McGill CAMROL® Bearings

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EMERSON™
Industrial Automation

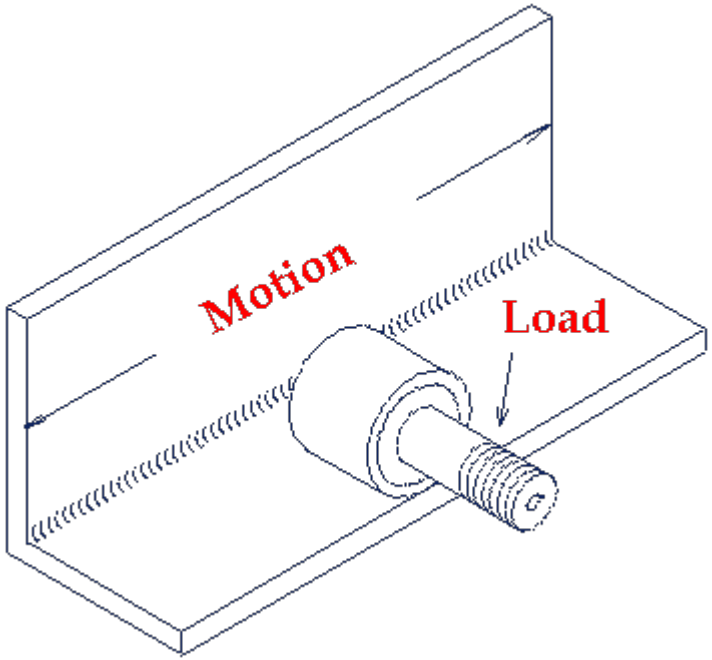
Overview

- Features & Benefits
- Competition
- Product Selection
- Markets & Applications
- Summary
- Key Contacts

Product Overview

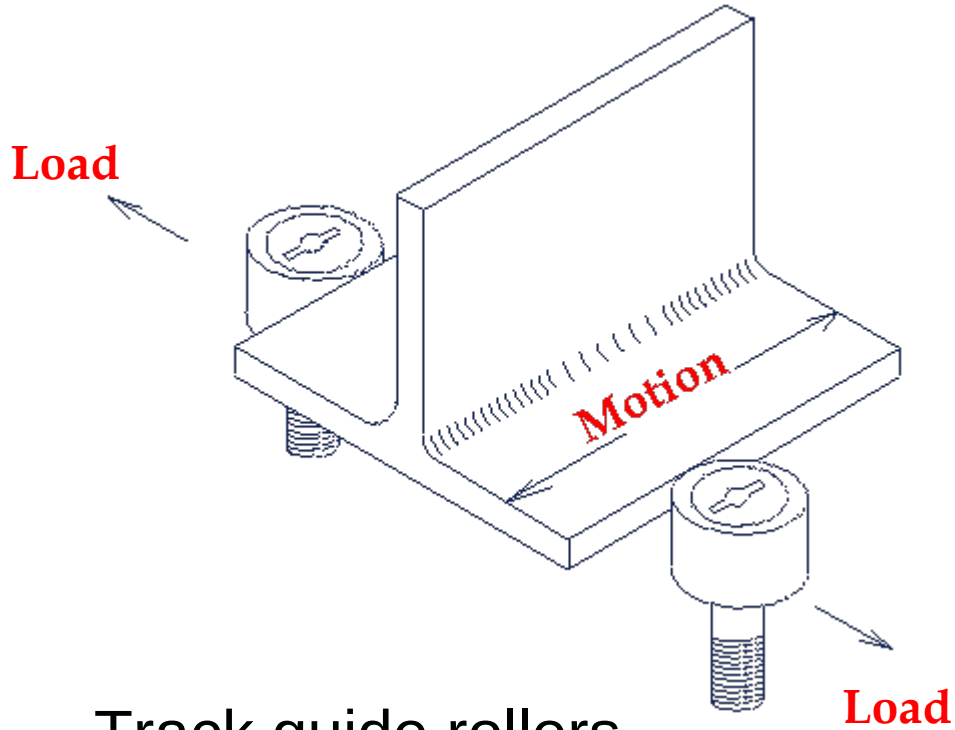
- Invented by McGill in 1937
- Replaced designs using bolt & bearing
  - Superior load carrying capability
  - Ease of use and availability
- McGill has the largest variety of cam followers: over 1400 varieties
  - Inch & Metric dimension CAMROL
  - Heavy-Duty CAMROL
  - CRES CAMROL
  - Special-Duty CAMROL
  - TRAKROL
  - Aircraft cam followers

