

Bottle Capping Machine

Saab Convertible Top

Curtis Block and Pin Type U-Joints: The Universal Solution for Design Engineers

Curtis Universal Joints are used throughout the world, transmitting torque in everything from rugged U.S. weapons systems to sophisticated electronic equipment in Disney World's most famous animated characters. Every day, we uncover new applications, as designers specify Curtis joints into their plans for unique new products and equipment of all kinds.

Curtis wants to hear about your U-joint applications. If you are planning a new use for

Curtis U-joints or are currently using our products in a unique way, please write or call our engineering department to let us know.

Our design engineers also can provide you with excellent technical support. While this catalog will answer many of your questions, a quick call to our toll-free number will put you in touch with professionals who can help you specify the right joint size and materials for your next project.

successful joint efforts in every industry

- Amusement Devices
- Animated Characters
- Astronomical Instrument Controls
- Automated Silicon Wafer Manufacturing Equipment
- Automobile Convertible Top
- Bakery Equipment
- Boilers & Tube Expanders for Super Heaters
- Bookbinding Machinery
- Bowling Alley Cleaning and Pin-Spotting Equipment
- Box Manufacturing Machinery
- Bus Door Linkage Systems
- Can Manufacturing
- Chocolate Coating Machinery & Candy Manufacturing
- Coil Winding Machinery
- Commercial Industrial Scale Calibration Control Linkage
- Computer Printer Drives
- Conveyors & Conveying Equipment
- Corrugated Box Manufacturing
- Drives on Bottle Capping Equipment
- Drives on Bottle Cleaning Equipment
- Drives on Carousel for Custom Rock Concert Stages
- Drives on Grain Augers
- Dune Buggies
- Electronics
- Elevation & Train Systems
- Encoding Machinery for Specialized Printing
- Feed Roll Drives for Woodworking Machines
- Fire Apparatus
- Fire Truck and Cement Truck Remote Controls
- First-Class Airliner Seat Adjustment Drives
- Food Processing Equipment
- Fuel Metering Equipment in Jet Aircraft
- Glass Manufacturing Equipment
- Gluing Machinery Drives & Controls
- Golf Cart Accelerator Linkage
- Hamburger Patty Forming Machines
- Handicapped Van Controls
- Honing Machinery Drive Linkages
- Horizontal Boring Machine Drives
- Hospital Beds and Surgical Tables
- Industrial Furnace Damper/Register Linkage Controls
- Industrial Sewing Machines & Attachments

successful joint efforts (cont'd)

- Jig Boring Machine Drives & Controls
- Lifeline System Aboard Aircraft Carriers
- Machine Gun Systems on Fighter Aircraft
- Machine Tools
- Machinery for Dyeing Felt Hats
- Machinery for Removing Corn from Cob
- Mail Processing Equipment
- Marine Installation Valve Extensions & Throttle Controls
- Medical/Orthopedic Equipment
- Multi-Color Printing Machinery
- Multi-Spindle Drill Head Attachments
- Multi-Spindle Drills
- Operating Control Linkages
- Packaging & Canning Equipment
- Paper Bag & Paper Cup Manufacturing Equipment
- Paper Manufacturing Machinery
- Periscope Controls
- Plastic Injection Molding Machinery
- Potato Chip Machinery
- Power Station Furnace Damper Controls
- Printing Equipment Feeder Mechanisms
- Refineries & Chemical Plant Remote Controls
- Remote Controls on Nuclear Installations
- Remote Controls on Saw & Grinding Machinery
- Remote Linkages on Wind Box/Damper Controls on Large Boilers
- Remote Rigid Reach Rod Equipment Aboard Ships
- Remote Valve Actuators
- Resistance Welding Machinery
- Robotic Arms in Clean Room Environment
- Sheet Steel Leveling Equipment
- Shift Linkages on Stock Car Racers
- Ship Anchor Windlass Drives
- Solar Furnace Mirror Mountings
- Staunch System Aboard Carriers
- Steel Mill Machinery Levelers, Rolling Mills & Shears
- Steel Multi-Strip Forming Machine Drives
- Steering Column on Bradley Fighting Vehicle
- Steering Linkages on In-Plant Utility Vehicles
- Submarine Periscopes and Depth Control Valves
- Surgical & Medical Instruments
- Tensile Testing Equipment
- Textile Machinery
- Tobacco Cutting Machinery Knife Operating Devices
- Transformers - Power and Distribution Controls
- Trash Compactors
- Valve Actuators on Lawn & Garden Tractor Attachments
- Vertical Boring Mills

motion control

Here's Why Block & Pin U-Joints Are So Universal

When your design requires rotary or axial motion of a shaft or linkage, block and pin type universal joints are great problem-solvers.

Unlike needle-bearing joints formed from forgings or castings, block and pin joints are machined from barstock, providing increased tensile strength and a higher torque rating at a comparable size. Among the benefits: in tight spaces, you can transmit the torque you need using a smaller u-joint. This is a frequent solution for steel mill leveling roller applications, for example.

Double block and pin u-joints also give you extra versatility by accommodating severe angles. Take a look at the design problem at right (Around the Bend), which was called in to our engineers, for example.

When you have a special application challenge and need expert advice, call our Engineering Department at (888) 287-8477.

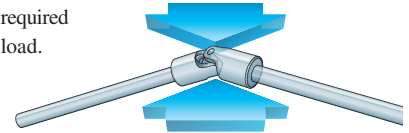
Tight Spot?

Problem

In steel mill leveling roller applications, there's not enough room for needle-bearing, cross-and-bearing type U-joints with torque ratings high enough to handle the required load.

Solution

Use Curtis block-and-pin type U-joints. Size for size, they transmit higher torques than needle-bearing joints.



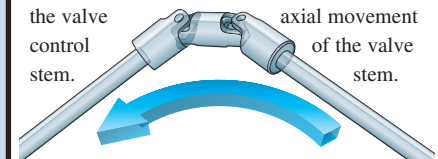
Around the Bend?

Problem

This metering valve needed axial and rotational stem movement, but its position deep inside a printing press prevented straight-line access to the valve control stem.

Solution

Standard Curtis double universal joints were used to connect and transmit torque through the linkage and metering valve with 60-degree shaft offsets. An internal hex in the joint accommodates axial movement of the valve stem.



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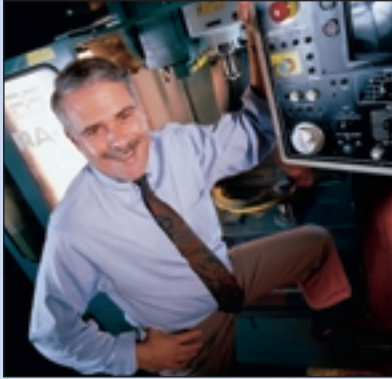


Curtis Universal Joint Company, Inc.
4 Birnie Avenue • Springfield, MA 01107 (413) 737-0281

TO ORDER OR FOR MORE INFORMATION: (888) 885-6468 fax (413) 737-8430 • www.curtisuniversal.com



curtis universal



The Leader in U-Joint Design For More Than 80 Years

Back in 1935, George V. Curtis, my great-grandfather, designed a way to disassemble and reassemble universal joints without the usual abuse of the joint. This revolutionary new idea **saved companies a great deal of time and money**, and fueled the founding of the Curtis Universal Joint Company.

Over the next eight decades, thousands of military, commercial and industrial end users would experience the ease and economy of our TakeApart design. Curtis U-joints are in use on L.A. Class, Trident and Sea Wolf submarines, aircraft carrier elevator systems, aircraft weapon systems and the Bradley Fighting Vehicle.

Today, Curtis prospers as a single-line manufacturer, selling both to industrial end users through distributors and to industrial/commercial O.E.M.'s. The company continues to focus on what we know best.

Curtis hallmarks are excellence in service, engineering and product quality — the very qualities that have gained our company a respected position in the power transmission market.

