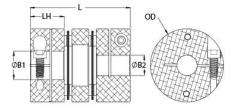




DCDE36-20-14-A

Ruland DCDE36-20-14-A, 1-1/4" x 7/8" Double Disc Coupling, Aluminum, Clamp Style, Electrically Isolating, 2.250" OD, 3.080" Length





Description

Ruland DCDE36-20-14-A is an electrically isolating clamp double disc coupling with 1.2500" x 0.8750" bores, 2.250" OD, and 3.080" length. It is zero-backlash and has a balanced design for reduced vibration at high speeds. The double disc design is comprised of two anodized aluminum hubs, two sets of thin stainless steel disc springs, and an acetal center spacer allowing each disc to bend individually and accommodate all types of misalignment. The acetal center spacer isolates the two hubs preventing the incidental transfer of current from the motor to the driven component or vice versa. DCDE36-20-14-A is lightweight and has low inertia making it well suited for applications with speeds up to 10,000 RPM. Hardware is metric and tests beyond DIN 912 12.9 standards for maximum torque capabilities. Ruland manufactures DCDE36-20-14-A to be torisionally rigid and an excellent fit for precise positioning stepper servo applications commonly found in semiconductor, solar, printing, machine tool, and test and measurement systems. It is machined from solid bar stock that is sourced exclusively from North American mills and ROHS3 and REACH compliant. DCDE36-20-14-A is manufactured in our Marlborough, MA factory under strict controls using proprietary processes.

Product Specifications

Type 302 Stainless Steel, C Spacer: AcetalTemperature-10°F to 150°F (-23°C to 65°C)Finish SpecificationSulfuric Anodized MIL-A-862 II, Class 2 and ASTM B580 Black AnodizeManufacturerRuland ManufacturingCountry of OriginUSAWeight (lbs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.Note 1Note 2Torque ratings are at maximum misalignment.Note 3Note 3Performance ratings are for guidance only. The user must determine suitability for a particular applicat normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. In cases, especially when the smallest standard bores are used or where shafts are undersized, slippag	Froduct Specifications			
Outer Diameter (OD) 2.250 in Bore Tolerance +0.001 in /-0.000 in Length (L) 3.080 in Hub Width (LH) 1.050 in Recommended Shaft Tolerance +0.0000 in /-0.0005 in Forged Clamp Screw M6 Screw Material Alloy Steel Hex Wrench Size 5.0 mm Screw Finish Black Oxide Seating Torque 16 Nm Number of Screws 2 ea Dynamic Torque Reversing 112.5 lb-in Angular Misalignment 0.012 in Static Torque 450 lb-in Axial Motion 0.030 in Torsional Stiffness 769 lb-in/Deg Moment of Inertia 0.5904 lb-in ² Maximum Speed 10,000 RPM Full Bearing Support Required? Yes Zero-Backlash? Yes Balanced Design Yes Torque Wrench TVkBT-4C-3/8-140 Recommended Hex Key Metric Hex Keys Material Specification Sulfuric Anodized MIL-A-862 II, Class 2 and ASTM B5800 Manufacturer Ruland Manufacturing Country of Origin USA Weight (Ibs) 0.763200 UPC 634529112441 <t< th=""><th>Bore (B1)</th><th>1.2500 in</th><th>Small Bore (B2)</th><th>0.8750 in</th></t<>	Bore (B1)	1.2500 in	Small Bore (B2)	0.8750 in
Length (L) 3.080 in Hub Width (LH) 1.050 in Recommended Shaft Tolerance +0.0000 in / -0.0005 in Forged Clamp Screw M6 Screw Material Alloy Steel Hex Wrench Size 5.0 mm Screw Finish Black Oxide Seating Torque 16 Nm Number of Screws 2 ea Dynamic Torque Reversing 112.5 lb-in Angular Misalignment 2.0° Dynamic Torque Reversing 225 lb-in Parallel Misalignment 0.012 in Static Torque 450 lb-in Axial Motion 0.030 in Torsional Stiffness 769 lb-in/Deg Moment of Inertia 0.5904 lb-in ² Maximum Speed 10,000 RPM Full Bearing Support Required? Yes Zero-Backlash? Yes Balanced Design Yes Torque Wrench TW:BT-4C-3/8-140 Recommended Hex Key Metric Hex Keys Material Specification Hubs: 2024-T351 Bar, Disc Type 302 Stainless Steel, C Spacer: Acetal Temperature -10°F to 150°F (-23°C to 65°C) Finish Specification Sulfuric Anodized MIL-A-862 II, Class 2 and ASTM B580 Black Anodize Manufacturer Ruland Manufacturing Country of Origin USA	B1 Max Shaft Penetration	1.050 in	B2 Max Shaft Penetration	1.458 in
