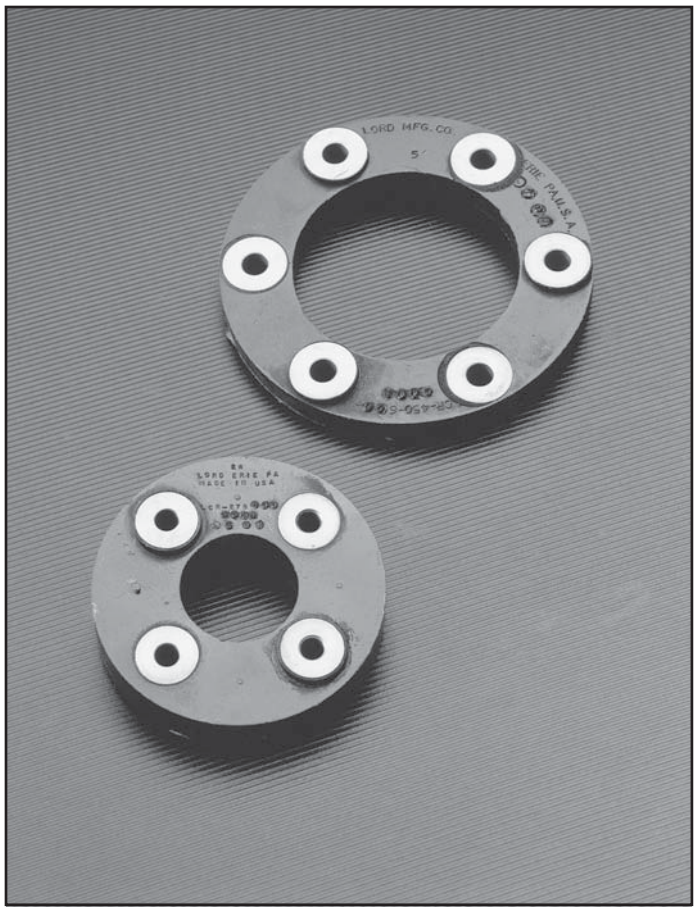


Dynaflex® LCR Series Couplings

Rated: 4 to 135 hp at 2000 rpm

LORD Dynaflex LCR Series Couplings are ring-type couplings developed to overcome numerous torsional problems associated with vehicular and industrial driveline systems. These easily installed couplings reduce noise transmission and increase bearing and driveline life through greater misalignment accommodation, isolation of low frequency disturbances, and isolation of torsional shock.

These highly flexible elastomeric couplings for accessory drives are also designed to eliminate lubrication and maintenance.

Features and Benefits

- Misalignment accommodation – elastomeric flexibility allows for large angular misalignment. For permissible misalignments, including axial and radial, Refer to Table 1.
- Vibration isolation – low torsional spring rate is achieved with the elastomeric ring-type coupling using rubber in compression. This allows for low system natural frequencies and isolation of first mode driveline disturbances in most driveline systems.
- Shock protection – isolates torsional shock, prevents backlash and protects system components, including bearings, from fatigue failure.
- Long service life – Dynaflex LCR Series Couplings have proven themselves under demanding service conditions.
- Maintenance-free – elastomer flexibility accommodates all motion without wear, eliminates the need for lubrication.
- Noise reduction – no metal-to-metal contact; elastomer attenuates structure-borne noise and isolates vibration from components that would act as noise generators.
- Systems Engineering – LORD has in-house computer capabilities for multi-torsional analysis to assist in proper coupling selection.

Typical Applications

Dynaflex LCR Series Couplings are useful for a wide range of rotary drive applications, from lawn and garden tractors to large construction equipment, including U-joint replacement. Typical applications include:

Typical End Product	Application
Farm Tractor	Trouble-Free Hydraulic Pump Devices
Lawn & Garden Tractors	Maintenance-Free Main Drive Couplings
Dynamometer	Protects Driveline from Failure
Snowmobile	Reliable Main Drive Coupling
Vibratory Rollers	Absorbs High Torsional Shock Loads in Eccentric Drive Units
On- & Off-Highway	Isolates and Protects Vehicles Auxiliary Driveline Systems
Industrial Machinery	Provides Inexpensive Coupling for Maximum Angular Misalignment and Vibration Control
Agriculture Equipment	Replaces Conventional Universal Joints and Provides Torsional Flexibility

Dynaflex LCR Series Couplings were designed and developed by LORD and have been in service since the early 1960s. The basic concept was intended for specific applications requiring low-cost, flexible couplings to accommodate all forms of misalignment and provide torsional resilience.

The coupling design incorporates metal inserts bonded in an elastomeric ring, which loads the flexing element in compression to transmit torque. Misalignment motion is accommodated by deflecting the elastomer in shear, which allows extreme misalignment without high reaction forces.