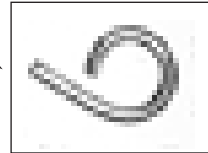
Richard M. Hartmann, Jr.

the TakeApart advantage - only from curtis

Only Curtis U-joints offer a quick and easy TakeApart feature which allows for simple disassembly, custom machining and reassembly with no damage to component parts. See page 20 for TakeApart instructions.



The Curtis exclusive Tell-Tale Lock Ring ensures firm, positive lockup of the entire assembly and facilitates quick disassembly and reassembly without the use of special tools.



special features for outstanding value

- **Quick and easy disassembly and reassembly**
allows for economical rework of U-joints in the field and replacement of worn parts on 7/8" outside diameter (O.D.) and larger.
- **No special tooling required**
for disassembly and reassembly.
- **Firm, positive lockup**
of the entire assembly thanks to Curtis' exclusive visible lock-ring design (the Curtis Tell-Tale Lock Ring).
- **Built-in lubrication passages**
with Curtis' exclusive internal lubrication system.
- **Lubrication covers (boots) available**
in all sizes to retain lubricants and keep out contaminants, extending the life of the joint. Curtis joints do not require grooves to be machined on hubs to retain boots.
- **Maximum wear with less galling and seizing**
because Curtis uses dissimilar materials on all bearing surfaces.
- **Soft hubs for easy machinability**
- **Smooth operation and longer life**
assured by close and well-controlled tolerances between mating parts and Curtis' built-in lubrication system.
- **Hubs ground on center**
for perfect concentricity. Centering holes are provided on solid hubs to aid in machining.
- **Operating angles**
of up to 35° on single joints and 70° on double joints.

STOCK PRODUCT AVAILABLE FOR SAME-DAY SHIPPING
STANDARD DIMENSION, STOCK UNIVERSAL JOINT PRODUCT FOR GUARANTEED DELIVERY*

Joint Diameter	ALLOY STEEL PRODUCT NUMBER						303 STAINLESS STEEL PRODUCT NUMBER					
	SINGLE JOINTS			DOUBLE JOINTS			SINGLE JOINTS			DOUBLE JOINTS		
	Solid	Standard Bore	Std. Bore w/Keyway & One Set Screw Each Hub	Solid	Standard Bore	Std. Bore w/Keyway & One Set Screw in Each End Hub	Solid	Standard Bore	Std. Bore w/Keyway & One Set Screw Each Hub	Solid	Standard Bore	Std. Bore w/Keyway & One Set Screw in Each End Hub
3/8"	CJ641	CJ641B	CJ641B1SS**	CJ641D	CJ641DB	CJ641DB1SS**	SS641	SS641B	SS641B1SS**	SS641D	SS641DB	SS641DB1SS**
1/2"	CJ642	CJ642B	CJ642B1SS**	CJ642D	CJ642DB	CJ642DB1SS**	SS642	SS642B	SS642B1SS**	SS642D	SS642DB	SS642DB1SS**
5/8"	CJ643	CJ643B	CJ643BKW1SS	CJ643D	CJ643DB	CJ643DBKW1SS	SS643	SS643B	SS643BK1SS	SS643D	SS643DB	SS643DBK1SS
3/4"	CJ644	CJ644B	CJ644BKW1SS	CJ644D	CJ644DB	CJ644DBKW1SS	SS644	SS644B	SS644BK1SS	SS644D	SS644DB	SS644DBK1SS
7/8"	CJ645	CJ645B	CJ645BKW1SS	CJ645D	CJ645DB	CJ645DBKW1SS	SS645	SS645B	SS645BK1SS	SS645D	SS645DB	SS645DBK1SS
1"	CJ646	CJ646B	CJ646BKW1SS	CJ646D	CJ646DB	CJ646DBKW1SS	SS646	SS646B	SS646BK1SS	SS646D	SS646DB	SS646DBK1SS
1-1/8"	CJ647	CJ647B	CJ647BKW1SS	CJ647D	CJ647DB	CJ647DBKW1SS	SS647	SS647B	SS647BK1SS	SS647D	SS647DB	SS647DBK1SS
1-1/4"	CJ648	CJ648B	CJ648BKW1SS	CJ648D	CJ648DB	CJ648DBKW1SS	SS648	SS648B	SS648BK1SS	SS648D	SS648DB	SS648DBK1SS
1-1/2"	CJ650	CJ650B	CJ650BKW1SS	CJ650D	CJ650DB	CJ650DBKW1SS	SS650	SS650B	SS650BK1SS	SS650D	SS650DB	SS650DBK1SS
1-3/4"	CJ651	CJ651B	CJ651BKW1SS	CJ651D	CJ651DB	CJ651DBKW1SS	SS651	SS651B	SS651BK1SS	SS651D	SS651DB	SS651DBK1SS
2"	CJ652	CJ652B	CJ652BKW1SS	CJ652D	CJ652DB	CJ652DBKW1SS	SS652	SS652B	SS652BK1SS	SS652D	SS652DB	SS652DBK1SS
2-1/2"	CJ653	CJ653B	CJ653BKW1SS	CJ653D	CJ653DB	CJ653DBKW1SS	SS653	SS653B	SS653BK1SS	SS653D	SS653DB	SS653DBK1SS
3"	CJ654	CJ654B	CJ654BKW1SS	CJ654D	CJ654DB	CJ654DBKW1SS	SS654	SS654B	SS654BK1SS	SS654D	SS654DB	SS654DBK1SS
4"	CJ655	CJ655B	CJ655BKW1SS	CJ655D	CJ655DB	CJ655DBKW1SS	SS655	SS655B	SS655BK1SS	SS655D	SS655DB	SS655DBK1SS

* Subject to details and restrictions printed below. ** Furnished with one (1) set screw each hub only (no keyway)

14 Sizes For SAME DAY SHIPPING

Did you know that we offer same day shipping? Curtis carries in stock at all times 14 sizes of single and double joints with solid and bored hubs, as well as "turn-key" joints in both alloy steel and stainless steel in outside diameters of 3/8" to 4". Order any of these in-stock items listed in the chart above by 3:00 E.T. Monday through Friday, and we'll ship your order same day. **Call 888-885-6468.**

'Turn-Key' Joints in Stock

Ready-to-use joints with standard bores and keyways with set screws installed are available for immediate delivery. Contact your Curtis distributor or call Curtis for current availability.

Special Materials Available

Curtis also offers joints in most stainless steel grades and many other non-corrosive and special-application materials. Certified material

options include Alloy Steel, Stainless Steel, Naval Brass, Aluminum-Bronze, Nickel-Aluminum-Bronze and Monel, all to ASTM, U.S. Government military or federal specifications, as required.

Curtis Will Custom Design

Curtis' experienced power transmission specialists will design and manufacture to meet your performance objectives and individual requirements. We can manufacture special lengths longer or shorter than standard units and also provide: keyways • set screw holes • broaching • turned O.D.'s • flanges • threading • milled slots • splines • slip shafts • EDM machining • welding • special bores • hexes, and other special machining. For special applications, we suggest you call us at 888-287-8477.

U N I V E R S A L

Bowling Pin Setters

Test Stands

Bakery Equipment

Fire Apparatus

Handicapped Vans

A P P L I C A T I O N S

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alloy steel single joints

U N I V E R S A L

Stock Car Racers

Nuclear Installations

Tractor Attachments

In-Plant Utility Vehicles

Grain Augers

A P P L I C A T I O N S



Curtis Carries a Complete Line of Universal Joints in 14 O.D. Sizes

To assure you of prompt service, Curtis stocks at all times 14 sizes of joints with solid and bored hubs.

Standard alloy steel Curtis Turn-Key Joints are also available from stock, and are ready for installation with standard bores, keyways and set screws already installed.

Curtis Alloy Steel Joints employ the use of leaded alloys for all major component parts of their joints. The use of leaded materials greatly improves the machinability of these alloys.

