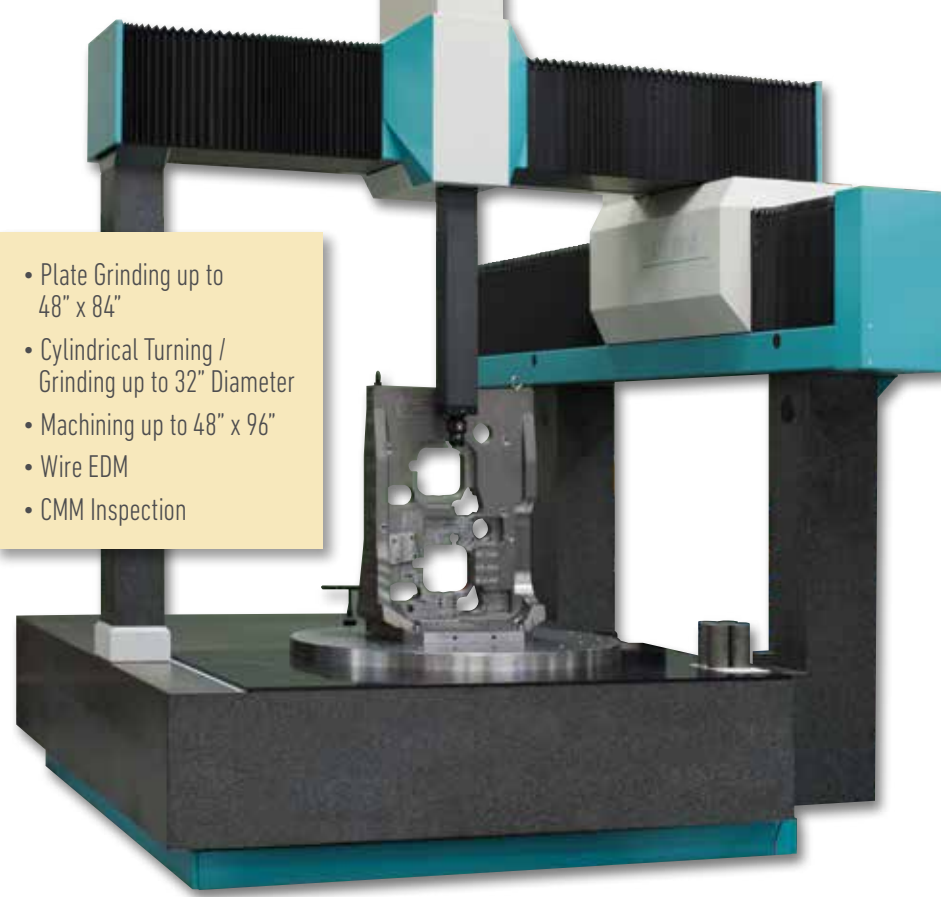


► **PRECISION COMPONENT MACHINING**

Large Part Machining and Inspection



- Plate Grinding up to 48" x 84"
- Cylindrical Turning / Grinding up to 32" Diameter
- Machining up to 48" x 96"
- Wire EDM
- CMM Inspection



- In-House Deep Hole Drilling
- Hole diameters as small as 3/16"
- Hole depths up to 72"
- Leak Testing

► **AUTOMATION SYSTEMS**



CO-OP Tool supplies turnkey automation modules for new applications, as well as retrofitting existing applications. We supply a complete turnkey package from the initial concept development, through manufacturing, assembly, installation and run-off on the customer's floor.

- Custom End-of-Arm Tooling
 - 2-Jaw Parallel Gripping Systems
 - 3-Jaw Concentric Gripping Systems
 - Pullback (Angular) Gripping Systems
 - Rotating Gripping Systems
 - Collet Gripping Systems
 - Custom Gripping Systems
- Orientation Modules / Pre-Staging Modules
- Compliance & Alignment Devices
- Automation Fixtures
- Turnkey Automated Systems
- Perishable / Backup Tooling

SPARE PARTS, REPAIR AND RECONDITIONING
A Big Part of CO-OP Tooling Experience is Service and Support

