

Instruction Manual for Baldor•Dodge® Raptor Spacer Couplings

These instructions must be read thoroughly before installing or operating this product. Video walkthroughs of each installation procedure are available by scanning the QR codes at the beginning of each section. Videos should be used as an accompaniment to the instruction manual and not intended to replace the written instructions. The instruction manual was correct at the time of printing. Please see www.baldor.com for updated instruction manual.



Install Hubs



Set Spacing



Install Element

WARNING: To ensure the drive is not unexpectedly started, turn off and lock-out or tag-out 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 Instructions

Step 1 - HUB INSTALLATION

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



FINISHED BORE CLEARANCE FIT

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



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 Baldor Electric Company nor are the responsibility of Baldor Electric Company. 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 INTERFERENCE FIT

1. Hubs may be oriented as seen in Figure 4. Depending on shaft spacing requirements, determine the best hub orientation using Table 4.
2. If needed, hubs can be mounted with the shaft extending past the hub, flush, or recessed within the hub as seen in Figure 1.
3. Use a scribe to mark the desired hub location on shafts.
 - a. Using an oven or oil bath, heat hubs evenly to 350°F (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 with the scribed marks.
5. Allow the hubs to cool to room temperature before installing element halves.



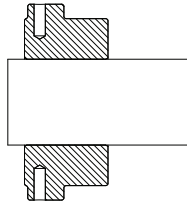
TAPER-LOCK & QD BUSHED HUBS

1. Hubs may be oriented as seen in Figure 5 for Taper-Lock and Figure 6 for QD. Depending on shaft spacing requirements, determine the best hub orientation using Table 5 for Taper-Lock and Table 6 for QD.
2. Hubs must be mounted with 100% keyseat and shaft engagement, as seen in "A" or "B" of Figure 1.
3. Install bushings in hubs per bushing instructions:
 - a. Taper-Lock – MN4044
 - b. QD – MN4049

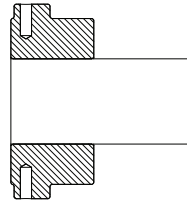


RAPTOR
with Patented WingLock Technology

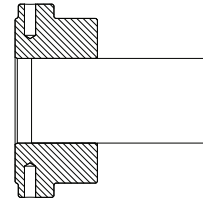
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A - Shaft extended past hub (without contacting other shaft)



B - Shaft flush with hub



C - Shaft recessed in hub (requires 80% keyseat and shaft engagement)

Figure 1 - Hub Mounting Options

Table 1 - 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	3.3125-4.000	11 - 34	35 - 47	48 - 69	70 - 100
Setscrew 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

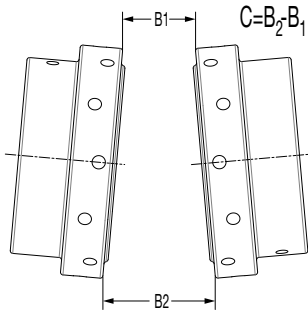


Figure 2 - Angular Misalignment

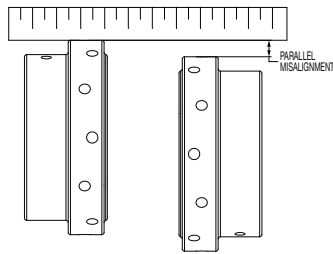


Figure 3 - Parallel Misalignment

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 are not required.

- Using scales or calipers, check the angular misalignment by measuring dimension “B” at four places on the outer diameter of the hub 90° apart, as seen in Figure 2. Use the “B₂” and “B₁” measurements to calculate “C”. Adjust the

equipment until the “C” measurements do not exceed the value in Table 2.

- 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 3. Adjust equipment until the gap does not exceed the value shown in Table 2.

Step 3 - ELEMENT INSTALLATION

- Place first element half on hubs and hand-tighten the flange head bolts.

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

- Place the second half of the element on the hubs and follow the same procedure. Hand-tighten the flange head bolts.
- Use a torque wrench to tighten all fasteners to the torque values listed in Table 3.