Curtis Alloy Steel Joints feature 4140-grade steel for all forks. Forks of 7/8" diameter and larger have induction-hardened bearing areas for strength and durability. The body (hubs) of the joints remain in an annealed state, which affords

free machinability. Center blocks and pins are machined from 8620 alloy steel. Center-blocks and pins are carburized and case hardened to generate superior wear characteristics yet remain ductile, thereby enabling the joint to handle shock loads without experiencing premature failure.

For assistance in ordering your universal joints, please refer to Curtis' How to Order instructions on page 19. To check the static torque rating, dimensions, weight and other specific characteristics of Standard Curtis Alloy Steel Joints, please refer to the Selection Guides for single, double and Turn-Key joints.



SELECTION GUIDE - ALLOY STEEL BLOCK AND PIN TYPE STANDARD SINGLE JOINTS

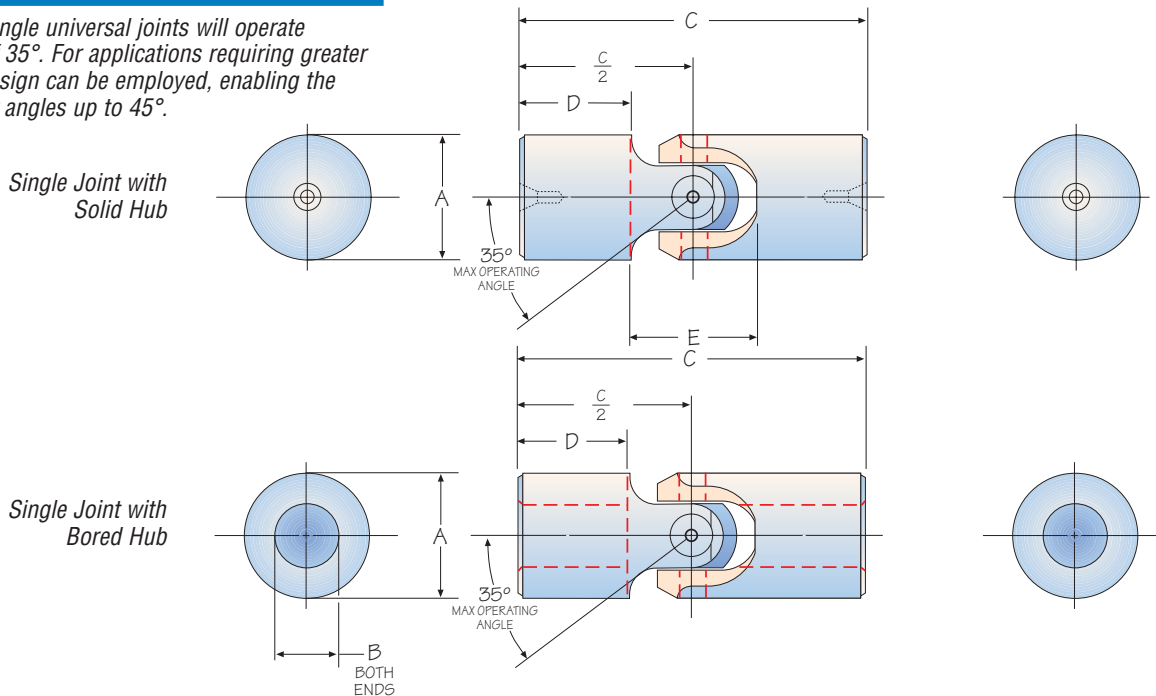
MEET MILITARY SPEC. MIL-U-20625A, CLASS A

SINGLE JOINTS		BREAKING LOADS		DIMENSIONS OF STANDARD JOINTS IN INCHES					APPROXIMATE WEIGHT IN POUNDS	
Standard Solid Hub	Standard Bored Hubs Bore 1/2 of O.D.	Static Torque Rating	Compression or Tension Load	Outside Dia. "A"	Bore Dia. "B"	Total Length "C"	Hub/Bore Length "D"	Shaft to Shaft Distance "E"	Solid Hubs	Bored Hubs
Cat. No.	Cat. No.	Inch Pounds	Pounds	+ .000 - .003	± .001	±1/64 **±1/32	±1/64			
CJ641	CJ641B	140	—	3/8"	3/16"	1-3/4"	11/16"	3/8"	.05	.04
CJ642	CJ642B	425	1200	1/2"	1/4"	2"	3/4"	1/2"	.10	.08
CJ643	CJ643B	900	2000	5/8"	5/16"	2-1/4"	13/16"	5/8"	.18	.14
CJ644	CJ644B	1610	3200	3/4"	3/8"	2-11/16"	31/32"	3/4"	.30	.24
CJ645	CJ645B	1800	4600	7/8"	7/16"	3"	1-1/32"	15/16"	.45	.31
CJ646	CJ646B	3050	5600	1"	1/2"	3-3/8"	1-3/16"	1"	.66	.50
CJ647	CJ647B	3500	6000	1-1/8"	9/16"	3-1/2"	1-7/32"	1"	.88	.69
CJ648	CJ648B	5500	8800	1-1/4"	5/8"	3-3/4"	1-1/4"	1-1/4"	1.15	.88
CJ650	CJ650B	9000	14000	1-1/2"	3/4"	4-1/4"	1-11/32"	1-9/16"	1.81	1.44
CJ651	CJ651B	14000	18000	1-3/4"	7/8"	**5"	1-9/16"	1-7/8"	2.86	2.31
CJ652	CJ652B	22000	25000	2"	1"	**5-7/16"	1-5/8"	2-3/16"	4.06	3.31
CJ653	CJ653B	32000	35000	2-1/2"	1-1/4"	**7"	2-3/32"	2-13/16"	8.25	6.81
CJ654	CJ654B	55000	—	3"	1-1/2"	**9"	2-27/32"	3-5/16"	15.25	12.5
CJ655	CJ655B	131000	—	4"	2"	**10-5/8"	3-1/8"	4-3/8"	31.3	25.8

Universal joint hub modifications are available in metric, which include but may not be limited to bores, keyways, set screw holes, square holes and hex holes. Contact the Curtis sales department for more information.

note:

Curtis standard single universal joints will operate through angles of 35°. For applications requiring greater angles, special design can be employed, enabling the joint to operate at angles up to 45°.



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turn-key / ready-to-use joints

U N I V E R S A L

Tractor Steering

Commercial Ovens

Bowling Alley Cleaning

Missile Containers

Snow Blowers

A P P L I C A T I O N S



Curtis Bored Hub Universal Joints Are Even Simpler to Install

Manufacturers choose our TakeApart™ design for easy installation. But in some cases, Curtis Joints don't have to be disassembled at all! We supply a complete line of standard bored joints outfitted with standard keyways and set screws already installed. Talk about ease of matching connecting shafts! We call these U-joints Turn-Key Joints because they truly are complete and ready to go.

In alloy steel, we have all standard sizes

available in stock, ranging from 3/8" to 4" O.D. with standard bores (one-half of the O.D.), keyways and installed set screws. The 3/8" and 1/2" joints come with set screws only, while other standard O.D. sizes include keyways. Joints 7/8" or larger have Curtis' simple TakeApart feature to allow for more specialized modification.

Our large inventory allows O.E.M.'s and users delivery on demand.



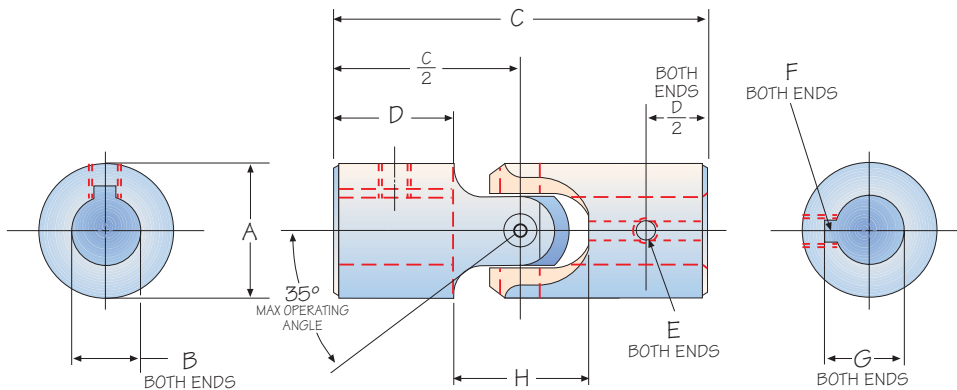
SELECTION GUIDE - TURN-KEY JOINTS ALLOY STEEL TURN-KEY / READY-TO-USE CURTIS JOINTS

MEET MILITARY SPEC. MIL-U-20625A, CLASS A

Universal joint hub modifications are available in metric, which include but may not be limited to bores, keyways, set screw holes, square holes and hex holes. Contact the Curtis sales department for more information.