Basic Functions



Track or Load support roller

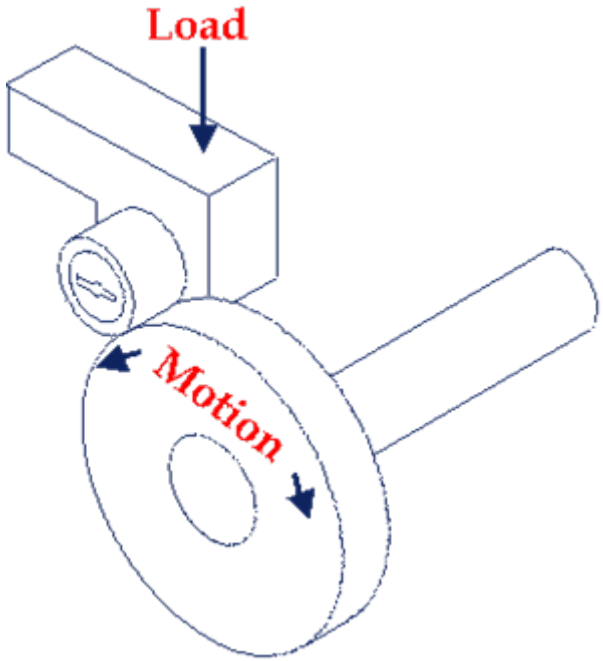
- Provides anti-friction linear motion

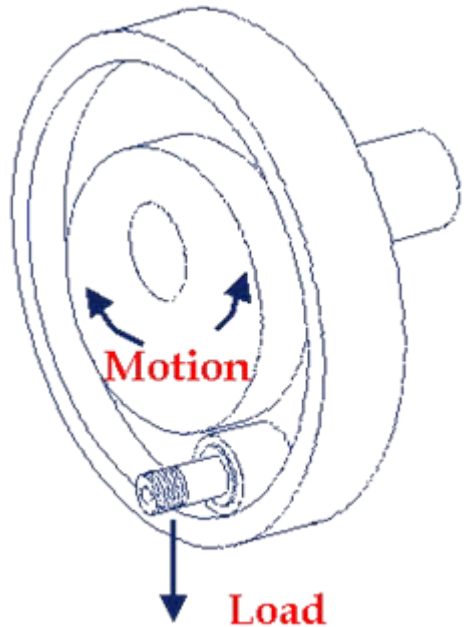


Track guide rollers

- To provide free and accurate lateral location during linear movement

Basic Functions

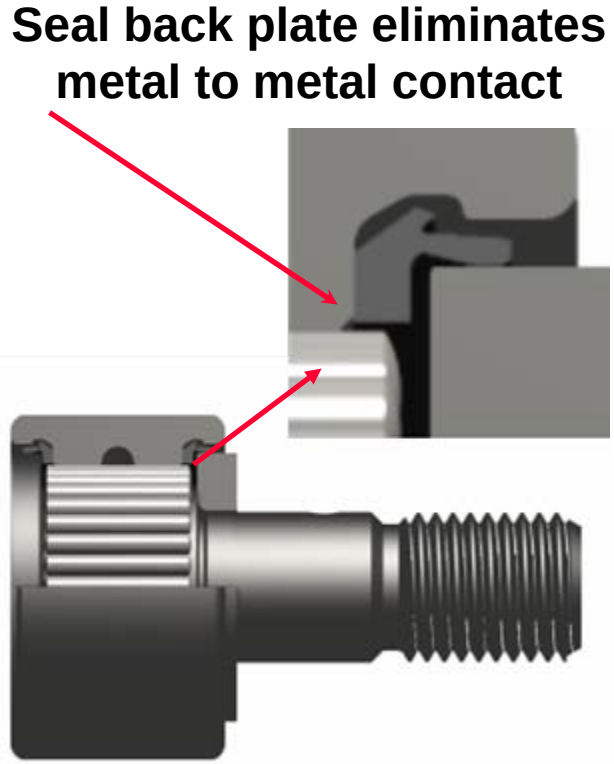




- External cam applications
  - Translates rotational motion to linear motion
- Internal cam applications
  - Common uses:
    - High speed repetitive motion
    - Timing