They are ideally suited for light-duty elastomeric universal joints, particularly where noise reduction or shock attenuation is required.

Absence of metal-to-metal contact through the coupling eliminates the need for lubrication and maintenance, while also reducing noise transmissions. Installation is accomplished by insertion between simple parallel flanges. This lightweight coupling element can be arranged in a single or double series configuration to match specific torsional stiffness and misalignment requirements.

Static Load Deflection Characteristics of LCR-300-600-046A Reference Curve

Ring-type couplings isolate torsional vibration and reduce the harmful effects of torsion shock. Torsional resilience is one important characteristic. Figure 1 shows the torsional spring rate.

Accommodating axial misalignment along the axis of shafts without high reaction forces is a unique feature of ring couplings. Figure 2 shows this load deflection relationship.

Ring-type couplings accommodate parallel misalignment with relatively low radial reaction forces imposed on driving and driven equipment. Figure 3 shows typical radial load deflection curves. Load deflection characteristics for other LCR couplings are available upon request.

Figure 1 – Typical Load/Deflection Curves

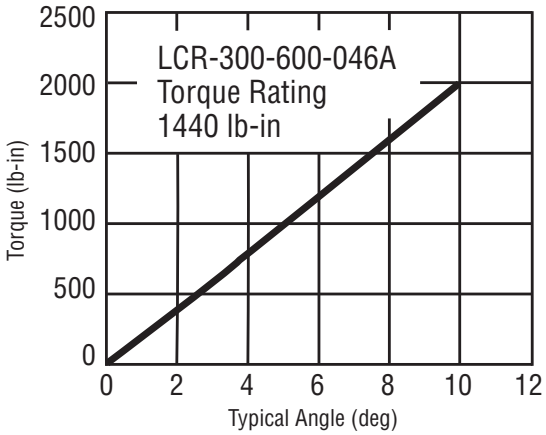


Figure 2 – Axial Load Deflection Curves

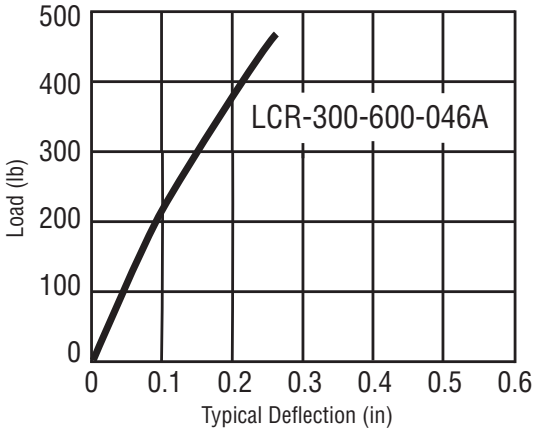
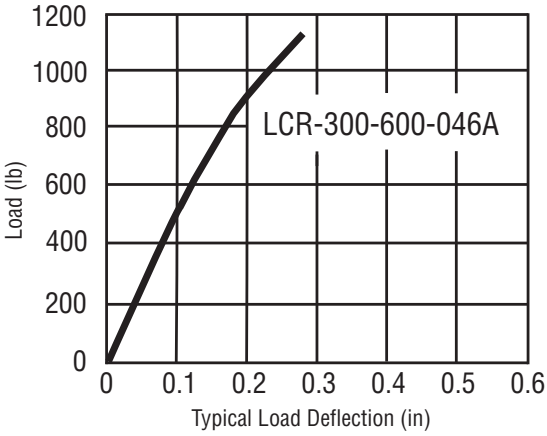


Figure 3 – Typical Radial Load Deflection Curves



Specifications

Materials: The elastomer used in Dynaflex LCR Series Couplings is high-quality natural rubber, which meets LORD specifications (available upon request) and exceeds SAE standards. Natural rubber is used because of its excellent physical properties such as tensile strength, tear and abrasion resistance, fatigue resistance and low temperature characteristics. Other elastomers are available to meet special applications needs. The elastomer-to-metal bonds are even stronger than the elastomers.

Dynaflex LCR Series Couplings listed on the following pages have aluminum alloy inserts. Many other insert configurations are possible to meet attachment requirements.

Environmental: Ring-type couplings will perform satisfactorily when exposed to the normal fluid, temperature and other environmental conditions found in driveline systems. Special oil-resistant elastomers can be provided where total or partial oil immersion is necessary. For operation in ambient temperatures exceeding 170°F (77°C), consult LORD Engineering.

Misalignment: Misalignment capability applies for speeds up to 3500 rpm. Operation up to 7000 rpm is permitted with reduced misalignment (consult LORD Engineering).

Note: For speeds above 4000 rpm, shielding is required and/or balancing of assembly may be required.

Installation: Normal installation involves simple through bolt attachment to flanges. For flywheel attachment applications, metal inserts can be tapped/counter-bored to permit easy installation.

