-1

211-218 Series: M8-1

Dodge® Setscrew ball bearings
UCF



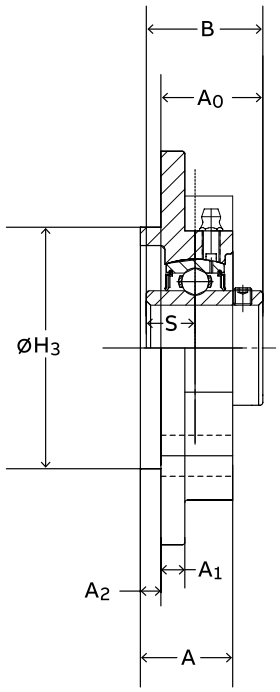
Shaft dia. (mm)	Part number	A	A_0	A_1	B	J	L	N	S (mm)	Bolt size
20	UCF204	25.5	33.3	12	31,0	64	86	12	12,7	M10
25	UCF205	27.0	35.8	14	34,1	70	95	12	14,3	M14
30	UCF206	31.0	40.2	14	38,1	83	108	12	15,9	M14
35	UCF207	34.0	44.4	16	42,9	92	117	14	17,5	M14
40	UCF208	36.0	51.2	16	49,2	102	130	16	19,0	M14
45	UCF209	38.0	52.2	18	49,2	105	137	16	19,0	M16
50	UCF210	41.0	54.6	19	51,6	111	143	16	19,0	M16
55	UCF211	43.0	58.4	20	55,6	130	162	19	22,2	M16
60	UCF212	48.0	68.7	20	65,1	143	175	19	24,5	M20
65	UCF213	50.0	69.7	22	65,1	149	187	19	25,4	M20
70	UCF214	55.0	75.4	24	74,6	152	193	19	30,2	M20
75	UCF215	56.0	79.0	24	77,8	159	200	19	33,3	M20
80	UCF216	56.0	83.8	24	83,3	165	208	23	33,3	M20
85	UCF217	59.0	87.6	24	85,7	175	220	23	34,1	M20
90	UCF218	70.0	98.3	27	96,0	187	235	23	39,7	M20

