

Raptor Spacer Couplings Instruction Manual

These instructions must be read thoroughly before installation or operation. This instruction manual was accurate at the time of printing. Please see dodgeindustrial.com for updated instruction manuals.

WARNING: To ensure the drive is not unexpectedly started, turn off and lock-out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.

WARNING: All products over 25 kg (55 lbs) are noted on the shipping package. Proper lifting practices are required for these products.



INSTALLATION

Step 1 - Hub Installation

Before installation the hubs, ensure that shafts have been cleaned and are free of dirt, grease, and burrs. Verify that keys fit shafts properly.



Figure 1 - Install Hubs

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 desirable 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.

Finished Bore Clearance Fit

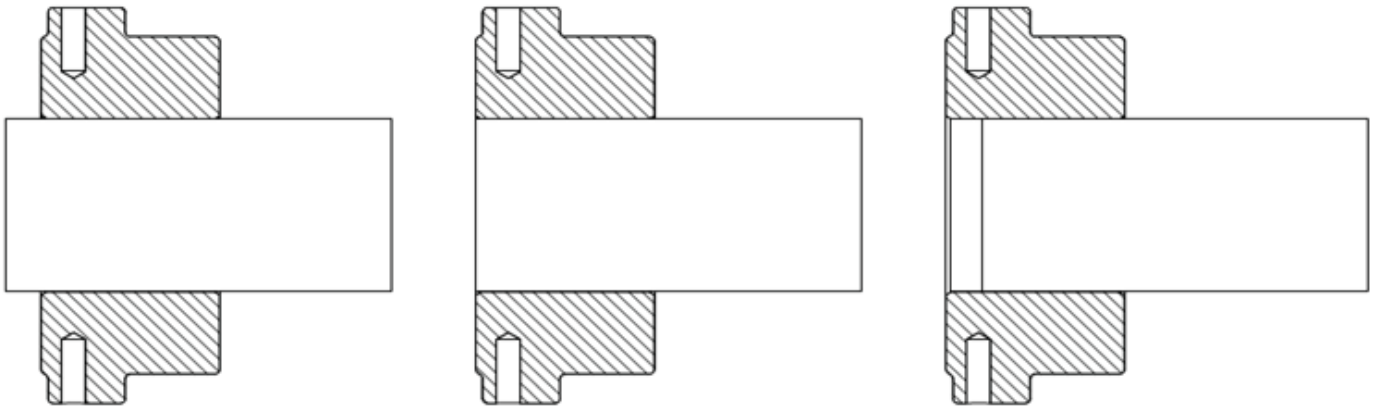
1. Hubs may be oriented as seen in Figure 3. Depending on shaft spacing requirements, determine the best hub orientation using Table 1.
2. If needed, hubs can be mounted with the shaft extending past the hub, flush, or recessed within the hub as seen in Figure 2.
3. Use a half element to set proper hub spacing, or reference Table 1 to set appropriate shaft spacing. Depending upon shaft spacing requirements, hubs may be oriented as seen in Figure 3, where A is the dimension between hub faces.
4. When hubs are properly spaced, tighten set screws to the torque value given in Table 1.

Finished Bore Interference Fit

1. Hubs may be oriented as seen in Figure 3. Depending on shaft spacing requirements, determine the best hub orientation using Table 1.
2. If needed, hubs can be mounted with the shaft extending past the hub, flush, or recessed within the hub as seen in Figure 2.
3. Use a scribe to mark the desired hub location on shafts.
 - a. Using an oven or oil bath, heat hubs evenly to 350° (204°C). Do NOT exceed 450°F (232°C).
 - b. An open flame or torch does not provide even heating and is NOT recommended.
4. Slide heated hubs onto shafts and align them with the scribed marks.
5. Allow the hubs to cool to room temperature before installing element halves.