Remote Driven Units: Multiple U-joint shafts (especially longer shafts) and the speed at which the shaft rotates (especially higher rpm's) can create complex stability problems. To assure satisfactory coupling performance, all design layouts for remote mounted driven units should be reviewed by LORD Engineering. LORD analytical capability is only one part of the engineering service available on all coupling applications.

LCR ring-type couplings can be selected based on horsepower or maximum torque requirements. The data listed on the next page provides the necessary information to select a coupling and design it into your system.

New equipment designs and retrofits involving reciprocating engine drives and unusual driveline arrangements should be analyzed to avoid potential vibration and misalignment problems. Contact LORD Engineering for assistance.

Dynaflex LCR Series Couplings

Table 1 – Specifications and Dimensions

Part Number	Rated Performance Characteristics																				
	Torque Rating ①		Per 100 rpm		Capacity						Static Torsional Rate - K_θ		Axial Rate - K_A		Radial Rate - K_R		Permissible Misalignments				
	lb-in	N-m	hp	kW	1750 rpm		2000 rpm		3600 rpm		lb-in/ rad	N-m/ rad	lb/in	N/mm	lb/in	N/mm	Angular	Axial		Parallel	
					hp	kW	hp	kW	hp	kW								in	mm	in	mm
LCR-275-400-004A	125	14	0.20	0.15	3.5	2.6	4.0	3.0	7.1	5.3	420	47	150	26	375	66	±5°	±1/8	3.18	±1/16	1.59
LCR-275-400-009A	290	33	0.46	0.34	8.1	6.0	9.2	6.9	16.6	12.4	530	60	350	60	850	149	±4°	±3/32	2.38	±1/16	1.59
LCR-275-400-017A	550	62	0.87	0.65	15.3	11.4	17.5	13.0	31.4	23.4	1600	181	950	166	1300	228	±3°	±3/64	1.19	±1/32	0.79
LCR-300-600-046A	1440	163	2.28	1.70	40.0	29.8	45.7	34.1	82.3	61.3	18000	2034	2300	404	4500	790	±2°	±1/16	1.59	±1/32	0.79
LCR-400-800-060A	1900	215	3.01	2.24	52.8	39.3	60.3	45.0	108.5	80.9	24000	2712	1450	254	3000	525	±2°	±1/16	1.59	±1/64	0.40
LCR-400-800-115A	3600	407	5.71	4.26	100.0	74.5	114.2	85.2	205.6	153.3	46000	5197	3600	630	6400	1121	±2°	±1/16	1.59	±1/64	0.40
LCR-400-800-135A	4200	475	6.66	4.97	116.6	87.0	133.3	99.4	239.9	178.9	63000	7118	4200	736	9000	1576	±1-1/2°	±1/16	1.59	±1/64	0.40
LCR-450-600-011A	350	40	0.56	0.42	9.6	7.1	11.1	8.3	20.0	14.9	3100	350	1000	175	420	74	±5°	±1/8	3.18	±1/16	1.59

① Torque ratings as listed are maximum steady torques per application requirements. For general applications, dynamic torques of ±35 percent of the coupling rate torques can be applied to the listed torque ratings. Shock torques (e.g., start-up torque, etc.) of up to 200 percent rated torque are generally acceptable.

Torque Requirements:

$$\text{Torque (lb-in)} = \frac{63025 \times \text{hp}}{\text{rpm}}$$

Table 2 – Specifications and Dimensions

Part Number	Physical Characteristics (Nominal)*																			
	Weight		Inertia ②		No. of Inserts	A B.C. Dia.		B Hole Dia.		C Coupling I.D.		D Coupling I.D.		E Length		F Insert Dia.		G Length		H Length	
	lb-Mass	kg	lb-in-sec²	kg-mm²		in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
LCR-275-400-004A	0.52	0.236	0.0020	226.0	4	2.75	69.85	0.32	8.13	4.00	101.60	1.62	41.15	1.00	25.40	0.91	23.11	0.12	3.18	0.75	19.05
LCR-275-400-009A	0.52	0.236	0.0020	226.0	4	2.75	69.85	0.32	8.13	4.00	101.60	1.62	41.15	1.00	25.40	0.91	23.11	0.12	3.18	0.75	19.05
LCR-275-400-017A	1.00	0.454	0.0038	430.0	4	2.75	69.85	0.32	8.13	4.00	101.60	1.62	41.15	1.75	44.45	0.91	23.11	0.12	3.18	1.50	38.10
LCR-300-600-046A	0.91	0.413	0.0041	463.0	6	3.00	76.20	0.39	9.91	4.06	103.12	1.88	47.75	1.53	38.86	1.00	25.40	0.12	3.18	1.28	32.50
LCR-400-800-060A	1.25	0.567	0.0072	814.0	8	4.00	101.60	0.51	12.95	5.21	132.33	2.74	69.60	1.50	38.10	1.00	25.40	0.12	3.18	1.25	31.75
LCR-400-800-115A	1.25	0.567	0.0072	814.0	8	4.00	101.60	0.51	12.95	5.21	132.33	2.74	69.60	1.50	38.10	1.00	25.40	0.12	3.18	1.25	31.75
LCR-400-800-135A	1.40	0.635	0.0099	111.9	8	4.00	101.60	0.51	12.95	5.21	132.33	2.74	69.60	2.00	50.80	1.00	25.40	0.12	3.18	1.75	44.45
LCR-450-600-011A	0.78	0.354	0.0032	362.0	6	4.50	114.30	0.41	10.30	5.56	141.22	3.40	86.36	0.68	17.27	1.00	25.40	0.12	3.18	0.43	10.92