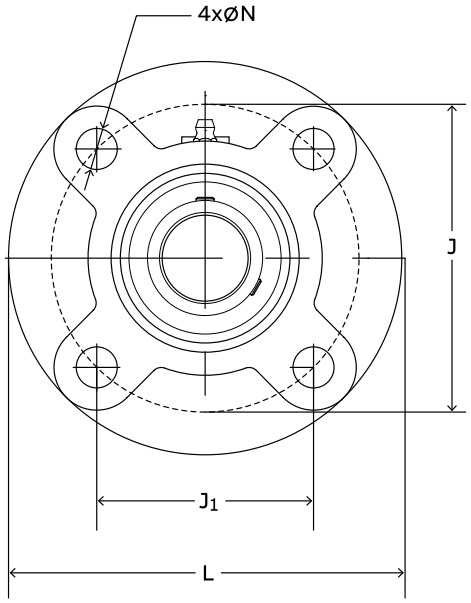
Lube Fitting Thread –

204-210 Series: M6-1

211-218 Series: M8-1

Dodge® Setscrew ball bearings
UCFC





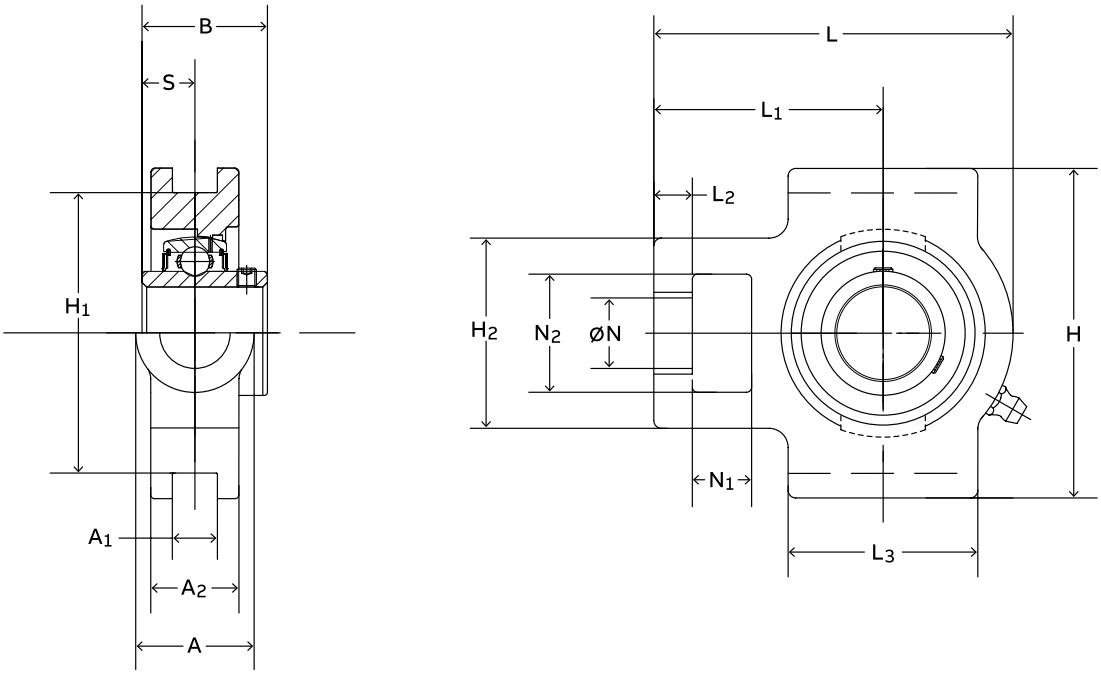
Shaft dia. (mm)	Part number	A	A_0	A_1	A_2	B	H_3	J	J_1	L	N	S (mm)	Bolt size
20	UCFC204	25.5	28.3	7	5	31.0	62	78	55.2	100	12	12,7	M10
25	UCFC205	27.0	29.8	6	6	34.1	70	90	63.6	115	12	14,3	M10
30	UCFC206	31.0	32.2	8	8	38.1	80	100	70.7	125	12	15,9	M10
35	UCFC207	34.0	36.4	9	8	42.9	90	110	77.8	135	14	17,5	M12
40	UCFC208	36.0	41.2	9	10	49.2	100	120	84.9	145	14	19,0	M12
45	UCFC209	38.0	40.2	13	12	49.2	105	132	93.3	160	16	19,0	M14
50	UCFC210	40.0	42.6	13	12	51.6	110	138	97.6	165	16	19,0	M14
55	UCFC211	43.0	46.4	15	12	55.6	125	150	106.1	185	19	22,2	M16
60	UCFC212	48.0	56.7	19	12	65.1	135	160	113.1	195	19	25,4	M16
65	UCFC213	50.0	55.7	15	14	65.1	145	170	120.2	205	19	25,4	M16
70	UCFC214	54.0	61.4	16	14	74.6	150	177	125.2	215	19	30,2	M16
75	UCFC215	56.0	62.5	18	16	77.8	160	184	130.1	220	19	33,3	M16
80	UCFC216	58.0	67.3	18	16	82.6	170	200	141.4	240	23	33,3	M20
85	UCFC217	63.0	69.6	20	18	85.7	180	208	147.1	250	23	34,1	M20
90	UCFC218	68.0	78.3	20	18	96.0	190	220	155.6	265	23	39,7	M20