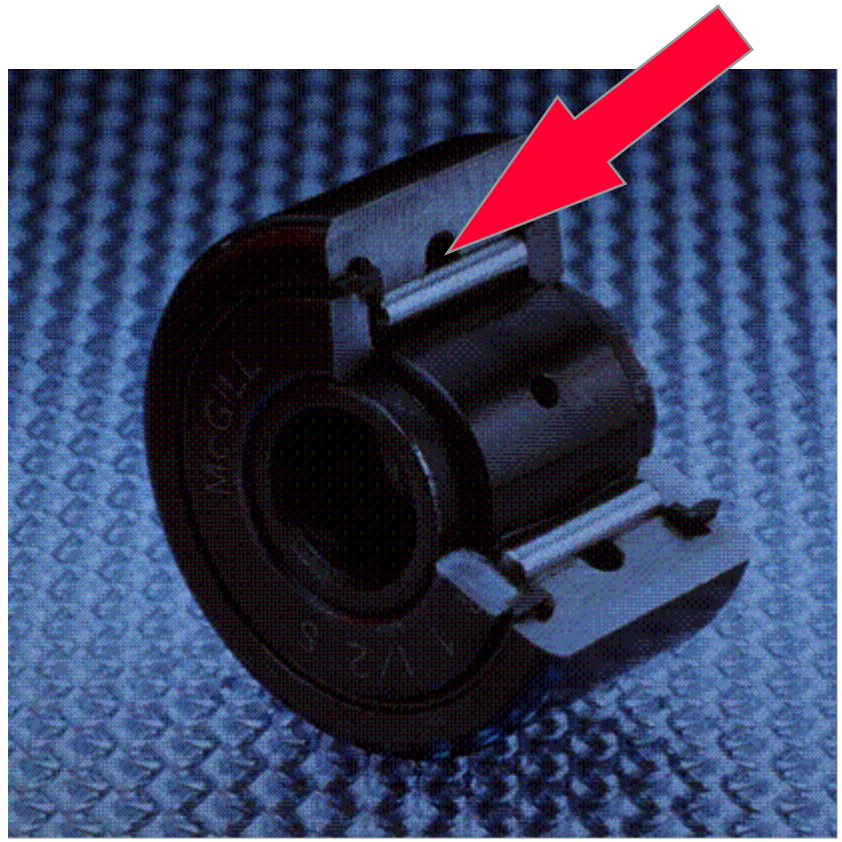
LUBRI-DISC® Seal

- Helps keep lubricant in & contamination out
- Prolongs lubrication intervals
- Reduces internal friction
- Eliminates metal to metal contact at outer counterbore
- Vents help prevent seal blowout during relubrication
- Nomenclature: add “S” suffix
  - Example: CF-1-S
- Available in inch & metric series



Lubrication Groove

- Provides additional grease capacity
- Extends lubrication intervals
- Only in sealed bearings
- Only in inch series



Hex Hole

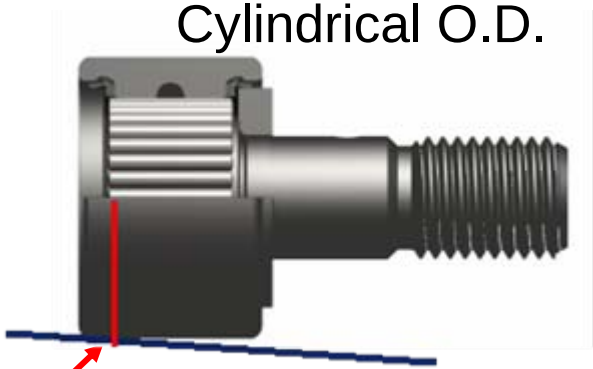
- Hex hole provides better holding power for mounting versus standard screwdriver slot
- Available in inch and metric series
- Relubrication capability lost at roller end of bearing
  - Inch sizes below 3”
  - All metric sizes

- Recommended for eccentric bushing bearings & blind hold mounting
- Nomenclature: add “B” suffix
  - Example CF-1-SB

Crowned O.D.

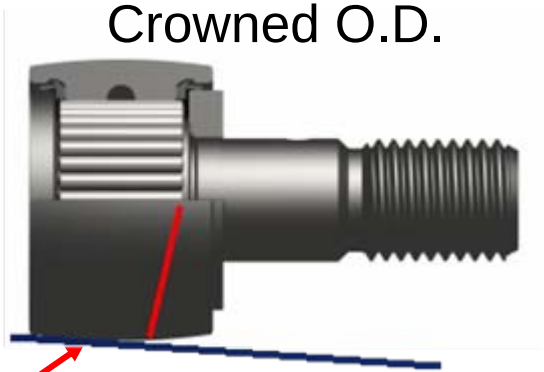
- Helps keep load centered as stud deflects
- Compensates for misalignment up to .009 in/in
- Recommended for turntable applications
  - Reduces skidding

Cylindrical O.D.



Track or housing misalignment results in corner loading

Crowned O.D.