Recommended Shaft Tolerance +0.0000 in / -0.0005 in Forged Clamp Screw M6 Screw Material Alloy Steel Hex Wrench Size 5.0 mm Screw Finish Black Oxide Seating Torque 16 Nm Number of Screws 2 ea Dynamic Torque Reversing 112.5 lb-in Angular Misalignment 2.0° Dynamic Torque Non-Reversing 225 lb-in Parallel Misalignment 0.012 in Static Torque 450 lb-in Axial Motion 0.030 in Torsional Stiffness 769 lb-in/Deg Moment of Inertia 0.5904 lb-in ² Maximum Speed 10,000 RPM Full Bearing Support Required? Yes Zero-Backlash? Yes Balanced Design Yes Torque Wrench TW-BT-4C-3/8-140 Recommended Hex Key Metric Hex Keys Material Specification Hubs: 2024-T351 Bar, Disc Type 302 Stainless Steel, C Spacer: Acetal Spacer: Acetal Temperature -10°F to 150°F (-23°C to 65°C) Finish Specification Sulfuric Anodized MIL-A-862 Manufacturer Ruland Manufacturing Country of Origin USA Weight (lbs) 0.763200 UPC	Outer Diameter (OD)	2.250 in	Bore Tolerance	+0.001 in / -0.000 in
Screw MaterialAlloy SteelHex Wrench Size5.0 mmScrew FinishBlack OxideSeating Torque16 NmNumber of Screws2 eaDynamic Torque Reversing112.5 lb-inAngular Misalignment2.0°Dynamic Torque Non-Reversing225 lb-inParallel Misalignment0.012 inStatic Torque450 lb-inAxial Motion0.030 inTorsional Stiffness769 lb-in/DegMoment of Inertia0.5904 lb-in²Maximum Speed10,000 RPMFull Bearing Support Required?YesZero-Backlash?YesBalanced DesignYesTorque WrenchTW:BT-4C-3/8-140Recommended Hex KeyMetric Hex KeysMaterial SpecificationHubs: 2024-T351 Bar, Disc Type 302 Stainless Steel, CTemperature-10°F to 150°F (-23°C to 65°C)Finish SpecificationSulfuric Anodized MIL-A-862 II, Class 2 and ASTM B580 Black AnodizeManufacturerRuland ManufacturingCountry of OriginUSAWeight (lbs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.Vote 3Performance ratings are for guidance only. The user must determine suitability for a particular appliceNote 3Performance ratings are for guidance only. The user must determine suitability for a particular appliceNote 4Torque ratings for the couplings are based on the physical limitations/failure point of the disc springs. In 	Length (L)	3.080 in	Hub Width (LH)	1.050 in
Screw FinishBlack OxideSeating Torque16 NmNumber of Screws2 eaDynamic Torque Reversing112.5 lb-inAngular Misalignment2.0°Dynamic Torque Non-Reversing225 lb-inParallel Misalignment0.012 inStatic Torque450 lb-inAxial Motion0.030 inTorsional Stiffness769 lb-in/DegMoment of Inertia0.5904 lb-in ² Maximum Speed10,000 RPMFull Bearing Support Required?YesZero-Backlash?YesBalanced DesignYesTorque WrenchTW:BT-4C-3/8-140Recommended Hex KeyMetric Hex KeysMaterial SpecificationHubs: 2024-T351 Bar, Disc Type 302 Stainless Steel, C Spacer: AcetalTemperature-10°F to 150°F (-23°C to 65°C)Finish SpecificationSulfuric Anodized MIL-A-862 II, Class 2 and ASTM B580 Black AnodizeManufacturerRuland ManufacturingCountry of OriginUSAWeight (Ibs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.Xote 2Note 3Performance ratings are for guidance only. The user must determine suitability for a particular applica normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. ncase, sepecially when the smallest standard bores are used or where shafts are undersized, slippag	Recommended Shaft Tolerance	+0.0000 in / -0.0005 in	Forged Clamp Screw	M6
Number of Screws2 eaDynamic Torque Reversing112.5 lb-inAngular Misalignment2.0°Dynamic Torque Non-Reversing225 lb-inParallel Misalignment0.012 inStatic Torque450 lb-inAxial Motion0.030 inTorsional Stiffness769 lb-in/DegMoment of Inertia0.5904 lb-in ² Maximum Speed10,000 RPMFull Bearing Support Required?YesZero-Backlash?YesBalanced DesignYesTorque WrenchTW:BT-4C-3/8-140Recommended Hex KeyMetric Hex KeysMaterial SpecificationHubs: 2024-T351 Bar, Disc Type 302 Stainless Steel, C Spacer: AcetalTemperature-10°F to 150°F (-23°C to 65°C)Finish SpecificationSulfuric Anodized MIL-A-862 II, Class 2 and ASTM B580 Black AnodizeManufacturerRuland ManufacturingCountry of OriginUSAWeight (lbs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.Note 2Note 2Torque ratings are at maximum misalignment.Note 3Performance ratings are for guidance only. The user must determine suitability for a particular applica normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. In cases, especially when the smallest standard bores are used or where shafts are undersized, slippage	Screw Material	Alloy Steel	Hex Wrench Size	5.0 mm