SINGLE JOINTS		BREAKING LOADS		DIMENSIONS OF STANDARD JOINTS IN INCHES							APPROX. WEIGHT IN POUNDS
Standard Bored Hubs w/ Keyway & 1 Set Screw Ea. End*	Static Torque Rating	Compression or Tension Load	Outside Dia. "A"	Bore Dia. "B"	Total Length "C"	Hub/Bore Length "D"	Set Screw Size "E"	Keyway Size "F"	Far Side to Bottom of K/W "G"	Shaft to Shaft Distance "H"	
Cat. No.	Inch Pounds	Pounds	+0.000 -0.003	±.001	±1/64 **±1/32	±1/64	Unified Std. Threads Class 3B	Commercial Tolerance	+0.010 -0.000		
CJ641B1SS*	140	—	3/8"	3/16"	1-3/4"	11/16"	2-56 NC	—	—	3/8"	.04
CJ642B1SS*	425	1200	1/2"	1/4"	2"	3/4"	4-40 NC	—	—	1/2"	.08
CJ643BK1SS	900	2000	5/8"	5/16"	2-1/4"	13/16"	10-32 NF	3/32" x 3/64"	.352"	5/8"	.14
CJ644BKW1SS	1610	3200	3/4"	3/8"	2-11/16"	31/32"	10-32 NF	3/32" x 3/64"	.416"	3/4"	.24
CJ645BKW1SS	1800	4600	7/8"	7/16"	3"	1-1/32"	10-32 NF	3/32" x 3/64"	.480"	15/16"	.31
CJ646BKW1SS	3050	5600	1"	1/2"	3-3/8"	1-3/16"	1/4-20 NC	1/8" x 1/16"	.555"	1"	.50
CJ647BKW1SS	3500	6000	1-1/8"	9/16"	3-1/2"	1-7/32"	1/4-20 NC	1/8" x 1/16"	.618"	1"	.69
CJ648BKW1SS	5500	8800	1-1/4"	5/8"	3-3/4"	1-1/4"	5/16-18 NC	3/16" x 3/32"	.705"	1-1/4"	.88
CJ650BKW1SS	9000	14000	1-1/2"	3/4"	4-1/4"	1-11/32"	5/16-18 NC	3/16" x 3/32"	.832"	1-9/16"	1.44
CJ651BKW1SS	14000	18000	1-3/4"	7/8"	**5"	1-9/16"	5/16-18 NC	3/16" x 3/32"	.958"	1-7/8"	2.31
CJ652BKW1SS	22000	25000	2"	1"	**5-7/16"	1-5/8"	3/8-16 NC	1/4" x 1/8"	1.109"	2-3/16"	3.31
CJ653BKW1SS	32000	35000	2-1/2"	1-1/4"	**7"	2-3/32"	3/8-16 NC	1/4" x 1/8"	1.363"	2-13/16"	6.81
CJ654BKW1SS	55000	—	3"	1-1/2"	**9"	2-27/32"	1/2-13 NC	3/8" x 3/16"	1.663"	3-5/16"	12.5
CJ655BKW1SS	131000	—	4"	2"	**10-5/8"	3-1/8"	1/2-13 NC	1/2" x 1/4"	2.219"	4-3/8"	25.8

* Furnished with one (1) set screw each hub only (no keyway)



note:

Curtis standard single universal joints will operate through angles of 35°. For applications requiring greater angles, special design can be employed, enabling the joint to operate at angles up to 45°.

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U N I V E R S A L

Concert Stages

Animated Characters

Conveyor Equipment

Clean Room Robotics

Hospital Equipment

A P P L I C A T I O N S

Universal joint hub modifications are available in metric, which include but may not be limited to bores, keyways, set screw holes, square holes and hex holes. Contact the Curtis sales department for more information.



Curtis Double Joints Afford Extra Angularity

Curtis double joints are available in 14 sizes, and share all of the advantages of Curtis single U-joints. Features include:

- **Extra angularity** allows standard units to operate at angles up to 70°.
- **Quick and easy TakeApart™ design** for easy and economical disassembly and reassembly, with no special tooling required.
- **Firm, positive lockup** of the entire assembly thanks to Curtis' exclusive Tell-Tale Lock Ring.
- **Built-in lubrication passages** with Curtis' exclusive internal lubrication system.
- **Lubrication covers (boots)** available in all sizes to retain lubrication and keep out contaminants, extending the life of the joint. Curtis Joints do not require grooves on hubs to retain boots.
- **Less galling and seizing** because Curtis uses dissimilar materials on all bearing surfaces.
- **Maximum wear and strength** from Curtis' induction hardened forks.
- **Easy machinability** due to Curtis' soft hubs.
- **Smooth operations and longer life** assured by close and well-controlled tolerances between mating parts and Curtis' built-in lubrication system.
- **Perfect concentricity** with hubs ground on center and centering holes provided on solid hubs to aid in machining.