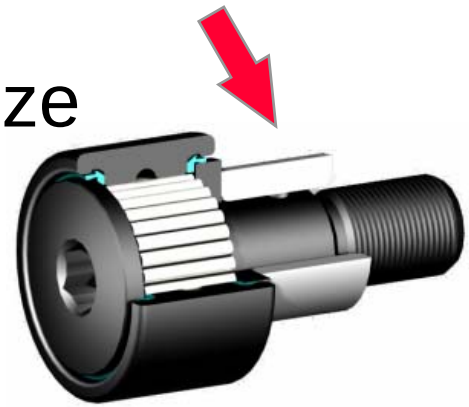
Crowned O.D. helps prevent corner loading

Crowned O.D.

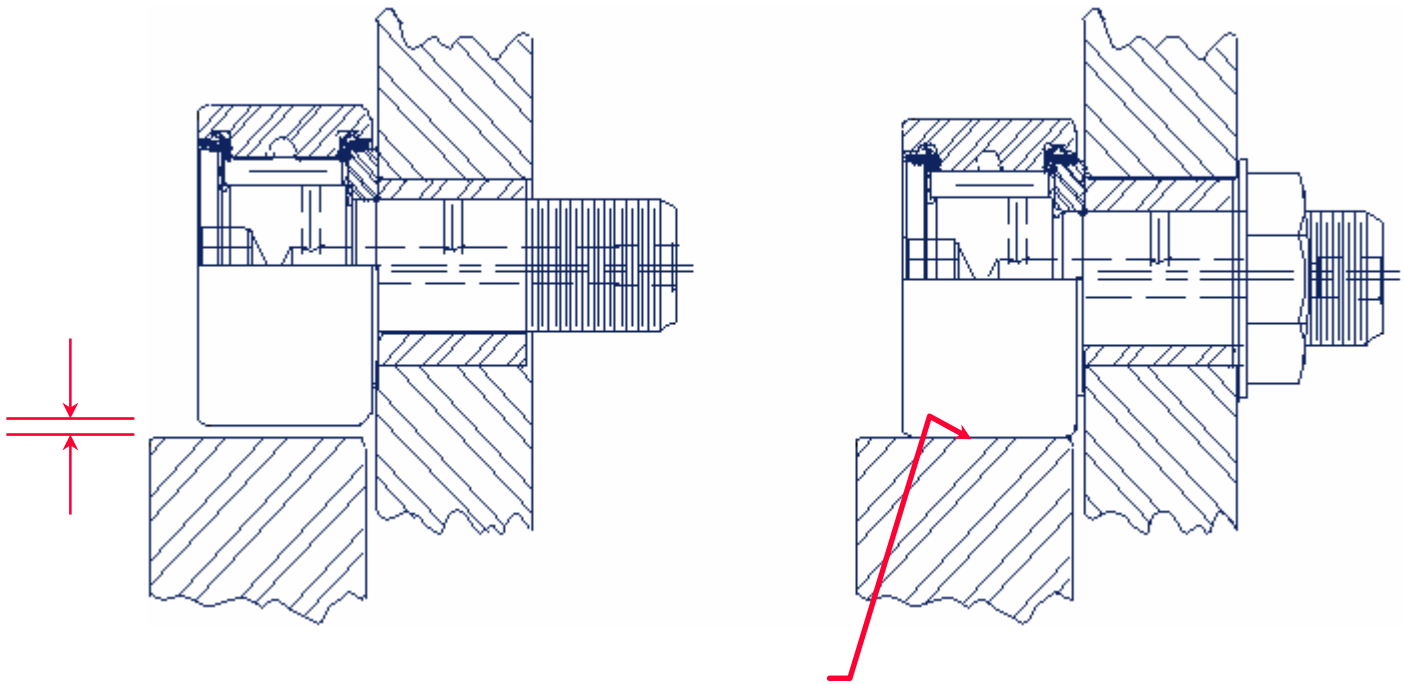
- Option for inch series
  - Crown varies with size
    - Nomenclature: add “C” prefix
    - Example CCF-2 has 24” radius crown
- Standard for metric series
  - 500mm standard crown on metric series
    - Nomenclature add “X” suffix for cylindrical O.D.
    - Example: MCF 19 X
- Crowned O.D. creates higher track contact stress versus cylindrical O.D.
  - Multiply inch series track capacity by 0.8 to obtain crowned O.D. track capacity
  - Multiply metric series track capacity by 1.25 to obtain cylindrical O.D. track capacity

Eccentric Bushing

- Bushing pressed onto unthreaded stud diameter
- Allows for adjustment of bearing to track or cam
  - Compensates for improper positioning of mounting holes
  - Can equalize loads over several bearings
- Total adjustment is double the amount of eccentricity
- Amount of eccentricity varies with size
  - Refer to catalog
- Nomenclature: Add “E” prefix
  - Example CFE-1-SB