Taper-Lock & QD Bushed Hubs

1. Hubs may be oriented as seen in Figure 3. Depending on shaft spacing requirements, determine the best hub orientation using Table 1.
2. Hubs must be mounted with 100 percent keyset and shaft engagement, as seen in A or B of Figure 2.
3. Install bushings in hubs per bushing instructions:
 - a. Taper-Lock, MN4044
 - b. QD, MN4049



**A - Shaft Extending Past Hub
(Without Contacting Other Shaft)**

B - Shaft Flush with Hub

**C - Shaft Recessed in Hub
(Requires 80 percent Keyset and Shaft Engagement)**

Figure 2 - Hub Mounting Options

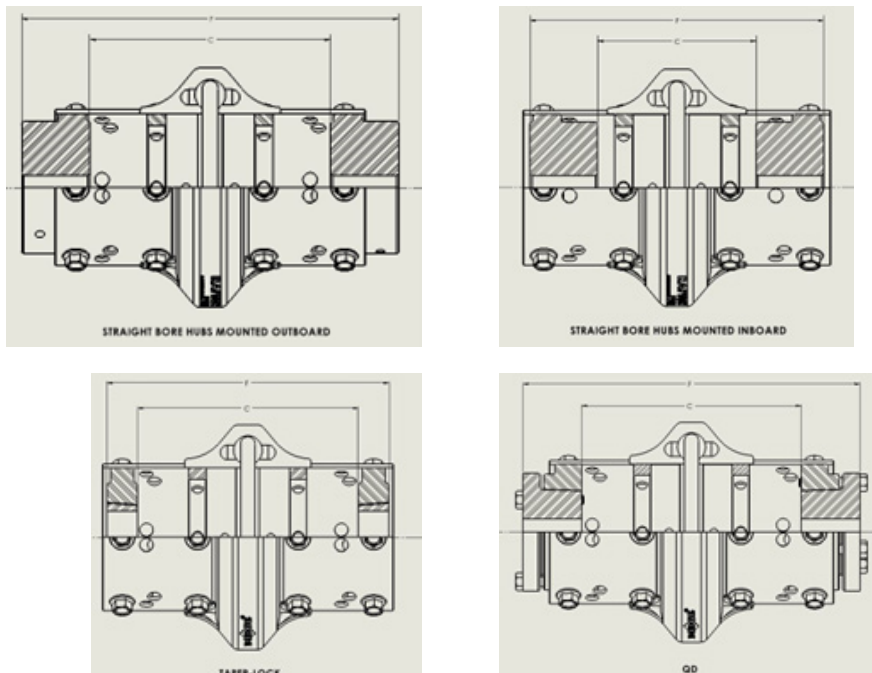


Figure 3 - Hub Orientation Options

Table 1 - Hub Spacing

Hub Type	Straight bore								Taper-Lock								QD							
	C (BSE) - in		C (BSE) - mm		F - in		F - mm		C (BSE) - in		C (BSE) - mm		F - in		F - mm		C (BSE) - in		C (BSE) - mm		F - in		F - mm	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
E2-R	4	4.56	102	116	5.88	6.44	149	164	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E3-R	3.38	5.51	86	140	7.25	8.51	184	216	4.27	5.84	108	148	7.25	7.6	184	193	-	-	-	-	-	-	-	-
E4-R	3.02	5.51	77	140	7.25	8.87	184	225	4.27	5.84	108	148	7.25	7.6	184	193	4.5	6.07	114	154	7.25	8.07	184	205
E5-R	2.88	5.51	73	140	7.25	9.01	184	229	4.27	5.84	108	148	7.25	7.6	184	193	3.98	5.55	101	141	7.25	8.17	184	208
E10-R	2.62	5.51	67	140	7.25	9.27	184	235	4.16	5.73	106	146	7.25	7.73	184	196	7.04	5.99	179	152	7.25	8.61	184	219
E20	2.76	7.08	70	180	9.38	11.4	238	290	5.04	7.12	128	181	9.38	9.38	238	238	5.16	7.24	131	184	9.38	11.12	238	282
E30	2.06	7.08	52	180	9.38	11.7	238	297	4.59	6.67	117	169	9.38	9.38	238	238	4.46	6.54	113	166	9.38	10.66	238	271
E40	1.68	7.08	43	180	9.38	12.08	238	307	4.09	6.17	104	157	9.38	9.67	238	246	3.71	5.79	94	147	9.38	11.29	238	287
E50	1.18	7.08	30	180	9.38	12.58	238	320	4.09	6.17	104	157	9.38	9.67	238	246	4.22	6.3	107	160	9.72	11.8	247	300
E60	2.74	9.84	70	250	12.5	16.34	318	415	6.16	8.29	156	211	12.5	12.92	318	328	4.98	7.74	126	197	12.5	15.24	318	387
E70	2	9.84	51	250	12.5	17.08	318	434	4.66	7.42	118	188	12.5	14.42	318	366	3.98	6.74	101	171	13.23	15.99	336	406
E80	2.26	9.84	57	250	12.5	19.58	318	497	4.16	6.92	106	176	12.5	14.92	318	379	1.9	4.66	48	118	15.4	18.16	391	461