NOTE: When replacing a spacer element be sure to replace all bolts to ensure the element is properly secured to the hubs. If only the elastomeric element is being replaced and not the spacer extensions, the bolts connecting the element to the spacer extensions should be replaced.

Table 2 - Angular and Parallel Misalignment (inches)

Coupling Size	E2	E3	E4	E5	E10	E20	E30	E40	E50	E60	E70	E80
Angular (C)	.129	.162	.182	.219	.255	.235	.284	.347	.426	.306	.323	.393
Parallel	.188	.188	.188	.188	.188	.188	.188	.188	.188	.188	.188	.188

Table 3 - Hardware

Size	Capscrew Torque								Hardware Quantity	Imperial Hardware Kit	Metric Hardware Kit
	Imperial Hardware				Metric Hardware						
	Bolt Size (inches)	in-lbs	ft-lbs	Nm	Bolt Size (mm)	in-lbs	ft-lbs	Nm			
E2	1/4	147	12	17	M6	126	11	14	8	017000	017008
E3-E5	1/4	147	12	17	M6	126	11	14	8	017001	017009
E10	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	1,178	98	133	M12	1,022	85	115	16	017004	017012
E100	3/4	3,846	321	435	M20	4,581	382	518	20	017005	017013
E120	3/4	3,846	321	435	M20	4,581	382	518	24	017006	017014
E140	1	9,078	756	1,026	M24	7,798	650	881	32	017007	017015

Spacer - Finished Bore

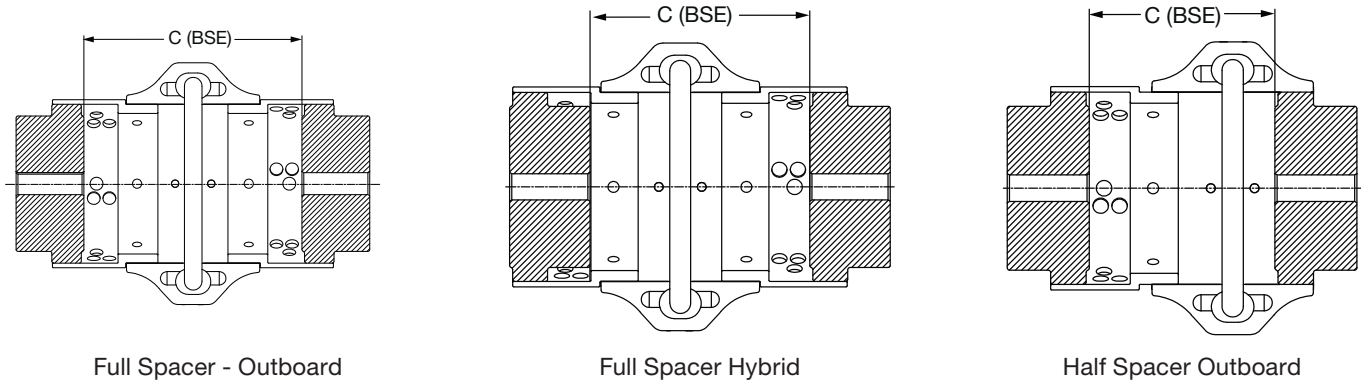


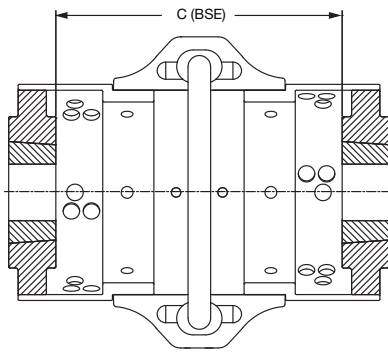
Figure 4 - Hub Orientation Options for Finished Bore

Table 4 - Finished Bore Spacer Lengths - "C"