- Spare Parts & Perishable Tooling
- Build-to-print Replacement Details
- Rebuild / Recondition Programs
- Hydraulic / Pneumatic Troubleshooting and Repair Services

Hammill
MANUFACTURING COMPANY

CO-OP TOOL WORKHOLDING SYSTEMS

CUSTOM WORKHOLDING
► Excelling in the design, development and manufacture of custom workholding, including chucks, collets, hydraulic arbors and tombstone fixtures
► 40,000 Sq. Ft. Facilities
1517 Coiming Drive | Toledo, Ohio 43612
419.476.9125 | www.productionworkholding.com

HAMMILL MEDICAL
MEDICAL IMPLANTS & INSTRUMENTS
► The highest machining technology serving the medical implant industry
► 90,000 Sq. Ft. Facilities
360 Tomahawk Drive | Maumee, Ohio 43537
419.476.0789 | www.hammill-mfg.com

PRODUCTION WORKHOLDING SOLUTIONS
FOR MANUFACTURERS WHO DEMAND PRECISION



PRODUCTION FIXTURES
CUSTOM CHUCKING APPLICATIONS
ENGINEERED AUTOMATION SYSTEMS
PRECISION MACHINING & SPARE PARTS

PRODUCTION WORKHOLDING SOLUTIONS
FOR MANUFACTURERS WHO DEMAND PRECISION

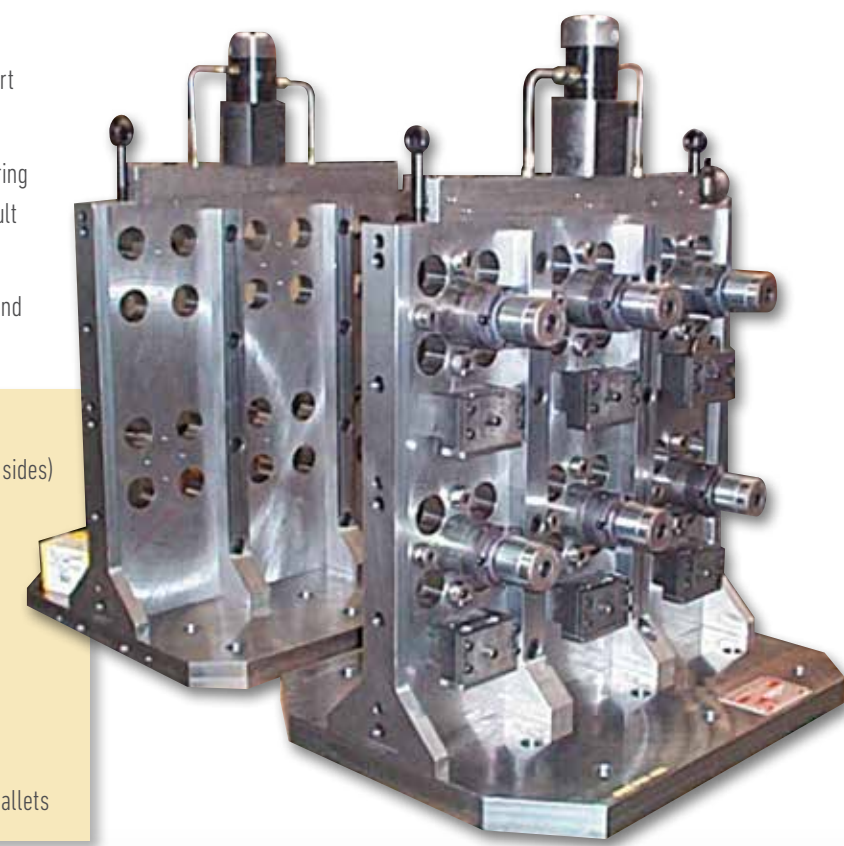
CO-OP Tool Workholding Systems provides a **Turnkey Workholding Package**. Concept development and design – including tool layout, manufacture, assembly and fixture run-off are all inclusive in your custom solution.

Our job is to keep you out of trouble!