1. All inch fasteners are Grade 8
2. All metric fasteners are ISO Class 10.9
3. Fasteners are recommended for one time use only
4. All fasteners use thread locking patches

Table 2 - Set Screw Installation Torque for Clearance Fit Hubs

Bore Size	Inch Bores (inches)							Metric Bores (mm)			
	0.500-0.5625	0.625-0.875	0.9375-1.25	1.3125-1.75	1.8125-2.75	2.8125-3.25	3.125-4.000	11-34	35-47	48-69	70-100
Set Screw Size	10-24NC	1/4-20NC	5/16-18NC	3/8-16NC	1/2-13NC	5/8-11NC	3/4-10NC	M6 x 1.0	M8 x 1.25	M12 x 1.75	M16 x 2.0
Torque (in-lb)	36	87	165	290	620	1325	2400	64	150	480	1185
Torque (ft-lb)	3	7	14	24	52	110	200	5	13	40	100
Torque (Nm)	4	9.8	19	33	70	150	271	7.2	17	54	134

Step 2 - Verify Alignment

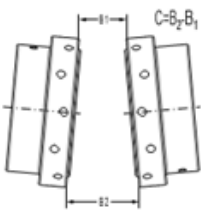


Figure 4 - Angular Misalignment

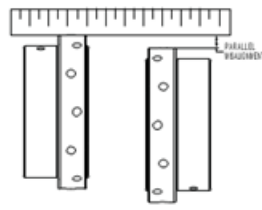


Figure 5 - Parallel Misalignment

Coupling hubs should be aligned using scales, straight edges, or calipers. Dial indicators, laser alignment tools, or other precision alignment equipment can be used but is not required.

1. Adjust equipment to achieve the desired distance between hub ends. Refer to dimension A in Figure 3 and Table 1.
2. Using scales or calipers, check the angular misalignment by measuring dimension B at four locations on the outer

diameter of the hub 90° apart, as seen in Figure 4. Use the B2 and B1 measurements to calculate C. Adjust the equipment until the C measurements do not exceed the value in Table 3.

3. Check parallel misalignment by placing a straight edge across the outside diameter of the hubs and measuring the gap between the straight edge and the hub at four locations 90° apart, as seen in Figure 5. Adjust equipment until the gap does not exceed the value shown in Table 3.

Step 3 - Element and High-Speed Ring Installation

1. If required for your application, place the high-speed rings on the innermost hole (closest to rubber) on the element and hand tighten flange head bolts to the element. Place element half on hubs and hand tighten the flange head bolts



Figure 6 - Install High-Speed Rings



Figure 7 - Install Element Half with High-Speed Rings

NOTE: When tightening the bolts, start at the center bolt hole and then install the bolts on the neighboring holes.

2. Place the second half of the element on the hubs and follow the same procedure. Hand tighten the high-speed ring flange head bolts to the element, and the element flange head bolts to the hub.
3. Use a torque wrench to tighten all fasteners (flange head bolts) to the torque values listed in Table 4.