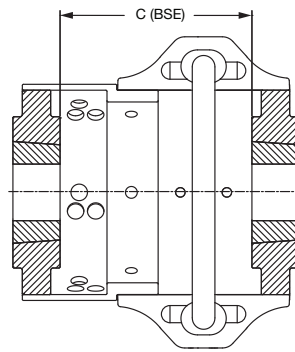
Size	Element Part Number	Half Element Part Number	ANSI (in.)				ISO & DIN (mm)			
			3.5	5	7	10	100	140	180	250
ES2	017064	017182	Full Spacer Outboard				Full Spacer Outboard			
ES3	017065	017183	Full Spacer Outboard	Full Spacer Outboard			Full Spacer Outboard	Full Spacer Outboard		
ES4	017066	017184	Full Spacer Outboard	Full Spacer Outboard			Full Spacer Outboard	Full Spacer Outboard		
ES5	017067	017185	Full Spacer Outboard	Full Spacer Outboard			Full Spacer Outboard	Full Spacer Outboard		
ES10	017068	017186	Full Spacer Outboard	Full Spacer Outboard			Full Spacer Outboard	Full Spacer Outboard		
ES20	017069	017187	Half Spacer Outboard	Half Spacer Outboard	Full Spacer Outboard		Half Spacer Outboard	Full Spacer Outboard	Full Spacer Outboard	
ES30	017070	017188	Half Spacer Outboard	Half Spacer Outboard	Full Spacer Outboard		Half Spacer Outboard	Full Spacer Outboard	Full Spacer Outboard	
ES40	017071	017189		Half Spacer Outboard	Full Spacer Outboard		Half Spacer Outboard	Full Spacer Outboard	Full Spacer Outboard	
ES50	017072	017190		Half Spacer Outboard	Full Spacer Outboard		Half Spacer Hybrid	Full Spacer Outboard	Full Spacer Outboard	
ES60	017073	017191		Half Spacer Outboard	Full Spacer Outboard	Full Spacer Outboard		Half Spacer Hybrid	Full Spacer Outboard	Full Spacer Outboard
ES70	017074	017192			Full Spacer Outboard	Full Spacer Outboard			Full Spacer Outboard	Full Spacer Outboard
ES80	017075	017193			Full Spacer Hybrid	Full Spacer Outboard			Full Spacer Hybrid	Full Spacer Outboard

- (1) Table shows actual spacer lengths relative to standard ANSI and ISO spacer lengths
 (2) All calculations based off of outboard hubs

Spacer - Taper-Lock Bushed



Full Spacer - Taper-Lock Bushed



Half Spacer - Taper-Lock Bushed

Figure 5- Hub Orientation Options for Spacer Taper-Lock Bushed

Table 5 - Taper-Lock Bushed Spacer Length Options "C"

Size	Element Part Number	Half Element Part Number	ANSI (in.)				ISO & DIN (mm)			
			3.5	5	7	10	100	140	180	250
ES3	017065	017183	3.3 Full Spacers	4.8 Full Spacers			96 Full Spacers	136 Full Spacers		
ES4	017066	017184	3.3 Full Spacers	4.8 Full Spacers			96 Full Spacers	136 Full Spacers		
ES5	017067	017185	3.3 Full Spacers	4.8 Full Spacers			96 Full Spacers	136 Full Spacers		
ES10	017068	07186	3.3 Full Spacers	4.8 Full Spacers			96 Full Spacers	136 Full Spacers		
ES20	017069	017187	3.5 Half Spacers	5.0 Half Spacers	7.0 Full Spacers		99 Half Spacers	139 Full Spacers	179 Full Spacers	
ES30	017070	017188	3.5 Half Spacers	5.0 Half Spacers	7.0 Full Spacers		100 Half Spacers	140 Full Spacers	180 Full Spacers	
ES40	017071	017189		5.2 Half Spacers	7.2 Full Spacers		106 Half Spacers	146 Full Spacers	186 Full Spacers	
ES50	017072	017190		5.2 Half Spacers	7.2 Full Spacers		106 Half Spacers	146 Full Spacers	186 Full Spacers	
ES60	017073	017191		5.2 Half Spacers	7.2 Full Spacers	10.2 Full Spacers		144 Half Spacers	184 Full Spacers	254 Full Spacers
ES70	017074	017192			7.8 Full Spacers	10.8 Full Spacers			201 Full Spacers	271 Full Spacers
ES80	017075	017193			8.1 Full Spacers	11.1 Full Spacers			207 Full Spacers	277 Full Spacers