► **PRODUCTION FIXTURES**

- All fixtures are tested for accuracy and functionality with actual part pieces prior to shipping.
- Our commitment focuses on quality at the source – the manufacturing process. Innovative design, combined with years of experience result in consistent quality in every part.
- Co-Op Tool Engineers can Troubleshoot Existing Fixture Problems and provide long-term, production-intent solutions to fix the problem.

- | | |
|---|--|
| Fixture Actuation: | Applications: |
| • Hydraulic | • Multi-sided fixtures (up to 6 sides) |
| • Pneumatic | • Progressive Fixtures |
| • Manual | • Indexing Fixtures |
| • Captured Oil – accumulator built into fixture for cell applications | • Collet Centralizing Fixtures |
| • Spring Clamp with Air or Hydraulic Unclamp | • Broaching Fixture |
| | • Trunion Fixtures |
| | • Sequencing & Pressure Reducing Designs |
| | • Rotary Transfer Fixtures & Pallets |



► **CUSTOM CHUCKING APPLICATIONS**

Over 45 years of engineering experience goes into every custom power chuck, collet chuck or diaphragm chuck we manufacture. We design and build custom workholding and tooling for machine tool builders, distributors, tier 1 and tier 2 manufacturers and OEMs.

- Power Chucks
- Diaphragm Chucks
- Collet Chucks
- Advanced Workholding Applications

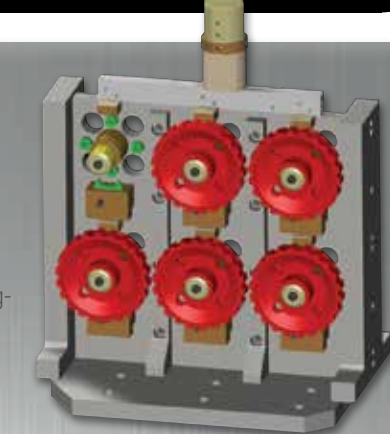
[PRODUCTION FIXTURES]

All fixtures are supplied with a Complete Engineering Package, including CAD drawings, all detail drawings and commercial items.

A/B FIXTURE
Part: Transmission case
Clamping Function: Hydraulic clamping with spring actuated load-assist mechanism



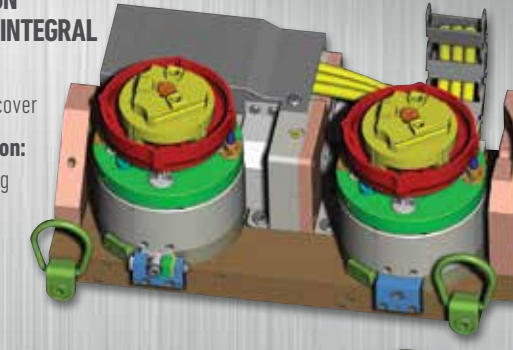
1-SIDED "WINDOW FRAME" FIXTURE
Part: Pinion carrier
Clamping Function: ID pull-back collet chuck with hydraulic actuation, and spring-loaded radial orienter device



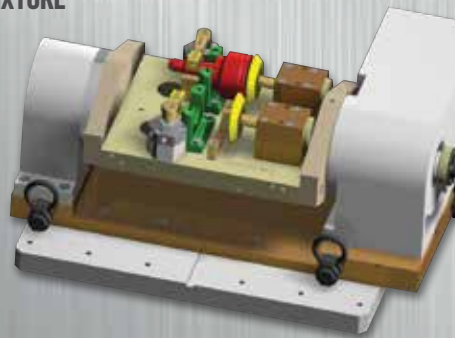
2-SIDED, B/C KNUCKLE FIXTURE WITH CENTRALIZING COLLET CHUCK
Part: Rear knuckle, right & left hand
Clamping Function: ID collet centering unit, with integral face clamps, & diamond pin orientation device, hydraulic actuation & air sensing