Eccentric Bushing



Rotation of eccentric bushing and stud allows adjustment to cam or track

Packaging

- Ten pack on inch dimension sizes
  - ½” to 1 5/8” O.D. only
- Inch series
  - Bearing in plastic bag
  - Bearing (in bag) and oil hole plug(s) in bearing box
- Metric Series
  - Bearings in heat sealed plastic bags
  - Accessory package in heat sealed plastic bag
    - Metric lube fitting
    - Nuts (2)
    - Oil hole plugs

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Special Features

- Extra precision requirements
  - Special radial runout
  - Special stud configurations
  - Left hand threads / Special threads / No threads
  - Tapped lubrication holes
  - Hex hole at thread end
  - Screwdriver slot at thread end
  - Annular lube groove at stem radial hole

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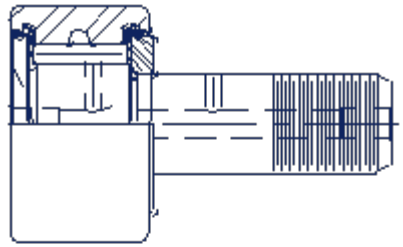
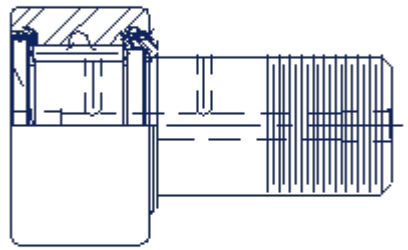
Special Features

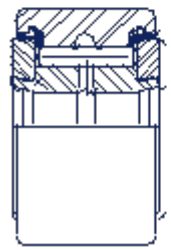
- Special outer ring configurations
  - V-groove or flange – consider TRAKROL bearings
  - Polyurethane tire
- Special grease
  - High temperature, food grade, etc.
  - Plugs or grease fittings installed
- Special plating / material
  - McGill CRES CAMROL
  - Chrome plating
  - Zinc Plating

Basic Types

- Standard stud cam follower
  - Cantilever (overhung) mounting
  - Loading up to 25% BDR
  - Series: CF, MCF, MCFR, MCFD
- Heavy stud cam follower
  - Cantilever (overhung) mounting
  - Loading up to 50% BDR
  - Higher static load capacity than standard stud
  - Series: CFH
- Cam yoke roller
  - Yoke mounting on customer furnished shaft
  - Loading up to 50% BDR
  - Deflection in minimized
  - Static load rating same as heavy stud type
  - Series: CYR, MCYR, MCYRR, MCYRD







Note: For a given O.D. size, each type has the same BDR based on rollers and race diameter

Stud Type Sealed

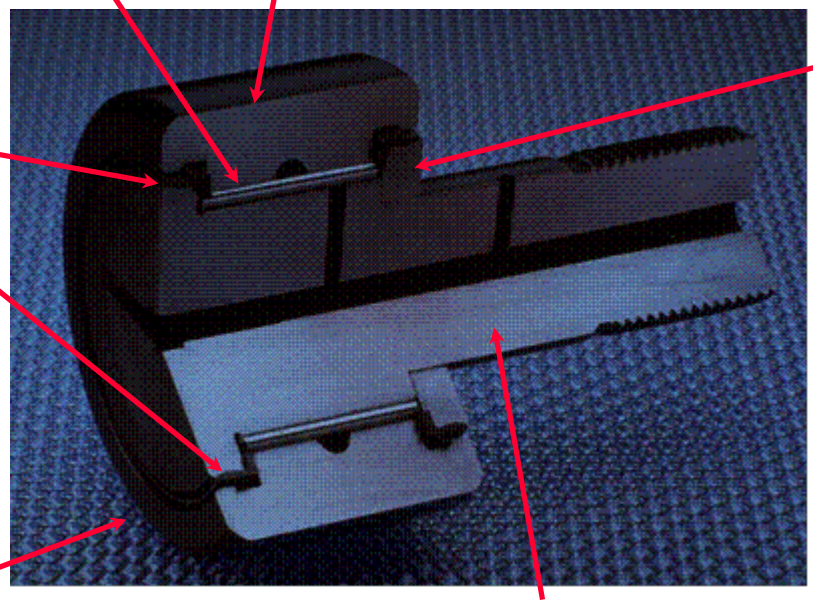
CF-- S

MCF--S

OUTER RING

NEEDLE ROLLER

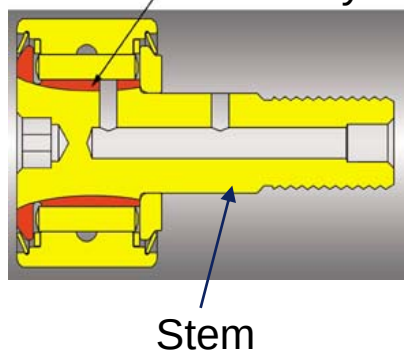
Large radial cross section to withstand bending stress due to heavy rolling or shock loads