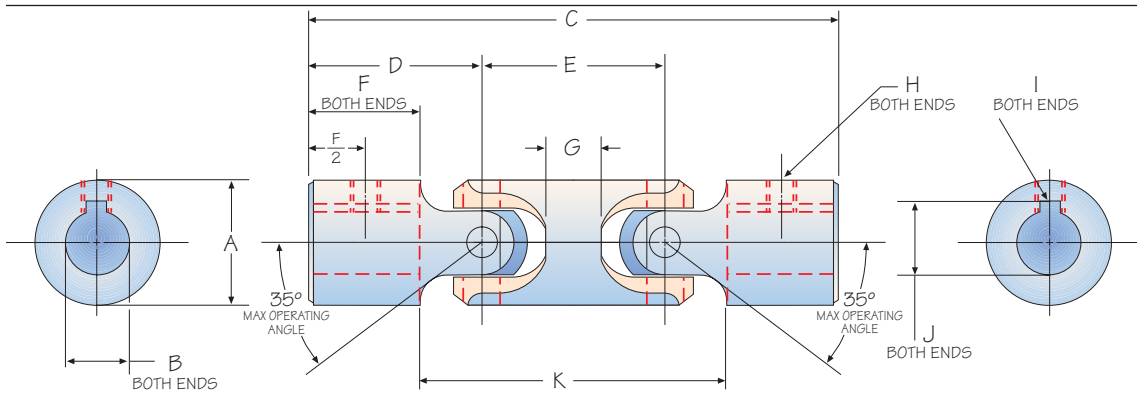
SELECTION GUIDE - ALLOY STEEL BLOCK AND PIN TYPE STANDARD DOUBLE JOINTS

MEET MILITARY SPEC. MIL U-20625A, CLASS A

DOUBLE JOINTS			BREAKING LOADS		DIMENSIONS OF STANDARD JOINTS IN INCHES											APPROXIMATE WEIGHT IN POUNDS	
Standard Solid Hub	Standard Bored Hubs Bore 1/2 of O.D.	Standard Bored Hubs w/ Keyway & 1 Set Screw Ea. End*	Static Torque Rating	Compression or Tension Load	Outside Dia. "A"	Bore Dia. "B"	Total Length "C"	End Fork Lengths "D"	Centerline to Centerline Dim. "E"	Hub/Bore Length "F"	Center Sect. Hub Length "G"	Set Screw Size "H"	Keyway Size "I"	Far side to bottom of K/W "J"	Shaft to Shaft Distance "K"	Solid Hubs	Bored Hubs
Cat. No.	Cat. No.	Cat. No.	Inch Pounds	Pounds	+ .000 - .003	± .001	±1/32 **±3/64	± .010	± .010	±1/64	±1/64	Unified Std. Threads Class 3B	Commercial Tolerance	+ .010 - .000			
CJ641D	CJ641DB	CJ641DB1SS*	140	—	3/8"	3/16"	2-7/16"	7/8"	11/16"	11/16"	5/16"	2-56 NC	—	—	1-1/16"	.07	.06
CJ642D	CJ642DB	CJ642DB1SS*	425	1200	1/2"	1/4"	2-13/16"	1.0"	13/16"	3/4"	5/16"	4-40 NC	—	—	1-5/16"	.14	.12
CJ643D	CJ643DB	CJ643DBKW1SS	900	2000	5/8"	5/16"	3-1/4"	1-1/8"	1.0"	13/16"	3/8"	10-32 NF	3/32" x 3/64"	.352"	1-5/8"	.26	.22
CJ644D	CJ644DB	CJ644DBKW1SS	1610	3200	3/4"	3/8"	3-13/16"	1-11/32"	1-1/8"	31/32"	3/8"	10-32 NF	3/32" x 3/64"	.416"	1-7/8"	.43	.37
CJ645D	CJ645DB	CJ645DBKW1SS	1800	4600	7/8"	7/16"	4-3/8"	1-1/2"	1-3/8"	1-1/32"	7/16"	10-32 NF	3/32" x 3/64"	.480"	2-5/16"	.64	.50
CJ646D	CJ646DB	CJ646DBKW1SS	3050	5600	1.0"	1/2"	4-7/8"	1-11/16"	1-1/2"	1-3/16"	1/2"	1/4-20 NC	1/8" x 1/16"	.555"	2-1/2"	.91	.75
CJ647D	CJ647DB	CJ647DBKW1SS	3500	6000	1-1/8"	9/16"	5-1/8"	1-3/4"	1-5/8"	1-7/32"	9/16"	1/4-20 NC	1/8" x 1/16"	.618"	2-5/8"	1.22	1.04
CJ648D	CJ648DB	CJ648DBKW1SS	5500	8800	1-1/4"	5/8"	5-5/8"	1-7/8"	1-7/8"	1-1/4"	5/8"	5/16-18 NC	3/16" x 3/32"	.705"	3-1/8"	1.65	1.38
CJ650D	CJ650DB	CJ650DBKW1SS	9000	14000	1-1/2"	3/4"	6-9/16"	2-1/8"	2-5/16"	1-11/32"	3/4"	5/16-18 NC	3/16" x 3/32"	.832"	3-7/8"	2.69	2.32
CJ651D	CJ651DB	CJ651DBKW1SS	14000	18000	1-3/4"	7/8"	**7-3/4"	2-1/2"	2-3/4"	1-9/16"	7/8"	5/16-18 NC	3/16" x 3/32"	.958"	4-5/8"	4.27	3.72
CJ652D	CJ652DB	CJ652DBKW1SS	22000	25000	2.0"	1.0"	**8-5/8"	2-23/32"	3-3/16"	1-5/8"	1.0"	3/8-16 NC	1/4" x 1/8"	1.109"	5-3/8"	6.12	5.37
CJ653D	CJ653DB	CJ653DBKW1SS	32000	35000	2-1/2"	1-1/4"	**11-1/16"	3-1/2"	4-1/16"	2-3/32"	1-1/4"	3/8-16 NC	1/4" x 1/8"	1.363"	6-7/8"	12.34	10.90
CJ654D	CJ654DB	CJ654DBKW1SS	55000	—	3"	1-1/2"	**13-13/16"	4-1/2"	4-13/16"	2-27/32"	1-1/2"	1/2-13 NC	3/8" x 3/16"	1.663"	8-1/8"	22.22	19.47
CJ655D	CJ655DB	CJ655DBKW1SS	131000	—	4"	2.0"	**17"	5-5/16"	6-3/8"	3-1/8"	2.0"	1/2-13 NC	1/2" x 1/4"	2.219"	10-3/4"	47.61	42.11

All above configurations also available in 303 stainless steel.

* Furnished with one (1) set screw each hub only (no keyway)



note:

Dimension "E" as shown above is the shortest length center section that Curtis manufactures. Longer than standard center sections can be made per customer needs. Contact Curtis with your requirements.

Curtis standard double universal joints will operate through angles of 70°. For applications requiring greater angles, special design can be employed, enabling the joint to operate at angles up to 90°.

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A P P L I C A T I O N S



Curtis Carries Corrosion-Resistant Joints For Special Applications

Many applications require corrosion-resistant universal joints to assure sanitation or to avoid premature oxidation or deterioration. Curtis stainless steel U-joints are particularly important, for example, to industries that use food processing equipment, and for machinery that comes in contact with corrosive chemicals or is exposed to water for long periods. Furnace applications also benefit from stainless steel, which better withstands high temperatures and other environmental extremes.

Curtis offers:

- 14 standard O.D. sizes
- 3/8" to 4" diameter
- 303 grade stainless steel in stock
- 304, 316 and other grades available by special order

For assistance in ordering your universal joints, please refer to the Curtis How to Order instructions on page 19. To check the static torque rating, weight and other characteristics of Standard Curtis Stainless Steel joints, please refer to the Selection Guide for single joints on page 13.

SELECTION GUIDE - STAINLESS STEEL SINGLE JOINTS 18-8 TYPE 303 STAINLESS, NON-MAGNETIC

MEET MILITARY SPEC. MIL-U-20625A, CLASS C

SOLID OR STANDARD BORED JOINTS		SOLID HUBS		STANDARD BORED HUBS, 1/2 OF O.D. ± .0001"	
Joint Diameter Tol ± .020"	Max. Static Torque Inch Pounds*	Catalog Number	Approx. Weight in Pounds	Catalog Number	Approx. Weight in Pounds
3/8"	100	SS641	.05	SS641B	.04
1/2"	375	SS642	.10	SS642B	.08
5/8"	610	SS643	.18	SS643B	.14
3/4"	1000	SS644	.30	SS644B	.24
7/8"	1350	SS645	.45	SS645B	.31
1"	1900	SS646	.66	SS646B	.50
1-1/8"	2200	SS647	.88	SS647B	.69
1-1/4"	3600	SS648	1.15	SS648B	.88
1-1/2"	7200	SS650	1.81	SS650B	1.44
1-3/4"	10700	SS651	2.86	SS651B	2.31
2"	15500	SS652	4.06	SS652B	3.31
2-1/2"	21000	SS653	8.25	SS653B	6.81
3"	34000	SS654	15.25	SS654B	12.50
4"	81000	SS655	31.30	SS655B	25.80

* Static Torque to 10° Deflection in Inch Pounds

Universal joint hub modifications are available in metric, which include but may not be limited to bores, keyways, set screw holes, square holes and hex holes. Contact the Curtis sales department for more information.

Joins Can Be Ordered with Protective Lubrication Covers (Boots)

Curtis inventories lubrication covers (boots) that can be installed at Curtis or on site. Curtis boots are recommended where harsh environments exist or where lubrication retention is a problem. Curtis joints do not require grooves to be machined on hubs to retain boots. **See our Boot Kits Selection Guide on page 17 for further details.**

note:

Stainless steel joints are dimensionally the same as alloy steel joints, except for O.D. tolerance. Use the Selection Guide above for O.D. tolerance; see the Selection Guide for Alloy Steel Joints on page 7 for additional details.

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A P P L I C A T I O N S



Non-Corrosive and Special Material Joints Will Handle Especially Rugged Jobs

For marine and other applications which require unusually high non-corrosion standards, Curtis provides universal joints and parts in Alloy Steel, Stainless Steel, Bronze, Naval Brass, Aluminum-Bronze, Nickel-Aluminum-Bronze and Monel.