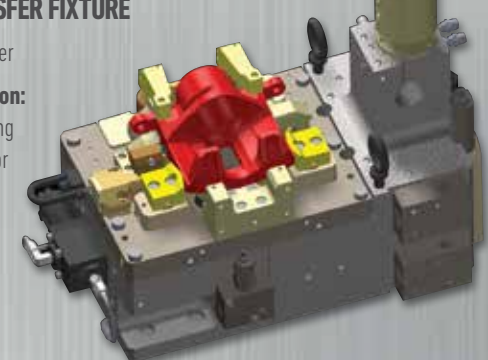
5-AXIS TRUNION FIXTURE WITH INTEGRAL SERVO MOTOR
Part: Alternator cover
Clamping Function: Hydraulic clamping with air sensing 5-axis motion is electronically controlled



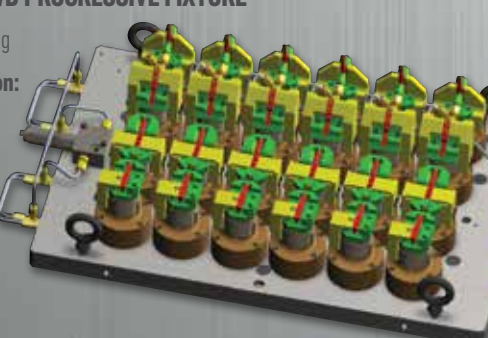
4-AXIS TRUNION FIXTURE
Part: CV housing
Clamping Function: Hydraulic part locator and hydraulic swing clamp, with sequencing



ROTARY TRANSFER FIXTURE
Part: Brake caliper
Clamping Function: Hydraulic clamping with air sensing for part presence



24-PART A/B/C/D PROGRESSIVE FIXTURE
Part: Steel housing
Clamping Function: 2-jaw centralized vice chucks, hydraulic clamp with air sequencing



1-SIDED "WINDOW FRAME" FIXTURE WITH REPLACEABLE WINDOW PLATES
Part: Cylinder head
Clamping Function: Hydraulic clamping with air sensing



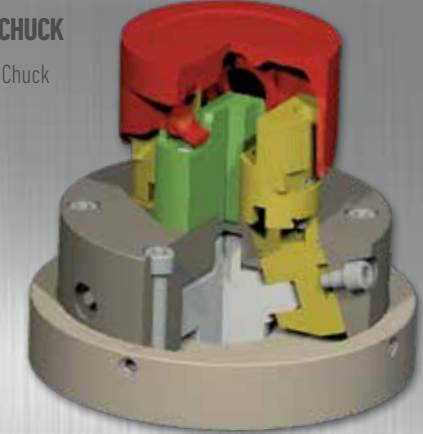
[POWER CHUCKS]

Versatile, power-gripping chucks designed for first operation applications: Ball Lock Power Chucks / Wedge Grip Power Chucks / 2-Jaw & 3-Jaw Power Chucks

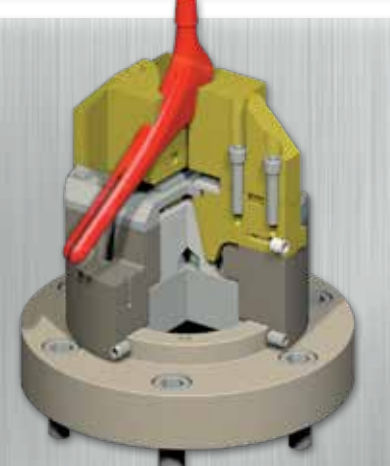
BALL LOCK POWER CHUCKS
 OD Ball Lock Chuck for turning, boring and facing automotive damper hub



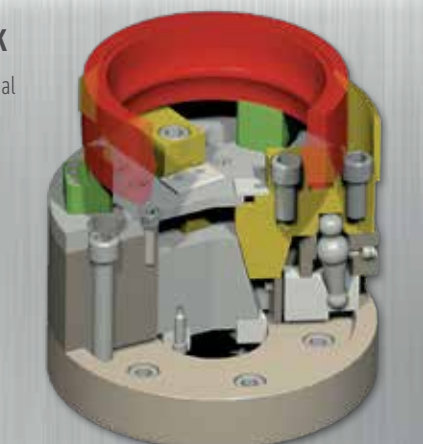
WEDGE GRIP POWER CHUCK
 Jaw ID Wedge Grip Piston Chuck for turning and grooving automotive piston



2-JAW POWER CHUCKS
 Jaw OD Counter-Centrifugal Chuck for finish turning medical hip implant