ENDPLATE

Press fit

SEALS



BLACK OXIDE FINISH

Provided on all external surfaces, extends life by helping inhibit rust

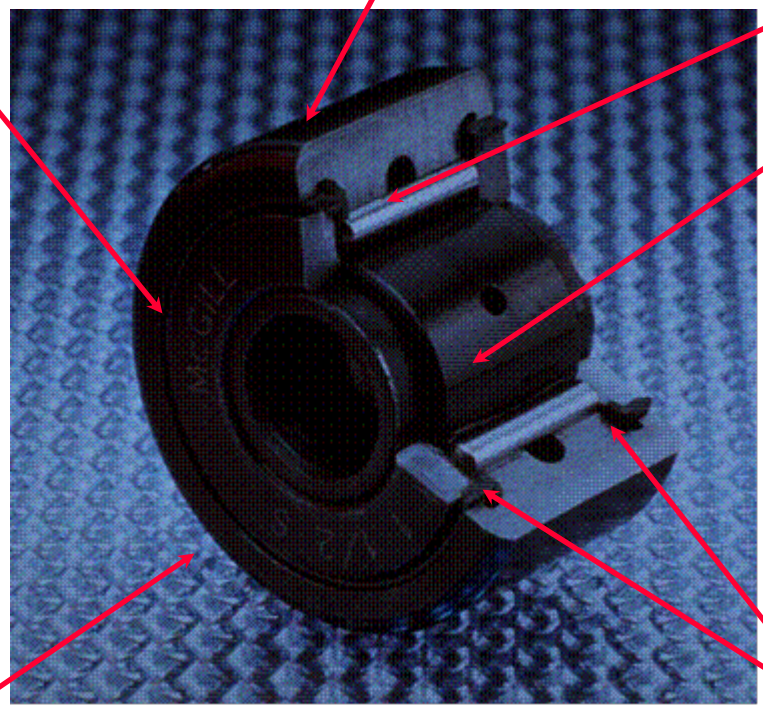
INNER (STUD)

Induction heat treated for a hardened raceway and a soft stem that can be modified by customers

Cam Yoke Sealed

CYR-- S

MCYR--S



OUTER RING

ENDPLATE

Inch –
Inner peened (5” and up use press fit)

Metric –
Liquid metal injection

NEEDLE ROLLER

INNER

Inch –
Induction hardened (5” and up are through hardened)

Metric –
Through hardened

SEALS

BLACK OXIDE FINISH

Note: All CAMROL bearings utilize bearing quality steel - heat treated to min 58 HRC on raceways

Internal Construction

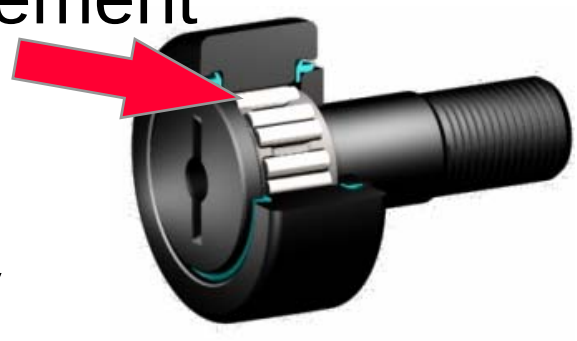
	Std. Stud	Heavy Stud	Yoke Type
Full Complement of Needle Rollers	CF MCF	CFH ---	CYR MCYR
Caged (Retainer Type) Needle Rollers	SDCF MCFR SDMCF	--- ---	--- MCYRR
2 Rows of Cylindrical Rollers	CFD MCFD	--- ---	CYRD MCYRD
Bushing Type	BCF	---	BCYR

Full Complement

- Allows for high radial loads
- Most common variety for inch series
- No thrust loads
- Inch series: CF (shown), CFH, CYR
- Metric Series: MCF, MCYR

Caged Needle Roller

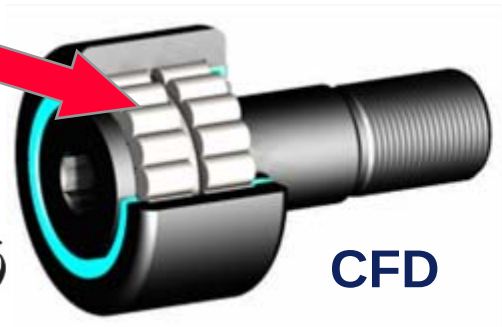
- Higher speeds versus full complement
- Increased internal grease void
  - Longer life without relubrication
  - Decreases load carrying capability