For assistance in ordering your universal joints and to determine the availability of special materials, call Curtis Universal at 888-885-6468

Use the Selection Guide provided on page 15 to check the dimensions, weight, and static torque rating of Curtis universal joints in naval brass.

We are always prepared to help you specify joints for special applications. Please call at any time for assistance in determining the torque rating or other specifications required for your particular application.

SELECTION GUIDE - NAVAL BRASS JOINTS
NAVY SPEC. MIL-N-994, COMP. A
 MEET MILITARY SPEC. MIL-U-20625A, CLASS B

*Curtis Inventories
 Naval Brass Joints in
 Popular Sizes. Call to
 Check Availability.*

SOLID OR STANDARD BORED JOINTS		SOLID HUBS		STANDARD BORED HUBS, 1/2 OF O.D. ± .001"	
Joint Diameter Tol. ± .020"	Max. Static Torque Inch Pounds*	Catalog Number	Approx. Weight in Pounds	Catalog Number	Approx. Weight in Pounds
3/8"	75	BZ641	.06	BZ641B	.05
1/2"	200	BZ642	.11	BZ642B	.09
5/8"	470	BZ643	.20	BZ643B	.16
3/4"	750	BZ644	.33	BZ644B	.27
7/8"	900	BZ645	.50	BZ645B	.34
1"	1600	BZ646	.73	BZ646B	.55
1-1/8"	1900	BZ647	.97	BZ647B	.76
1-1/4"	2900	BZ648	1.27	BZ648B	.97
1-1/2"	4700	BZ650	1.99	BZ650B	1.58
1-3/4"	8800	BZ651	3.15	BZ651B	2.54
2"	13000	BZ652	4.47	BZ652B	3.64
2-1/2"	16000	BZ653	9.08	BZ653B	7.49
3"	28000	BZ654	16.78	BZ654B	13.75
4"	65000	BZ655	34.43	BZ655B	28.38

*Universal joint hub
 modifications are
 available in metric,
 which include but may
 not be limited to bores,
 keyways, set screw
 holes, square holes
 and hex holes.
 Contact the Curtis
 sales department for
 more information.*

* Static Torque to 10° Deflection in Inch Pounds

note:

Naval brass joints are dimensionally the same as alloy steel joints, except for O.D. tolerance. Use the Naval Brass Selection Guide above for O.D. tolerance; see the Selection Guide for Alloy Steel Joints on page 7 for additional details.

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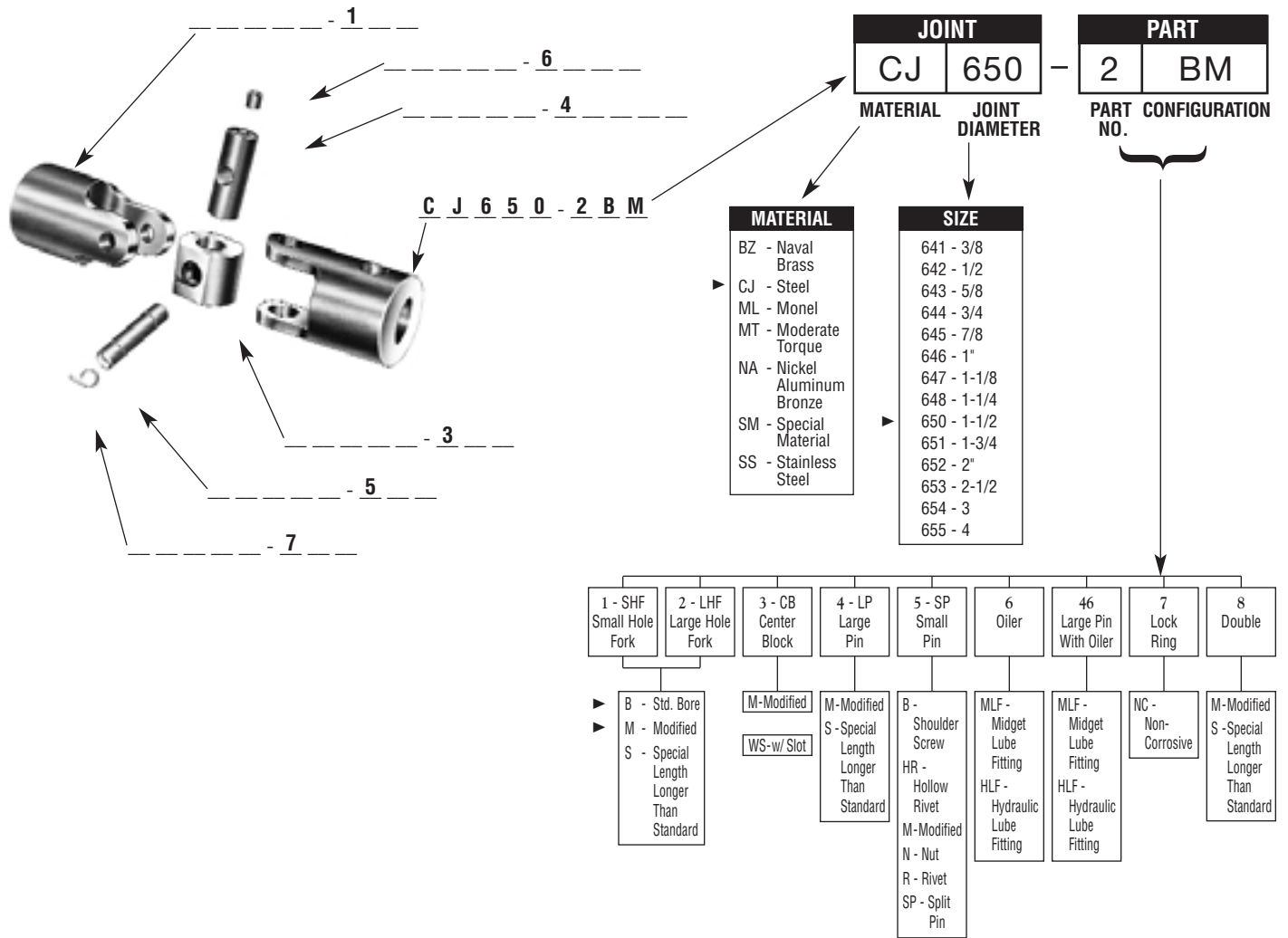


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curtis universal joint component part identification



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Railroad Cars

APPLICATIONS

Choosing the Correct Component Part Is as Easy as a Phone Call

Curtis Universal maintains an inventory of all component parts that, if required, can be readily machined to customer specifications.

In addition, boot kits which ensure joint lubrication and eliminate contaminants are available. To order a boot kit, refer to the Selection Guide on page 17.

For special assistance in ordering replacement parts for your joints, call Curtis Universal at 888-885-6468.

Lubrication information

What You Should Know About Lubrication If You Intend to Machine Your Part

Curtis furnishes universal joints with hubs in a machineable state. Our patented disassembly feature allows for

special machining in the field, where required. Our joints are shipped unlubricated, which allows you to disassemble and machine your joint without degreasing the parts. This also enables you to utilize your preferred brand of lubrication.

For lubricating the bearing area of the joint,

Curtis employs a ball spring oil fitting in its 1" through 4" diameter universal joints. Special flush type and hydraulic grease fittings are available upon request. Contact Curtis for assistance in determining the proper fitting for your application.

The individual parts of a universal joint should be

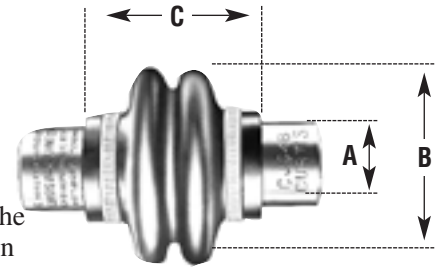
well-lubricated at all times. This allows the parts to easily oscillate or slide on each other.

We recommend that the universal joints be lubricated with a molybdenum disulfide (MoS₂)-based, free-flowing lubricant prior to use and every 40-50 operating hours thereafter.