* See detail drawings by part number for tolerances.

② Does not include bolts or flanges.

LORD does not supply hubs. LORD supplies ring elements only.

Figure 4 – Part Dimensions

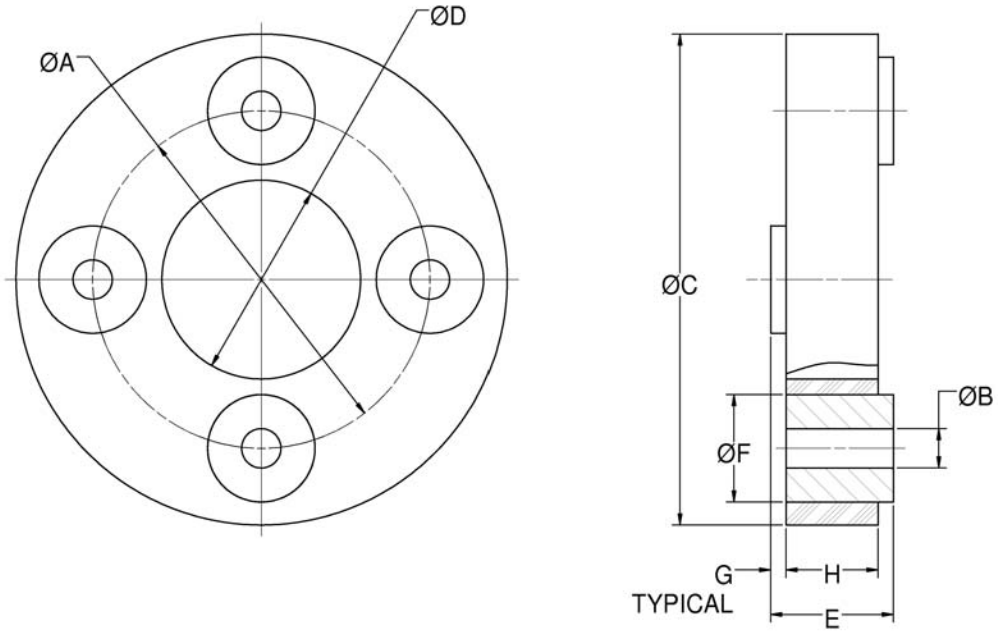
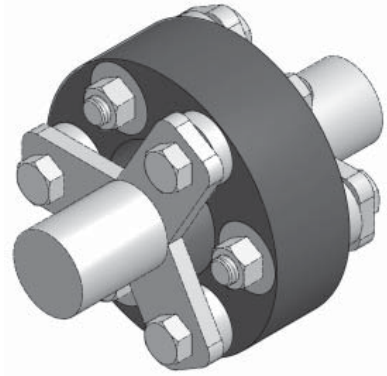
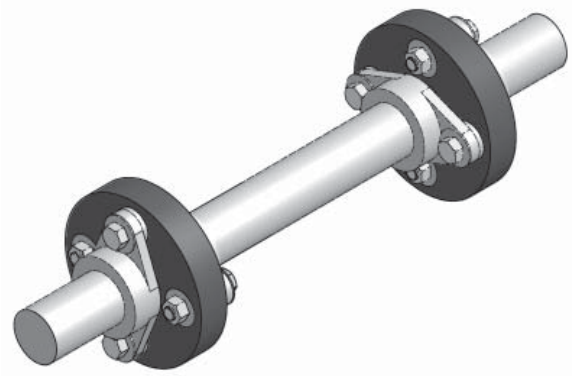


Figure 5 – Single Coupling Arrangement



Single coupling arrangement consists of two shafts jointed by a single coupling for maximum economy.

Figure 6 – Double Coupling Arrangement



Double coupling/series arrangement uses two couplings separated by a floating shaft. This provides same torque capacity as single hub arrangement, with twice the permissible angular misalignment and half the torsional stiffness. Superior to single coupling for control of torsional vibration.