(1) Table shows actual spacer lengths relative to standard ANSI and ISO spacer lengths

Spacer - QD Bushed

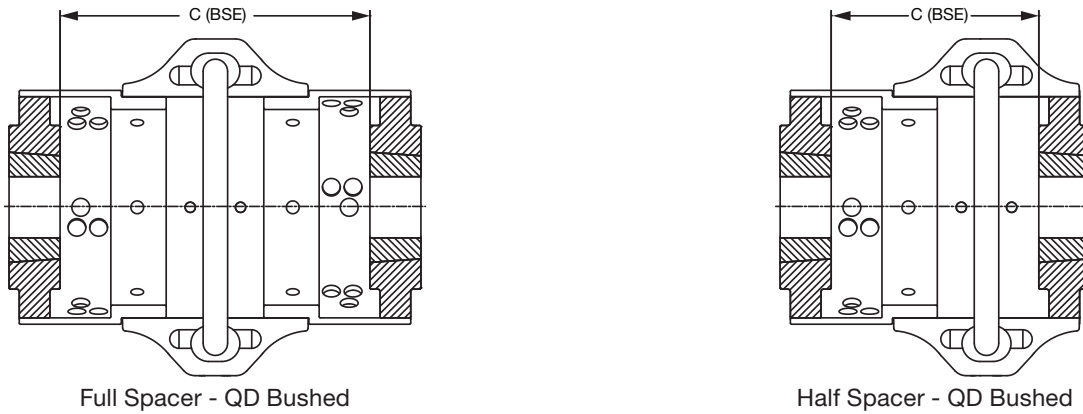


Figure 6 - Hub Orientation Options for Spacer - QD Bushed

Table 6 - QD Bushed Spacer Length Options - "C (BSE)"

Size	Element Part Number	Half Element Part Number	ANSI (in.)				ISO & DIN (mm)			
			3.5	5	7	10	100	140	180	250
ES4	017066	017184	3.2 Full Spacers	4.7 Full Spacers			93 Full Spacers	133 Full Spacers		
ES5	017067	017185	3.5 Full Spacers	5.0 Full Spacers			99 Full Spacers	139 Full Spacers		
ES10	017068	017186	3.3 Full Spacers	4.8 Full Spacers			94 Full Spacers	134 Full Spacers		
ES20	017069	017187	3.4 Half Spacers	4.9 Half Spacers	6.9 Full Spacers		98 Half Spacers	138 Full Spacers	178 Full Spacers	
ES30	017070	017188	3.6 Half Spacers	5.1 Half Spacers	7.1 Full Spacers		102 Half Spacers	142 Full Spacers	182 Full Spacers	
ES40	017071	017189		5.4 Half Spacers	7.4 Full Spacers		111 Half Spacers	151 Full Spacers	191 Full Spacers	
ES50	017072	017190		5.2 Half Spacers	7.2 Full Spacers		104 Half Spacers	144 Full Spacers	184 Full Spacers	
ES60	017073	017191		5.8 Half Spacers	7.8 Full Spacers	10.8 Full Spacers		159 Half Spacers	199 Full Spacers	269 Full Spacers
ES70	017074	017192			8.2 Full Spacers	11.2 Full Spacers			209 Full Spacers	279 Full Spacers
ES80	017075	017193			9.2 Full Spacers	12.2 Full Spacers			236 Full Spacers	306 Full Spacers

- (1) Table shows actual spacer lengths relative to standard ANSI and ISO spacer lengths
 (2) All calculations based off of outboard hubs.