Angular Misalignment2.0°Dynamic Torque Non-Reversing225 lb-inParallel Misalignment0.012 inStatic Torque450 lb-inAxial Motion0.030 inTorsional Stiffness769 lb-in/DegMoment of Inertia0.5904 lb-in ² Maximum Speed10,000 RPMFull Bearing Support Required?YesZero-Backlash?YesBalanced DesignYesTorque WrenchTW:BT-4C-3/8-140Recommended Hex KeyMetric Hex KeysMaterial SpecificationHubs: 2024-T351 Bar, Disc Type 302 Stainless Steel, C Spacer: AcetalTemperature-10°F to 150°F (-23°C to 65°C)Finish SpecificationSulfuric Anodized MIL-A-866 II, Class 2 and ASTM B580 Black AnodizeManufacturerRuland ManufacturingCountry of OriginUSAWeight (lbs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.Note 2Note 3Performance ratings are for guidance on Jy. The user must determine suitability for a particular applica normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs.	Screw Finish	Black Oxide	Seating Torque	16 Nm
Parallel Misalignment0.012 inStatic Torque450 lb-inAxial Motion0.030 inTorsional Stiffness769 lb-in/DegMoment of Inertia0.5904 lb-in²Maximum Speed10,000 RPMFull Bearing Support Required?YesZero-Backlash?YesBalanced DesignYesTorque WrenchTW:BT-4C-3/8-140Recommended Hex KeyMetric Hex KeysMaterial SpecificationHubs: 2024-T351 Bar, DiscType 302 Stainless Steel, CSpacer: AcetalSulfuric Anodized MIL-A-862Temperature-10°F to 150°F (-23°C to 65°C)Finish SpecificationUSAManufacturerRuland ManufacturingCountry of OriginUSAWeight (lbs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.Note 2Note 2Torque ratings are at maximum misalignment.Torque ratings are for guidance only. The user must determine suitability for a particular applicaNote 3Performance ratings are for guidance only. The user must determine point of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. In cases, especially when the smallest standard bores are used or where shafts are undersized, slippag	Number of Screws	2 ea	Dynamic Torque Reversing	112.5 lb-in
Axial Motion0.030 inTorsional Stiffness769 lb-in/DegMoment of Inertia0.5904 lb-in²Maximum Speed10,000 RPMFull Bearing Support Required?YesZero-Backlash?YesBalanced DesignYesTorque WrenchTW:BT-4C-3/8-140Recommended Hex KeyMetric Hex KeysMaterial SpecificationHubs: 2024-T351 Bar, DiscTemperature-10°F to 150°F (-23°C to 65°C)Finish SpecificationHubs: 2024-T351 Bar, DiscTemperatureRuland ManufacturingCountry of OriginUSAWeight (lbs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.Note 2Torque ratings are at maximum misalignment.Note 3Performance ratings are for guidance only. The user must determine suitability for a particular applica normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical	Angular Misalignment	2.0°	Dynamic Torque Non-Reversing	225 lb-in
Moment of Inertia 0.5904 lb-in ² Maximum Speed 10,000 RPM Full Bearing Support Required? Yes Zero-Backlash? Yes Balanced Design Yes Torque Wrench TW:BT-4C-3/8-140 Recommended Hex Key Metric Hex Keys Material Specification Hubs: 2024-T351 Bar, Disc Type 302 Stainless Steel, C Spacer: Acetal Temperature -10°F to 150°F (-23°C to 65°C) Finish Specification Sulfuric Anodized MIL-A-862 II, Class 2 and ASTM B580 Black Anodize Mauufacturer Ruland Manufacturing Country of Origin USA Weight (lbs) 0.763200 UPC 634529112441 Tariff Code 8483.60.8000 UNSPC 31163008 Note 1 Stainless steel hubs are available upon request. Note 2 Note 3 Performance ratings are for guidance only. The user must determine suitability for a particular applica Note 4 Torque ratings for the couplings are based on the physical limitations/failure point of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. In cases, especially when the smallest standard bores are used or where shafts are undersized, slippag	Parallel Misalignment	0.012 in	Static Torque	450 lb-in