SELECTION GUIDE BLOCK & PIN UNIVERSAL JOINT BOOT KITS			
Part No.	Universal Joint Dia. "A"	Max. Outside Diameter "B"	Overall Length "C"
CJ641-9K	3/8"	1-1/32"	1-1/32"
CJ642-9K	1/2"	1-1/4"	1-5/16"
CJ643-9K	5/8"	1-1/2"	1-7/16"
CJ644-9K	3/4"	1-15/32"	1-9/16"
CJ645-9K	7/8"	2"	1-13/16"
CJ646-9K	1"	2"	2-1/8"
CJ647-9K	1-1/8"	2-9/16"	2-7/16"
CJ648-9K	1-1/4"	2-37/64"	2-1/2"
CJ650-9K	1-1/2"	2-25/32"	3-1/4"
CJ651-9K	1-3/4"	3-1/32"	3-3/4"
CJ652-9K	2"	3-1/2"	4-3/16"
CJ653-9K	2-1/2"	5-1/2"	4-7/8"
CJ654-9K	3"	6"	5-5/8"
CJ655-9K	4"	6-7/8"	6-5/8"

No Grooves on Hub of Joint Needed to Retain Boot!

For both intermittent and continuously rated joints where lubrication such as an oil bath is not available, we recommend the use of boots suitable for grease packing to retain lubricant and keep out contaminants. These are available in kits for all sizes of single joints, and can be used in pairs on the double joint. Curtis boots do not require grooves on the hub of the joint to hold the boot in place.



Curtis Boot Kits consist of one boot and two ties. Part numbers may be obtained on the Selection Guide provided here.

Curtis Boots are typically manufactured from a polyvinyl chloride rubber blend which is impervious to ozone and is ultraviolet stabilized. Our boots have a useful temperature range of minus 60°F to plus 220°F. **Custom Design Boots Available**

Curtis will manufacture boots per your drawing requirements to meet your operating criteria or will design and fabricate boots to meet your specific needs. Send your requirements to Curtis, or contact Curtis' engineering department direct at 888-287-8477 for assistance in specifying a boot for your application.

Special Materials Available

Curtis can provide boots manufactured from various materials. Contact Curtis' engineering department for a list of available materials or advise them of your operating environment and they will specify a material for your application.

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C determining the proper joint size

UNIVERSAL

Lawn Tractors

Trash Compactors

Dune Buggies

Sound Film Apparatus

Conveyors

APPLICATIONS

Calculating the Joint Size Required

One way of determining the outside diameter (O.D.) size of the joint required is to measure the O.D. of the block and pin type joint you are replacing. You may also measure the shaft, which is generally equal to one-half the diameter. For powered applications, we recommend that the inside diameter (I.D.) of the joint not exceed 60% of the O.D.

If it is more appropriate to select the joint size taking into account its operating criteria, follow these steps:

1. Multiply RPM of the joint times the angle at which the joint will be operating. This yields the speed/angle factor.
2. With that result, select the corresponding operating use factor from the use factor table provided here. If the result exceeds 15,000, the speed/angle factor is too severe for a block and pin-type universal joint.
3. Calculate the input load on the joint:

$$\text{Input Load (Inch Lbs.)} = \frac{63,000 \times \text{H.P.}}{\text{RPM}}$$
4. Multiply the operating use factor times the input load to obtain the required static torque carrying capacity of the U-joint for your application.
5. Compare the required static torque carrying capacity with the static torque ratings on the appropriate product selection guide in this catalog to select the correct joint size. Choose a joint with a static torque rating equal to or greater than your calculated requirements.

Please keep in mind that the above calculations are not intended to be absolute. These formulas should be used as a general guide for sizing

universal joints that are exposed to non-harsh operating conditions. Special consideration must be taken when joints are exposed to severe conditions such as large operating angles, continuous operation, shock loading, reversing loads, high temperatures or harsh environments. Contact Curtis' Engineering Department for assistance in selecting the proper size universal joint for your application.

example

Operating Criteria:

Material = Alloy Steel RPM of Joint = 85
 Angle of Operation = 15° Horsepower = 10

1. Determine the Speed/Angle Factor:
 $\text{RPM (85)} \times \text{Angle of Operation (15)} = 1275$
2. Determine the Operating Use Factor:
 Use Factor Table indicates a use factor of 10 for an operating angle of 15° at a speed of 85 RPM.
3. Calculate the Input Load:

$$\text{Input Load (Inch Lbs.)} = \frac{63,000 \times 10 \text{ H.P.}}{85 \text{ RPM}} = 7,412$$
4. Multiply the Operating Use Factor times the input load to determine the required static torque carrying capacity of the U-joint:
 $\text{Use Factor (10)} \times \text{Input Load (7,412)} = 74,120 \text{ Inch Lbs.}$
5. Using Selection Guide for Alloy Steel Single Joints, select a joint with ratings equal to or greater than your calculated requirements.

Select 4" O.D. CJ655 Steel Joint rated at 131,000 Inch Lbs., since next size smaller is rated at 55,000 Inch Lbs.

USE FACTOR TABLE

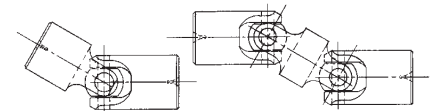
Speed / Angle Factor	Operating Use Factor
0 - 3,000	10
3,001 - 9,000	20
9,001 - 15,000*	40

* If the RPM x Angle of Operation is greater than 15,000, the application is not suited for a block and pin type universal joint.

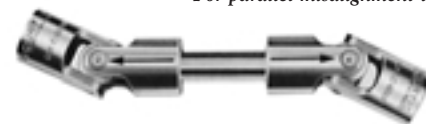
engineering / design tips

1. Dimensions of square holes in hubs and outside diameter (O.D.) of splines should not exceed one-half the outside diameter of the joint. Draw squares parallel to the fork ears.
2. Keyways cannot be in line on assembled joints; they must be at 90° except on double joints. Avoid cutting the keyway into the heat-treated ear of the fork.
3. Avoid blind bored holes and blind keyways in hubs. Bore, broach and cut clear through wherever possible.
4. Template drawings for all Curtis standard joints are available in a convenient folder which will be furnished free upon request.
5. In mounting two single universal joints in line, it is important that they be positioned correctly.

Proper mounting gives uniform rotation to the driven shaft, because the second joint compensates for the rotational error introduced by the first joint.



For angular misalignment use single joints.
 For parallel misalignment use double joints.



CORRECT ASSEMBLY



INCORRECT ASSEMBLY

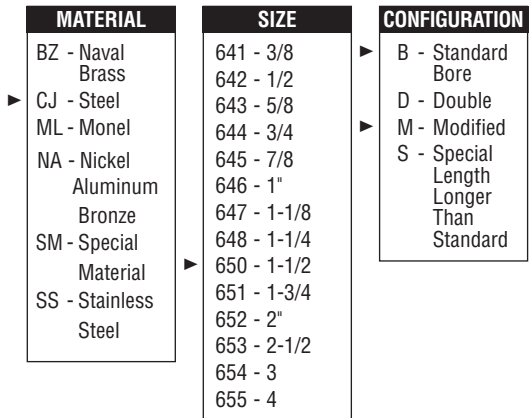
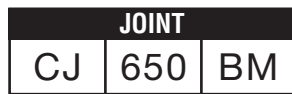
Determine the Appropriate Part Number

Refer to the identification system below to determine how to find the appropriate part number for your joint based on the dimensions and/or static torque ratio you require. The part number's suffix will also indicate whether the joint will have a solid or bored hub, or will need any other modifications. Refer to the appropriate pages to find the Selection Guides for Alloy Steel, Stainless Steel, Naval Brass, Aluminum-Bronze, Nickel-Aluminum-Bronze and Monel joints. The Curtis Cross-Reference Chart provided here will assist you in cross-referencing universal joints from other manufacturers.