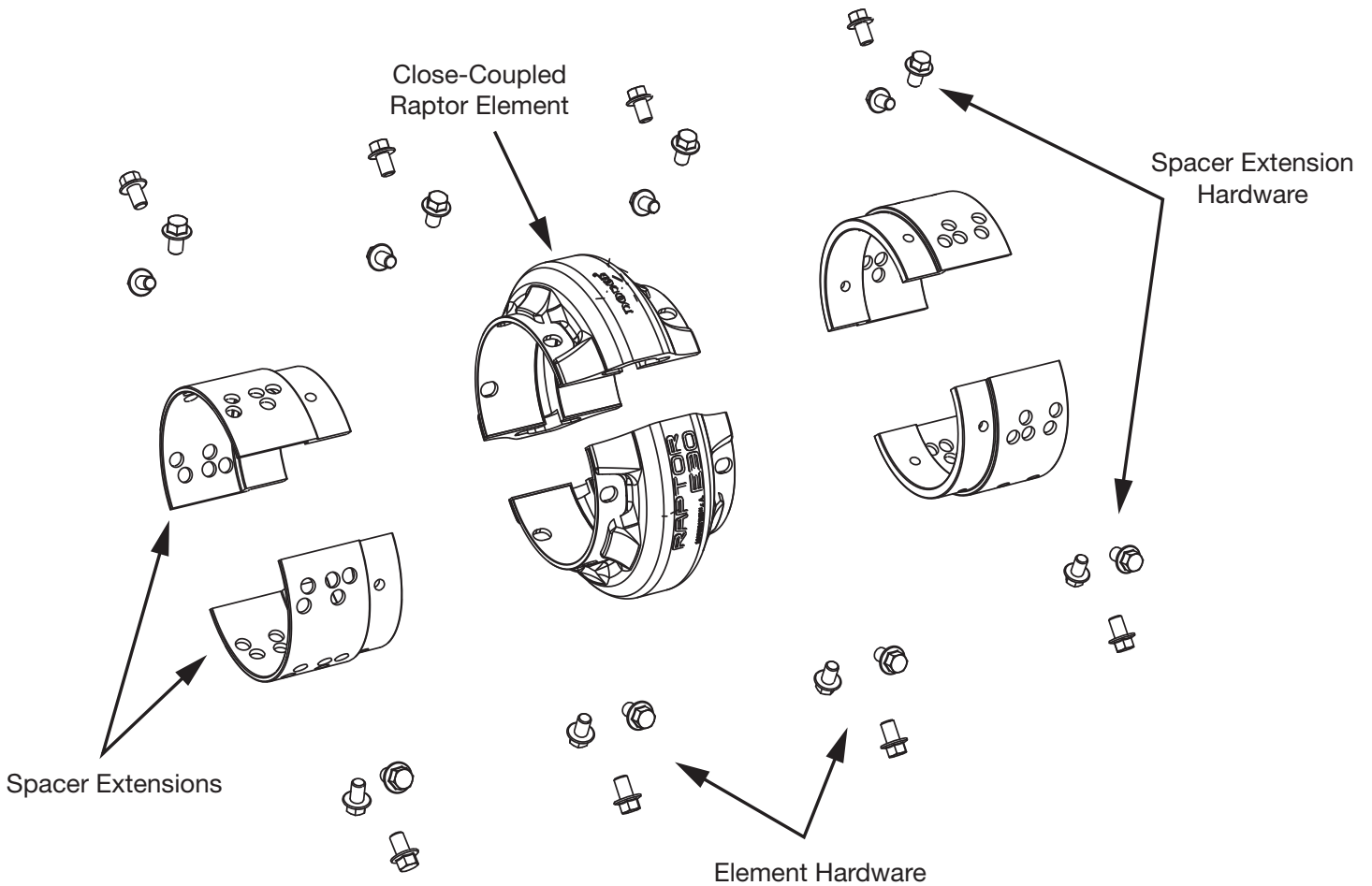


Table 7 - Raptor Space Element Component Part Numbers

Size	Complete Spacer Element Assemblies		Replacement Components			
	Standard (Natural Rubber) Elements		Close-Coupled Elements ①②		Spacer Extension Kit ③④	Replacement Hardware
	Full Spacer	Half Spacer	Standard (Natural Rubber)	Armored Elements		
ES2	017064	017182	015843	017126	017040	017000
ES3	017065	017183	015844	017127	017041	
ES4	017066	017184	015845	017128	017042	
ES5	017067	017185	015846	017129	017043	017001
ES10	017068	017186	015847	017130	017044	
ES20	017069	017187	015848	017131	017045	
ES30	017070	017188	015849	017132	017046	017002
ES40	017071	017189	015850	017133	017047	
ES50	017072	017190	015851	017134	017048	
ES60	017073	017191	015852	017135	017049	017003
ES70	017074	017192	015853	017136	017050	
ES80	017075	017193	015854	017137	017051	

