

# CUSTOM MEASUREMENT *SOLUTIONS*



## **ARNOLD GAUGE**

[www.arnoldgauge.com](http://www.arnoldgauge.com)

877-942-4243



# CUSTOM GAGES...

- **Is your Quality Lab Overloaded?**
- **Thinking about buying a new CMM to keep up with demand, but can't justify the cost and additional staff?**
- **Are your customers demanding tighter tolerances and zero defects?**
- **Implementing "Quality at the Source"?**
- **Can't find a solution in a catalog, and only receive no-quotes from current vendors?**
- **Do you have a tough gaging problem and Mikes and Calipers just don't cut it?**

*ARNOLD GAUGE* has been creating comprehensive measurement solutions **since 1918**. These solutions range from simple GO/No-Go gages to complete turnkey automatic measuring machines. We look forward to working with you to create a unique, effective solution.

**OUR GOAL: To help you make better parts!**

Here is just a sample of measurement solutions we have created.



**Page 3**

## AUTOMATIC

Uses the latest in automation and gaging technology to measure parts. Parts can be automatically sorted to assure that every "out-of-tolerance" part is taken out of your process.



**Page 6**

## VARIABLE

Uses indicators, electronic probes, lasers, etc. to provide an exact reading.



**Page 12**

## GO/NO-GO

Simply "passes" or "fails" a part or feature. Very rugged and does not require mastering.



**Page 14**

## CMM FIXTURES

Holds a workpiece in the optimal position for CMM inspection.



**Page 16**

## SPECIAL SOLUTIONS

Inventive ways to solve your toughest measurement challenges...

**WHAT CAN WE MEASURE FOR YOU?**

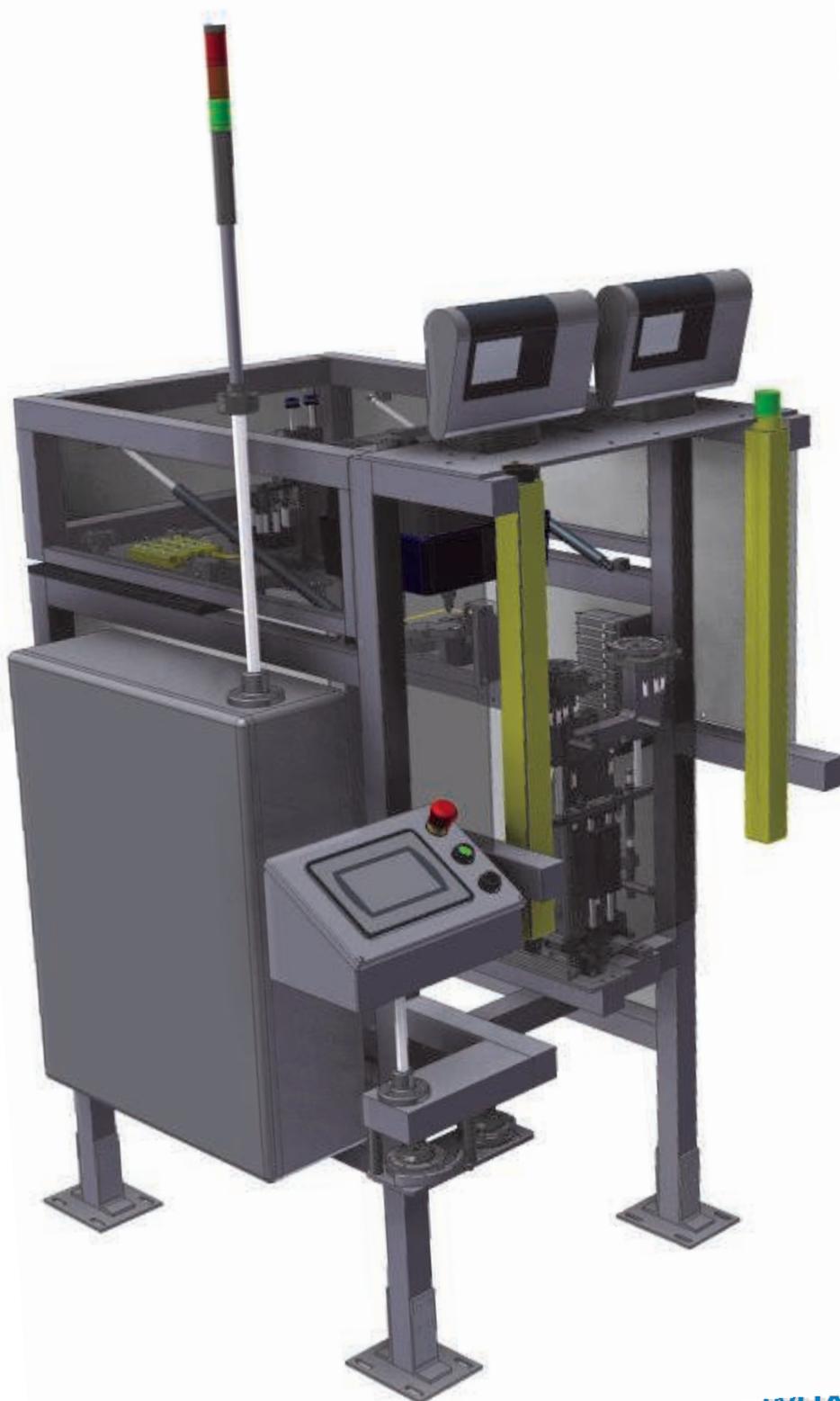


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# AUTOMATIC...