Full Bearing Support Required?YesZero-Backlash?YesBalanced DesignYesTorque WrenchTW:BT-4C-3/8-140Recommended Hex KeyMetric Hex KeysMaterial SpecificationHubs: 2024-T351 Bar, Disc Type 302 Stainless Steel, C Spacer: AcetalTemperature-10°F to 150°F (-23°C to 65°C)Finish SpecificationSulfuric Anodized MIL-A-862 II, Class 2 and ASTM B580 Black AnodizeManufacturerRuland ManufacturingCountry of OriginUSAWeight (lbs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.Note 3Note 3Performance ratings are for guidance only. The user must determine suitability for a particular applica normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. normal/typical conditions the hubs are uder of where shafts are undersized, slippag	Axial Motion	0.030 in	Torsional Stiffness	769 lb-in/Deg
Balanced DesignYesTorque WrenchTW:BT-4C-3/8-140Recommended Hex KeyMetric Hex KeysMaterial SpecificationHubs: 2024-T351 Bar, Disc Type 302 Stainless Steel, C Spacer: AcetalTemperature-10°F to 150°F (-23°C to 65°C)Finish SpecificationSulfuric Anodized MIL-A-862 II, Class 2 and ASTM B580 Black AnodizeManufacturerRuland ManufacturingCountry of OriginUSAWeight (lbs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.Note 2Note 3Performance ratings are for guidance only. The user must determine suitability for a particular applicaNote 4Torque ratings for the couplings are based on the physical limitations/failure point of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. In cases, especially when the smallest standard bores are used or where shafts are undersized, slippag	Moment of Inertia	0.5904 lb-in ²	Maximum Speed	10,000 RPM
Recommended Hex KeyMetric Hex KeysMaterial SpecificationHubs: 2024-T351 Bar, Disc Type 302 Stainless Steel, C Spacer: AcetalTemperature-10°F to 150°F (-23°C to 65°C)Finish SpecificationSulfuric Anodized MIL-A-862 II, Class 2 and ASTM B580 Black AnodizeManufacturerRuland ManufacturingCountry of OriginUSAWeight (lbs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.Note 2Note 3Performance ratings are for guidance only. The user must determine suitability for a particular applicaNote 4Torque ratings for the couplings are based on the physical limitations/failure point of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. Incases, especially when the smallest standard bores are used or where shafts are undersized, slippage	Full Bearing Support Required?	Yes	Zero-Backlash?	Yes
Type 302 Stainless Steel, C Spacer: AcetalTemperature-10°F to 150°F (-23°C to 65°C)Finish SpecificationSulfuric Anodized MIL-A-862 II, Class 2 and ASTM B580 Black AnodizeManufacturerRuland ManufacturingCountry of OriginUSAWeight (Ibs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.Note 2Note 2Torque ratings are at maximum misalignment.Note 3Note 3Performance ratings are for guidance only. The user must determine suitability for a particular applicat normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. In cases, especially when the smallest standard bores are used or where shafts are undersized, slippag	Balanced Design	Yes	Torque Wrench	<u>TW:BT-4C-3/8-140</u>
II, Class 2 and ASTM B580Black AnodizeManufacturerRuland ManufacturingCountry of OriginUSAWeight (Ibs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.31163008Note 2Torque ratings are at maximum misalignment.Veight (Ibs or a particular application of the disc springs.Note 3Performance ratings are for guidance only. The user must determine suitability for a particular application of the disc springs.Note 4Torque ratings for the couplings are based on the physical limitations/failure point of the disc springs.normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs.normal/typical conditions the hubs are undersized, slippag	Recommended Hex Key	<u>Metric Hex Keys</u>	Material Specification	Hubs: 2024-T351 Bar, Disc Springs: Type 302 Stainless Steel, Center Spacer: Acetal
Weight (lbs)0.763200UPC634529112441Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.31163008Note 2Torque ratings are at maximum misalignment.1000000000000000000000000000000000000	Temperature	-10°F to 150°F (-23°C to 65°C)	Finish Specification	Sulfuric Anodized MIL-A-8625 Type II, Class 2 and ASTM B580 Type B Black Anodize