Lube Fitting Thread –

204-210 Series: M6-1

211-218 Series: M8-1

Dodge® Setscrew ball bearings
UCT



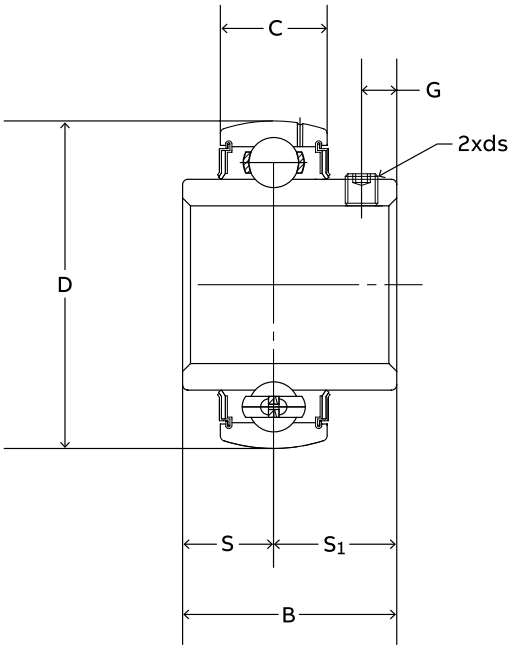
Shaft dia.	Part	A	A_1	A_2	B	H	H_1	H_2	L	L_1	L_2	L_3	N	N_1	N_2	S
(mm)	number															(mm)
20	UCT204	32	12	21	31.0	89	76	51	94	61	11	51	19	18	32	12,7
25	UCT205	32	12	24	34.1	89	76	51	97	62	11	51	19	18	32	14,3
30	UCT206	37	12	28	38.1	101	89	55	113	70	11	56	22	18	37	15,9
35	UCT207	37	12	30	42.9	102	89	64	129	78	14	64	22	18	37	17,5
40	UCT208	49	16	33	49.2	113	102	82	144	88	17	82	29	20	49	19,0
45	UCT209	49	16	35	49.2	116	102	82	144	88	17	82	29	20	49	19,0
50	UCT210	49	14	37	51.6	116	102	82	149	90	17	85	29	20	49	19,0
55	UCT211	64	22	38	55.6	144	130	101	171	106	20	94	35	26	64	22,2
60	UCT212	64	22	42	65.1	145	130	102	194	119	20	101	35	33	64	25,4

Lube Fitting Thread –

204-210 Series: M6-1

211-218 Series: M8-1

Dodge® Setscrew ball bearings
UC Inserts



Shaft dia.	Part	B	C	D	G	S	S_1	ds	C	C_o	Limiting speed
(mm)	number							(mm)		(kN)	(RPM)
20	UC204	31,0	16	47	4.3	12,7	18,3	M6 X 1,0	12,8	6,7	4.800
25	UC205	34,1	17	52	5.5	14,3	19,8	M6 X 1,0	14,0	7,9	4.000
30	UC206	38,1	19	62	5.5	15,9	22,2	M6 X 1,0	19,5	11,2	3.400
35	UC207	42,9	20	72	6.5	17,5	25,4	M8 X 1,0	25,7	15,2	3.000
40	UC208	49,2	21	80	8.0	19,0	30,2	M8 X 1,0	29,6	18,2	2.600
45	UC209	49,2	22	85	8.0	19,0	30,2	M8 X 1,0	31,9	20,8	2.400
50	UC210	51,6	23	90	9.0	19,0	32,6	M10 X 1,0	35,1	23,2	2.200
55	UC211	55,5	25	100	9.0	22,2	33,4	M10 X 1,0	43,6	29,2	2.000
60	UC212	65,1	27	110	10.5	25,4	39,7	M10 X 1,0	47,8	32,8	1.800
65	UC213	65,1	28	120	10.0	25,4	39,7	M10 X 1,0	54,0	37,0	1.700
70	UC214	74,6	29	125	12.0	30,2	44,4	M12 X 1,5	60,8	45,0	1.600
75	UC215	77,8	30	130	12.0	33,3	44,5	M12 X 1,5	66,0	49,5	1.500
80	UC216	82,6	33	140	12.0	33,3	49,3	M12 X 1,5	71,5	54,2	1.400
85	UC217	85,7	35	150	12.0	34,1	51,6	M12 X 1,5	80,0	60,0	1.300
90	UC218	96,0	37	160	12.0	39,7	56,3	M12 X 1,5	95,9	71,5	1.200

Dodge Industrial, Inc.
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