NOTES:

- ① For element replacement on existing Raptor half spacer couplings, purchase one close-coupled element
- ② For element replacement on existing Raptor full spacer couplings, purchase one close-coupled element and one set of replacement hardware
- ③ To convert an existing close-coupled Raptor element into a half spacer element, purchase one spacer extension kit
- ④ To convert an existing close-coupled Raptor element into a full spacer element, purchase two spacer extension kits

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 Baldor•Dodge representative.

Dodge Raptor couplings are manufactured under guidelines of the ATEX directive 2014/34/EU. Dodge 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 $T_5 = 100^{\circ}\text{C}$. 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

- II 2 GD c 100°C (T5)
- Or I M2 c
- Tamb -30°C to +50°C
- SIRA 15ATEX6170X
- Dodge Raptor Coupling Size**
- MFG. In USA, Greenville SC / Fort Smith AR

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, Dodge Raptor Couplings should not be considered fail safe or “break-away” power transmission devices. Overloads imposed to these devices could cause irreparable damage, shall be considered an explosive hazard, 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 Baldor•Dodge Engineering Catalog. Any assistance needed in selection shall be referred to a Baldor•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.
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 impede heat dissipation.
3. Increasing levels of 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. As a result the coupling could become an explosion hazard. Damaged coupling components must not be operated in hazardous environments.
6. Raptor Couplings are not intended to be used as thrust bearing members.
7. Coupling guards should have a minimum of 2” clearance over Dodge Raptor Couplings.
8. The coupling shall be suitably protected from falling objects.

EU Declaration of Conformity

The undersigned, representing the following supplier and the following authorised representative-


Baldor Electric Company
5711 R. S. Boreham, Jr. Street
Fort Smith, Arkansas 72901
USA

ABB Automation Products GmbH
Oberhausener Straße 33
40472 Ratingen, Germany

This declaration is issued under the sole responsibility of the manufacturer.

herewith declare that the Products

Product identification (brand and catalogue number/part number):

Couplings 
Dodge Raptor - Equipment Group I, Category M2 c /Equipment Group II Category 2 GD c 100 °C (T5) T amb - 30°C to +50°C

are in conformity with the provisions of the following EC Directive(s) when installed in accordance with the installation instructions contained in the product documentation:

94/9/EC and 2014/34/EU¹ ATEX

Note 1: 94/9/EC applies until April 19, 2016, 2014/34/EU applies from April 20, 2016

and that the standards and/or technical specifications referenced below have been applied:

EN 13463-1:2009

Non - Electrical Equipment For Potentially Explosive Atmospheres -Method And Requirements

EN 13463-5:2011

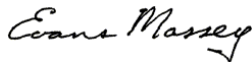
Non - Electrical Equipment For Potentially Explosive Atmospheres – Part 5 Protection by constructional safety 'c'

Notified Body:

Sira Certification Services Ltd
Unit 6
Hawarden Industrial Park
Hawarden
DEESIDE
CH5 3US

Certificate: SIRA 15ATEX6170X

Supplier
Signature:



Authorised representative
Signature:



Name: L. Evans Massey
Position: Manager Standards and Certification

Name: Michael Klein
Position: Regional Sales and Marketing Manager Central Europe

Date: 1 April 2016

Date: 1 April 2016

Document Control Number: DOC-BEZ-DA-M26-B-EN.DOC

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BALDOR
A MEMBER OF THE ABB GROUP

P.O. Box 2400, Fort Smith, AR 72902-2400 U.S.A., Ph: (1) 479.646.4711, Fax (1) 479.648.5792, International Fax (1) 479.648.5895

Dodge Product Support

6040 Ponders Court, Greenville, SC 29615-4617 U.S.A., Ph: (1) 864.297.4800, Fax: (1) 864.281.2433

www.baldor.com