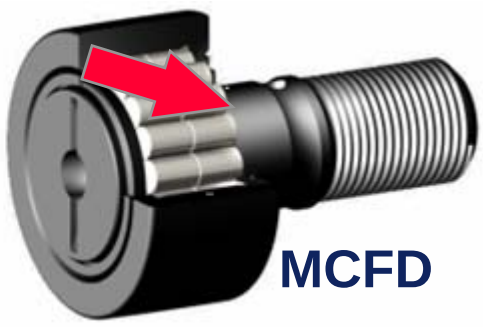
- Utilizes two rollers per pocket (except 16 & 19 mm sizes)
  - Maximize load ratings
- Most common variety for metric series
- No thrust loads
- Metric series only: MCFR(shown), MCYRR

Two Row Cylindrical Roller

- For heavy-duty applications
- Increased dynamic rating
- Extra grease capacity
- Higher speed capability versus full complement needle roller
- Some thrust loading possible
- Inch series: CFD, CYRD
- Metric series: MCFD, MCYRD



CFD



MCFD

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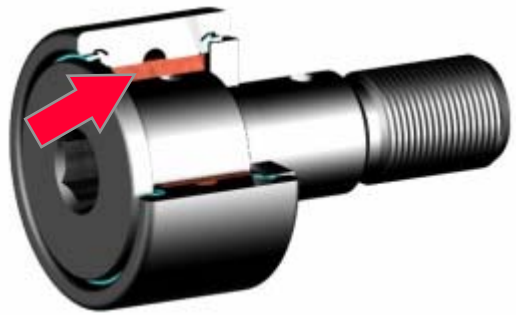
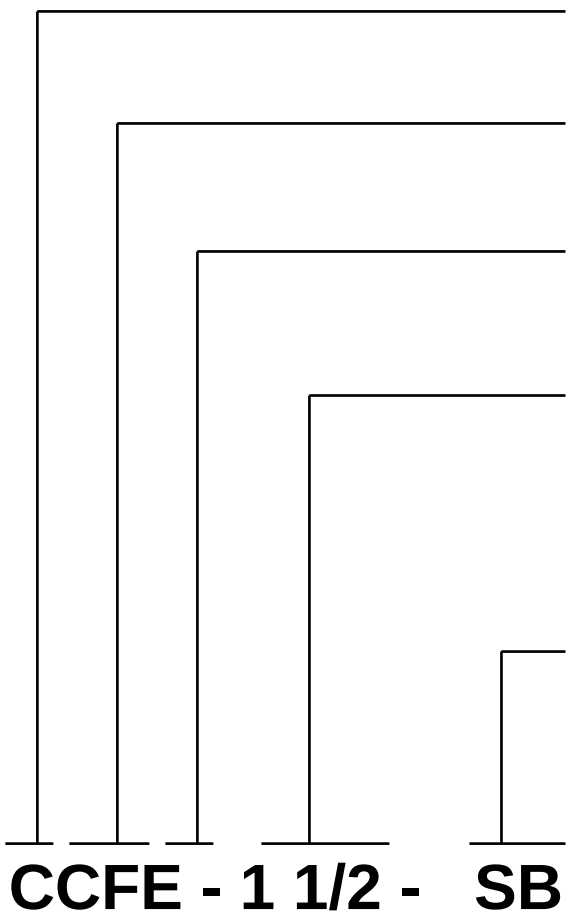
Bushing Type

- Self lubricating bushing replaces needle rollers
- Allows for non-maintenance operation
  - Do not lubricate with grease, okay to use oil
- Slow speeds, low loads only
  - Temperature limit: 200ºF (95ºC)
- Amount of acceptable wear will determine life
- Bushing material is not FDA approved
  - No direct food contact
- No thrust loads
- Inch series only: BCF, BCYR



Standard Nomenclature



Optional Prefix
C - Crowned O.D. (inch series)