## THE CUSTOMER:

Supplier to large automotive manufacturer

## THE PROBLEM:

Check 23 features on two different parts, including thickness, diameter, and special contoured surfaces. Some features have tolerances of 0.01mm (0.0002")

## THE SOLUTION:

*ARNOLD GAUGE* custom designed and built this fully automatic measurement solution to solve all of the customer's needs.

- Checks 23 features simultaneously
- Gage readouts automatically send pass/fail signal to PLC
- Passing parts are engraved with a tracking number for part traceability
- Under 30 second cycle time
- Ergonomically designed flip-up plate allows for easy maintenance access
- HMI (Human Machine Interface) allows for simple operation and support
- SPC Data Stored for historical analysis
- Light curtain to protect operator
- Ability to be robot loaded
- Passes 10% GR&R

WHAT CAN WE MEASURE FOR YOU?

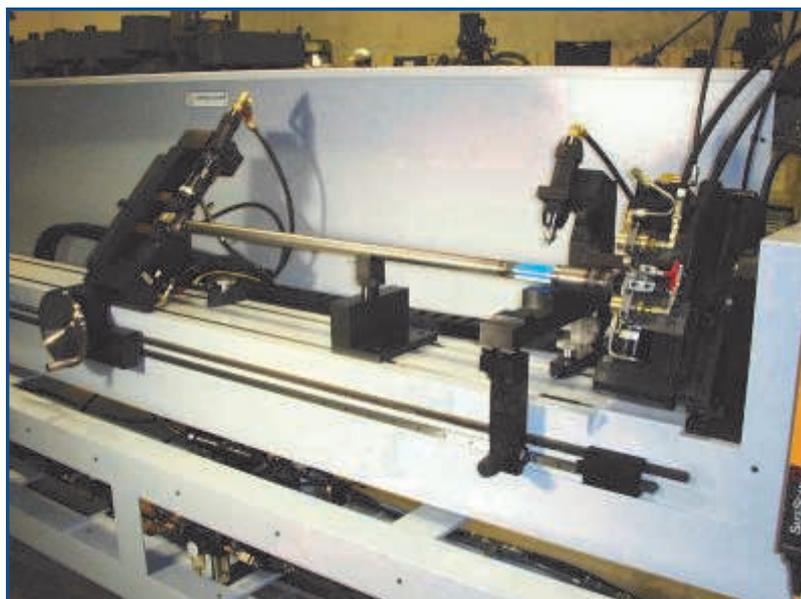


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# AUTOMATIC...



## THE CUSTOMER:

Supplier to a "big 3" automotive manufacturer

## THE PROBLEM:

Check backlash and torque failure on universal joints

## THE SOLUTION:

*ARNOLD GAUGE* custom built this fully automatic gage to solve all of the customer's needs.

- Automatically grips part ends, then twists with 20 newton meter force (200 inch lbs) to check backlash
- Automatically twists to assure workpiece can withstand 450 newton meter force (4000 inch lbs) to check torque failure
- Automatically stamps passing parts for traceability
- Custom built steel frame and machine body
- SPC Data Stored in PC for later analysis
- 15 foot tailstock travel and interchangeable tooling to accommodate a large range of parts

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# AUTOMATIC...



## THE CUSTOMER:

Tier 1 Automotive Supplier to  
Honda of America

## THE PROBLEM:

Check multiple features on wheel hubs

## THE SOLUTION:

*ARNOLD GAUGE* custom built this fully automatic gage to solve all of the customers needs.

- Checks multiple diameters and runouts
- Uses a combination of air and electronic gages
- Includes a vibratory shaker table to sort parts for easy packaging
- 14 Second cycle time, better than 10% GR&R

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# VARIABLE...



Checks multiple diameters and runouts for printer component  
-Includes Computer Based readouts and SPC software