Tariff Code8483.60.8000UNSPC31163008Note 1Stainless steel hubs are available upon request.Note 2Torque ratings are at maximum misalignment.Note 3Performance ratings are for guidance only. The user must determine suitability for a particular applicaNote 4Torque ratings for the couplings are based on the physical limitations/failure point of the disc springs.normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. In cases, especially when the smallest standard bores are used or where shafts are undersized, slippag	Manufacturer	Ruland Manufacturing	Country of Origin	USA
Note 1 Stainless steel hubs are available upon request. Note 2 Torque ratings are at maximum misalignment. Note 3 Performance ratings are for guidance only. The user must determine suitability for a particular applica Note 4 Torque ratings for the couplings are based on the physical limitations/failure point of the disc springs. In ormal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. In cases, especially when the smallest standard bores are used or where shafts are undersized, slippag	Weight (lbs)	0.763200	UPC	634529112441
Note 2 Torque ratings are at maximum misalignment. Note 3 Performance ratings are for guidance only. The user must determine suitability for a particular applica Note 4 Torque ratings for the couplings are based on the physical limitations/failure point of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. In cases, especially when the smallest standard bores are used or where shafts are undersized, slippag	Tariff Code	8483.60.8000	UNSPC	31163008
Note 3 Performance ratings are for guidance only. The user must determine suitability for a particular applica Note 4 Torque ratings for the couplings are based on the physical limitations/failure point of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. In cases, especially when the smallest standard bores are used or where shafts are undersized, slippag	Note 1	Stainless steel hubs are available upon request.		
Note 4Torque ratings for the couplings are based on the physical limitations/failure point of the disc springs. normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. In cases, especially when the smallest standard bores are used or where shafts are undersized, slippag	Note 2	Torque ratings are at maximum misalignment.		
normal/typical conditions the hubs are capable of holding up to the rated torque of the disc springs. In cases, especially when the smallest standard bores are used or where shafts are undersized, slippag	Note 3	Performance ratings are for guidance only. The user must determine suitability for a particular application.		
shaft is possible below the rated torque of the disc springs. Keyways are available to provide addition torque capacity in the shaft/hub connection when required. Please consult technical support for more	Note 4	normal/typical conditions the hubs a cases, especially when the smalles shaft is possible below the rated tor	are capable of holding up to the rated t standard bores are used or where s que of the disc springs. Keyways are	d torque of the disc springs. In some shafts are undersized, slippage on the e available to provide additional

B 45	assistance.			
Prop 65	WARNING This product can expose you to chemicals including Ethylene Thiourea and Nickel (metallic), known to the State of California to cause cancer, and Ethylene Thiourea known to the State of California to cause birth defects or other reproductive harm. For more information go to <u>www.P65Warnings.ca.gov</u> .			
Installation Instructions				
	 Align the bores of the DCDE36-20-14-A double disc coupling on the shafts that are to be joined and determine if the misalignment parameters are within the limits of the coupling. (<i>Angular Misialignment:</i> 2.0°, <i>Parallel Misalignment:</i> 0.012 in, <i>Axial Motion:</i> 0.030 in) Fully tighten the M6 screw on the first hub to the recommended seating torque of 16 Nm using a 5.0 mm hex torque wrench. Before tightening the screw on the second hub, rotate the coupling by hand to allow it to reach its free length. 			
	 Tighten the screw on the second hub to the recommended seating torque. Make sure the coupling remains axially relaxed and the misalignment angle remains centered along the length of the coupling. 			
	5. The shafts may extend into the relieved portion of the bore as long as it does not exceed the shaft penetration length of 1.050 in for bore 1 and 1.458 in for bore 2.			