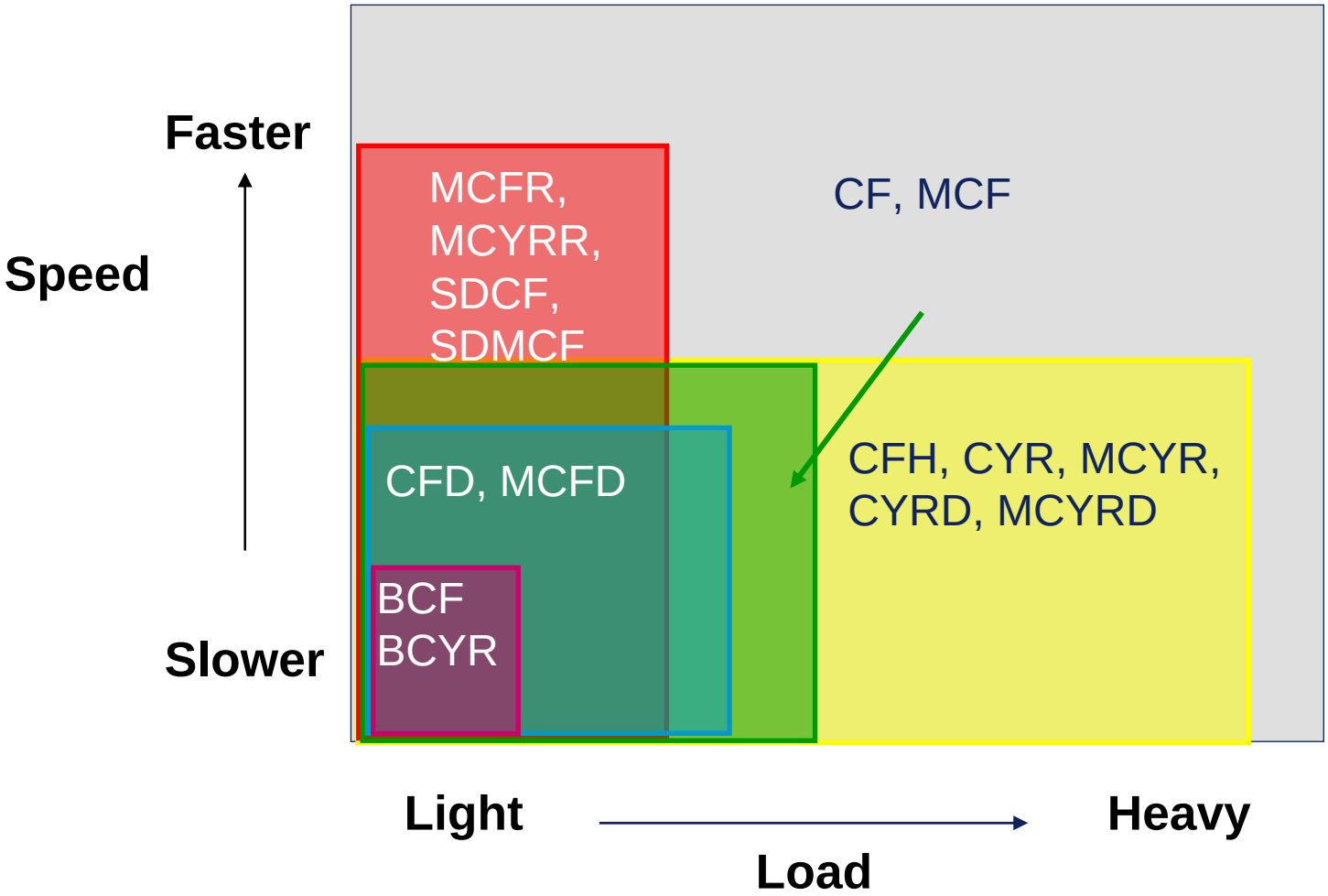
Basic Type, Construction
CF, BCF, CFH, CYR, MCF,MCFR,...

Optional Prefix
E - Eccentric Bushing (Std Stud only)

Size
Inch Series: O.D. in Inches
Metric stud type: O.D. in mm
Metric yoke type: Bore in mm

Optional Suffix
S - LUBRI-DISC Seal
B - Broach (hex hole)
X - Cylindrical O.D. (metric series)

Product Capability Comparisons



Markets & Applications

- Automotive
  - Conveying
  - Transfer lines
  - Parts elevators
  - Welding
- Printing Equipment
  - Newspaper presses
  - Flexo presses
  - Embossing rolls
- Packaging Machinery
  - Box folders
  - Container manufacturing
  - Fillers
  - Blow molders
- Machine Tools
  - Conveyor rollers
  - Transfer mechanisms
  - Strapping machines

Markets & Applications

- Steel Mills
  - Coilers
  - Forming equipment
  - Forging equipment
- Food Processing
  - Baking equipment
  - Packaging equipment
  - Mixing equipment
- Material Handling
  - Scissors lifts
  - Lift trucks
  - Stalker cranes
- Textile Machinery
  - Looms and weaving
  - Winders
  - Draw twisters

Key Contacts

- Visit us at www.emerson-ept.com
- EPT Customer Service (800-626-2120)
  - Price
  - Availability
  - ATO Eligibility
  - Order Entry
- Technical Customer Service (219-465-2211)
  - Technical product questions
  - Application & interchange assistance