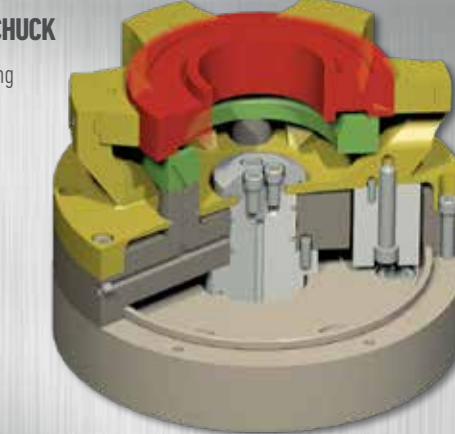
3-JAW POWER CHUCK
 Jaw OD Counter-Centrifugal Chuck for facing, turning and boring automotive damper ring



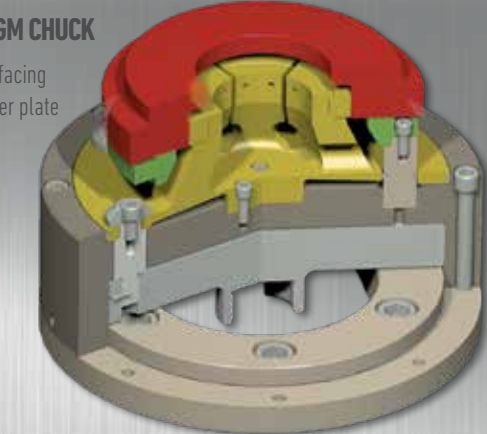
[DIAPHRAGM CHUCKS]

Primarily a second operation chuck generally used for grinding, boring, facing and turning applications.

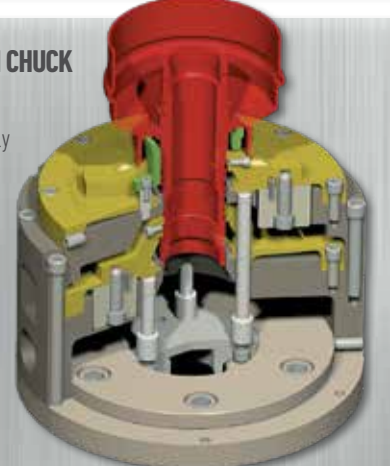
OD DIAPHRAGM CHUCK
 For high-speed turning automotive ring gear



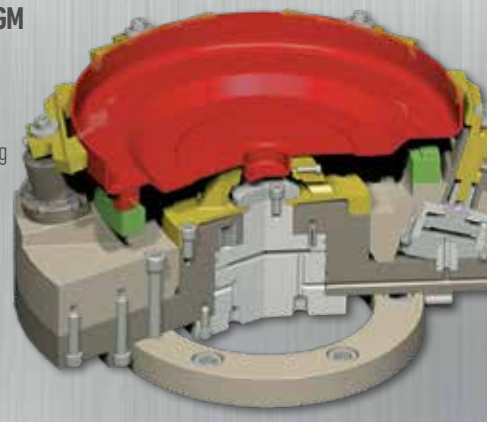
OD DIAPHRAGM CHUCK
 For turning and facing compressor cover plate



OD DOUBLE DIAPHRAGM CHUCK
 For finish boring automotive input clutch housing assembly



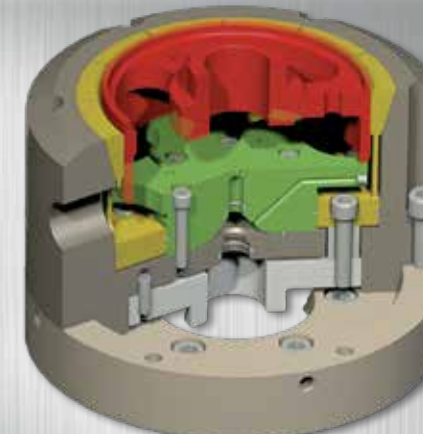
OD DIAPHRAGM CHUCK WITH HYDRAULIC DAMPENERS
 For finish turning and boring automotive torque converter



[COLLET CHUCKS]

The most common and versatile of all workholding devices. Superior holding power, higher accuracy and engineered for high-speed applications.