SELECTION GUIDE – BROACHES					
KEYWAY BROACHES Frac. Size Width Keyway Min. Bore		SQUARE HOLES Fractional Size		6-SPLINE HOLES Fractional Size	10-SPLINE HOLES Fractional Size
1/16"	3/8"	3/16"	3/4"	5/8"	1/2"
3/32"	3/8"	1/4"	13/16"	3/4"	5/8"
1/8"	1/2"	3/8"	7/8"	7/8"	3/4"
5/32"	19/32"	7/16"	57/64"	1"	7/8"
3/16"	19/32"	1/2"	1"	1-1/8"	1"
1/4"	21/32"	9/16"	1-1/4"	1-1/4"	1-1/4"
5/16"	27/32"	5/8"	1-1/2"	1-3/8"	
3/8"	57/64"	11/16"		1-1/2"	
1/2"	1-9/32"			1-5/8"	
5/8"	1-47/64"			1-3/4"	
				2"	

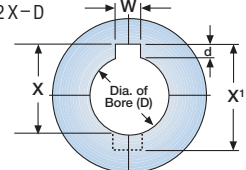
identification system

Assembled Universal Joint Identification Code



**FORMULA FOR CALCULATIONS
SINGLE & DOUBLE KEYWAY DEPTHS**

$$X = \sqrt{\left(\frac{D}{2}\right)^2 - \left(\frac{W}{2}\right)^2} + d + \frac{D}{2}$$

$$X' = 2X - D$$


EXAMPLE
Hole 1"; Keyway 1/4" wide (W) by 1/8" deep (d)

$$X = \sqrt{\left(\frac{1}{2}\right)^2 - \left(\frac{1}{8}\right)^2} + \frac{1}{8} + \frac{1}{2} = 1.109"$$

Bore of Hub Diameter of Hole (D)	Keyseat		Set Screw
	W	D	
5/16" to 7/16"	3/32"	3/64"	10-32
1/2" to 9/16"	1/8"	1/16"	1/4-20
5/8" to 7/8"	3/16"	3/32"	5/16-18
15/16" to 1-1/4"	1/4"	1/8"	3/8-16
1-5/16" to 1-3/8"	5/16"	5/32"	7/16-14
1-7/16" to 1-3/4"	3/8"	3/16"	1/2-13
1-13/16" to 2-1/4"	1/2"	1/4"	1/2-13
2-5/16" to 2-3/4"	5/8"	5/16"	5/8-11

For complete product information, please refer to the Selection Guides for Alloy Steel, Stainless Steel, Naval Brass & Special Materials

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Bus Doors

A P P L I C A T I O N S

the curtis TakeApart advantage

Curtis Universal Joint customers enjoy a unique advantage when modification of standard joints is required.

Other U-Joints Must Be “Abused” to Fit

In order to transmit power through an angle, there must be some means of affixing the shaft to the joint. Connecting the two may, for example, require a key, a cross pin or a set screw.

With most universal joints, affixing the joint requires time-consuming disassembly of the joint for machining of the hubs. This can damage component parts, result in an improper fit upon reassembly, or even require the replacement of damaged component parts!

Curtis Joints Are Easily Adapted

Curtis joints (7/8" to 4.0" O.D.) are designed with your end use in mind, and can be readily taken apart without the use of special tools. Curtis' patented Tell-Tale Lock Ring TakeApart feature makes it easy to disassemble the joint, machine component parts, reassemble and install in the field without costly disassembly of other drive train components.

See for yourself, using the sketch shown here: it is a simple matter to disassemble and reassemble the joint, eliminating any possibility

of damage to the joint ears, pins or center block, and change in fit of the centerblock in the milled slot.

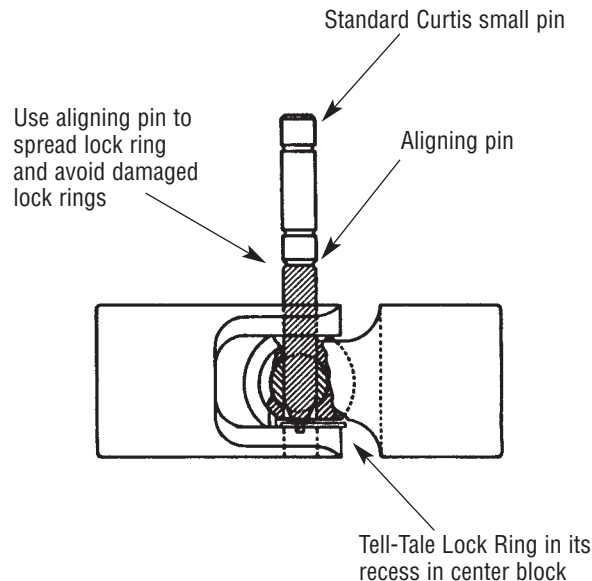
The Curtis Tell-Tale Lock Ring snaps around either pin groove and fits into the recess of the centerblock. It is visible when installed, insuring firm, positive lockup of the entire assembly. The lock ring design facilitates quick disassembly and reassembly without the use of special tooling. This feature is especially beneficial in the field, as it enables easy removal of parts for repair or faster disassembly of the drive train by quick removal of the U-joint.

We're Certain You'll Notice the True Curtis Advantage

Later, under operating conditions, doesn't it seem safe to assume that an “unabused” Curtis joint will hold up better in your application and give longer life than an “abused” joint? We think so. If you're a Curtis customer, you'll know so. The latest technology in universal joints backed by engineering excellence and service, service, service. That's what we call the real Curtis Advantage!

assembly instructions

Self-locking ring speeds assembly or disassembly on 7/8" outside diameter (O.D.) and larger joints.



TO DISASSEMBLE

Support joint rigidly, with small diameter pin in a vertical position. Press out pin, being careful not to lose the lock ring which is in the recess of the center block.

TO REASSEMBLE

Mount parts as shown in the drawing, making sure lock ring is in its recess in the center block. Insert a pointed aligning pin into the small hole and push it through, following with the small pin which will automatically lock itself into place.

Joints 3/4" and smaller outside diameter have small pins riveted at the factory.

what our customers say about curtis universal joints

In the past, we've had problems with joints (that) fell apart when the lock ring was omitted by error after reassembly. This is not possible with the Curtis joint, because one can readily see if the ring is in place or not."

*Ohio manufacturer of pumps
for molten aluminum*

"The TakeApart design is extremely convenient and practical."

*New York paper bag
machine manufacturer*

"The ability to take apart the joint is a big advantage for us. It allows us to modify the joint at our own facility to save time and money."

Illinois manufacturer of fork lift trucks

"The Tell-Tale Lock Ring feature is the only way to go. It solved all our problems."

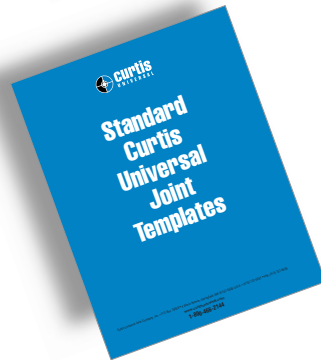
*Kentucky nut runner manufacturer
struggling with a screw-together design
that loosened up during use*

Call for Your Free Design Engineer's Desk Reference Publications



Joint Sizing Reference Guide

Okay, confess. Who knows how to calculate the proper joint size using application-specific operating criteria? One quick way is to call our Engineering Department at 800-466-2144 and have them compute it for you. You can also ask for this handy *Design Engineer's Desk Reference for Sizing Universal Joints*. Keep it right at your fingertips for easy reference.



Detailed Joint Templates

Our *Standard Curtis Universal Joint Templates* reference guide provides templates for block and pin universal joints from 3/8" to 4" in hub diameter. Joints up to 1-3/4" are shown at full size; those from 2" to 4" are shown at one-half size.



Curtis Universal Joint Company, Inc.
4 Birnie Avenue • Springfield, MA 01107 (413) 737-0281

TO ORDER OR FOR MORE INFORMATION: (888) 885-6468 fax (413) 737-8430 • www.curtisuniversal.com