Figure 8 - Install Second Element Half on Hubs with High-Speed Rings

Table 3 - Angular and Parallel Misalignment													
Coupling Size		E2	E3	E4	E5	E10	E20	E30	E40	E50	E60	E70	E80
Angular	in.	0.129	0.162	0.182	0.219	0.255	0.235	0.284	0.347	0.426	0.306	0.323	0.393
	mm	3.3	4.1	4.6	5.6	6.5	6	7.2	8.8	10.8	7.8	8.2	10
Parallel	in.	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188
	mm	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8

Table 4 - Hardware											
Size	Capscrew Torque								Hardware Quantity	Imperial Hardware Kit	Metric Hardware Kit
	Imperial Hardware				Metric Hardware						
	Bolt Size (in)	in-lbs	ft-lbs	Nm	Bolt Size (mm)	in-lbs	ft-lbs	Nm			
E2-R	1/4	147	12	17	M6	126	11	14	8	017000	017008
E3-R-E5-R	1/4	147	12	17	M6	126	11	14	8	017001	017009
E10-R	1/4	147	12	17	M6	126	11	14	12	017180	017181
E20-E30	3/8	502	42	57	M10	603	50	68	12	017002	017010
E40-E50	3/8	502	42	57	M10	603	50	68	16	017003	017011
E60-E80	1/2	1178	98	133	M12	1022	85	115	16	017004	017012

ATEX CERTIFICATION

These instructions do not cover all details or variations in equipment nor provide every possible contingency or hazard to be met in connection with installation, operation, and maintenance. Should further information be desired, or should particular problems arise which are not covered in this manual, the matter should be referred to your local representative.

Raptor couplings are manufactured under guidelines of the ATEX directive 2014/34/EU. Raptor couplings are suitable for ATEX Category 2 and M2, Group II and I for gas and dust environments and are also suitable for ATEX Category 3 for all gas or dust environments with ignition temperatures higher than T5 = 100°C. A UL-Certified adhesive label indicating ATEX certification will be attached to the product and will contain the following depending on size and ambient temperature:

ATEX Marking Information

- I M2
- Ex h I Mb
- II 2GB
- Ex h IIC T5 Gb
- Ex h IIC T100°C Db
- Tamb -30°C to +50°C
- SIRA 15 ATEX 6170X
- MFG by Dodge Industrial
- 1061 Holland Road, Simpsonville, SC 29681

Products manufactured prior to November 2021 may be marked as ABB Motors and Mechanical, Inc., Baldor, Reliance, etc.

Attention - Hazardous Area Use

For Hazardous Area Use, the following potential ignition hazards have been identified:

- Heat Generation
- Contact of rotating parts with stationary parts

These potential hazards have been addressed by the materials and design of the coupling and rely on correct installation and maintenance, as detailed in the equipment instructions.

WARNING: These couplings are designed to operate with surface temperatures below 100°C when properly installed and selected. Excessive temperatures greater than 80°C is a result of an abnormal operating condition caused by:

Improper Installation (refer to installation manual for proper procedures)

1. Excessive misalignment – re-align coupling/shafts
2. Failure of the element – replace element assembly
3. Excessive speed – re-evaluate application and selection
4. Excessive vibration – determine source, re-evaluate application

If applied in a Division 1 or Zone 1 environment, the excessive temperature may cause ignition of hazardous materials.

In hazardous environments, Raptor Couplings should not be considered fail safe or "break-away" power transmission devices. Overloads imposed to these devices could cause irreparable damage, should be considered a potential source of ignition, could create projectiles, and/or could cause torque transmission interruptions. The coupling shall be sized and used to the stated torque ratings of the unit as published in the appropriate Dodge Engineering Catalog. Any assistance needed in selection shall be

referred to a Dodge representative.

Additional Instruction for Safe Installation and Use

1. All rotating parts should be guarded to prevent contact with foreign objects which could result in sparks, ignition, or damage to the coupling. **Coupling guards should have a minimum of 1" radial clearance over Raptor Couplings up to size E20. Sizes E30 and above require 2" minimum radial clearance.**
2. Couplings should be periodically inspected for normal wear, dust/dirt buildup, cracks or tears in the element assembly or any similar scenario that would impeded neat dissipation.
3. Increasing levels or vibration and noise could indicate the need for inspection, repair or replacement of the coupling or element.
4. Electrical sparks are a source of ignition. To reduce the risk, proper electrical bonding and grounding is recommended.
5. Overloading may result in tearing or damage to the coupling element or other equipment. Damaged coupling components must not be operated in hazardous environments.
6. Raptor Couplings are not intended to be used as thrust-bearing members.
7. The coupling shall be suitably protected from impact.

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