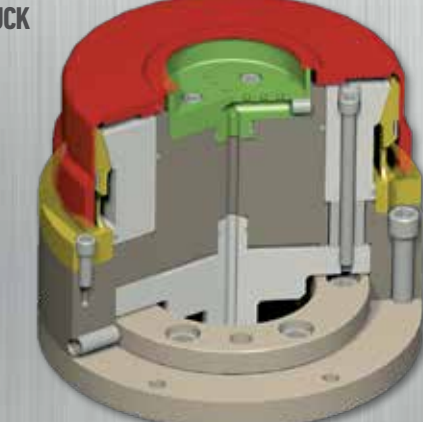
OD PULLBACK COLLET CHUCK
 For facing, boring and turning automotive damper hub



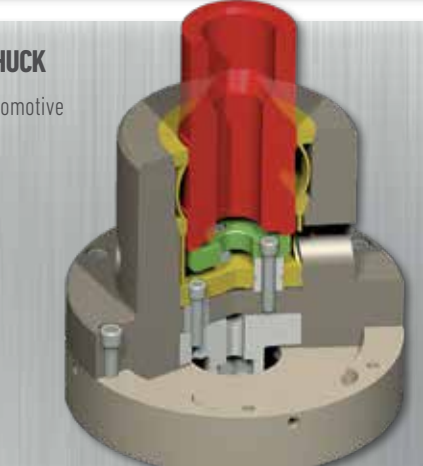
ID PULLBACK COLLET CHUCK
 For high-speed turning automotive rear sun gear



STATIC COLLET CHUCK
 For high-speed turning and facing automotive clutch housing



BUBBLE COLLET CHUCK
 For "dual-gripping" automotive axle tube assembly

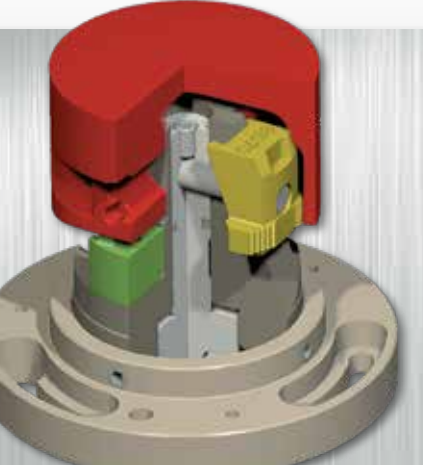


[ADVANCED WORKHOLDING APPLICATIONS]

5-JAW SHOE CHUCK
 For finish turning, boring and facing outer ring bearing hub



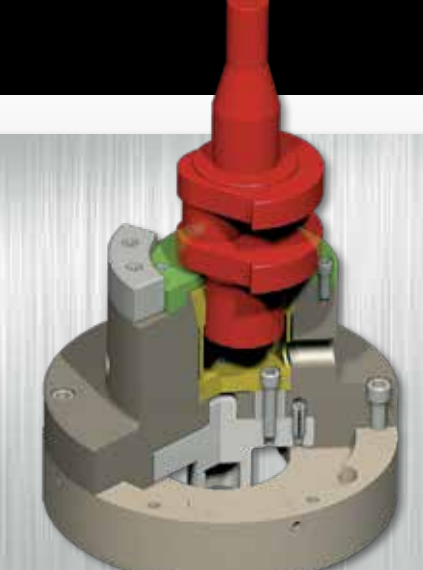
2-JAW DOVETAIL PISTON CHUCK WITH QUICK CHANGE ADAPTER
 For rough and finish turning piston



5-JAW IRIS CHUCK
 Ultra-wide Clamping Range, suitable for a large variety of applications (Patent Pending)



OD ECCENTRIC COLLET CHUCK
 For finish turning small engine crank shaft



ID PULLBACK COLLET CHUCK WITH SPECIAL COLLET
 For finish turning, facing and grooving small engine piston



OD COLLET CHUCK WITH CENTRIFUGAL DAMPENERS
 For finish boring automotive input clutch housing