Checks contour of glass TV screen



ID Air Gauge with SPC and Temperature Compensation

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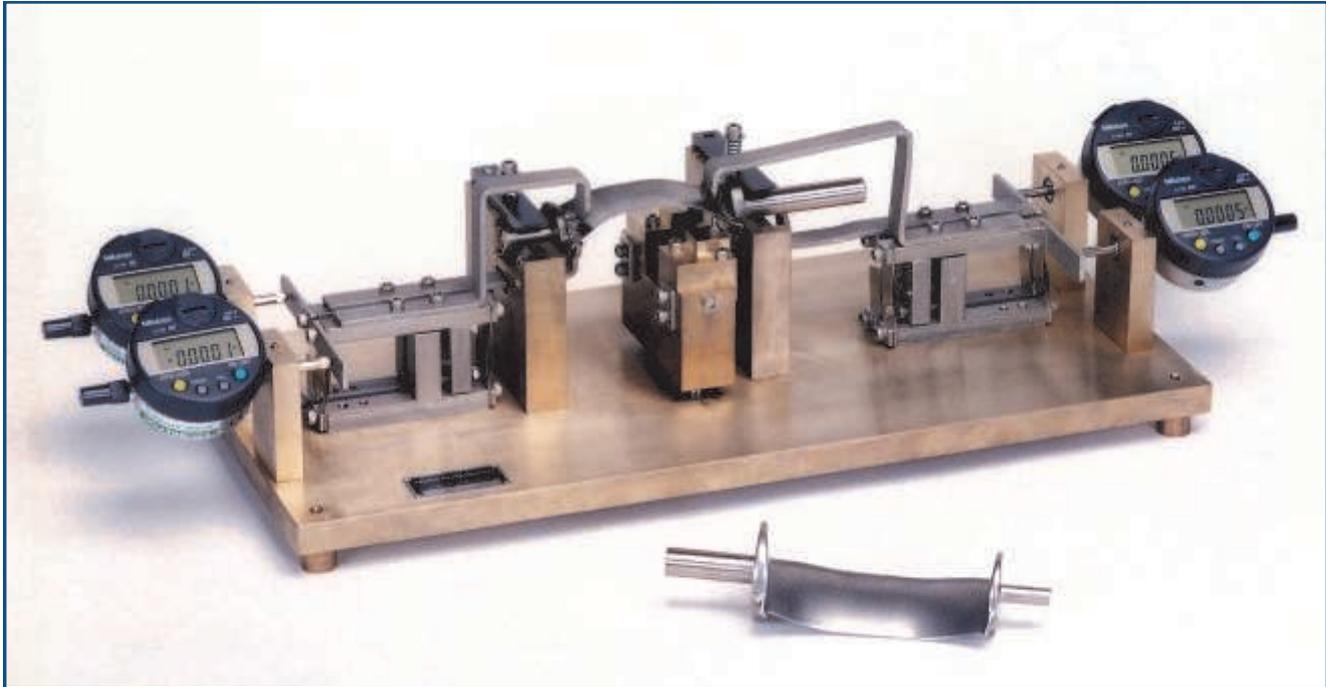


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# VARIABLE...



## THE CUSTOMER:

Aerospace manufacturer

## THE PROBLEM:

Check multiple features on a complex airfoil. Because of the electrochemical machining process, the air around the gage is very salty and corrosive. Normal black-oxidized steel rusts in a matter of days.

## THE SOLUTION:

*ARNOLD GAUGE* built this gage entirely out of stainless steel, AMPCO alloy metal, and carbide. Some components were chrome plated for extra corrosion resistance.

We designed the gage operation to be fast and simple. Parts can be loaded, checked, and unloaded in a matter of seconds.

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# VARIABLE...



Family of Air Thickness Gages with SPC Data Collection



This pair of gages uses test indicators. The delicate tips are guarded, and each station pivots for easy part loading.



Checks multiple features on an exhaust manifold. We included a "rotisserie" for easy access to the bottom of the part.

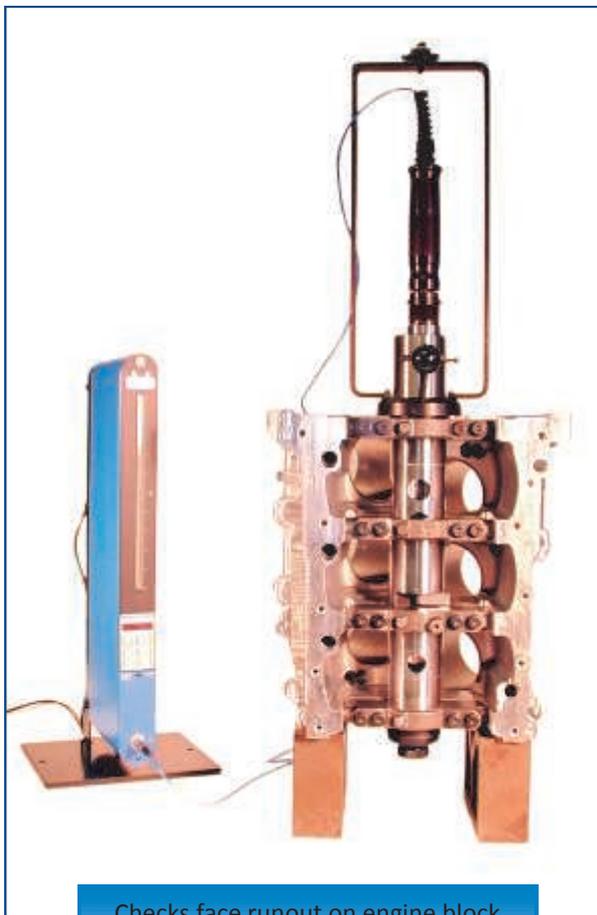
WHAT CAN WE MEASURE FOR YOU?



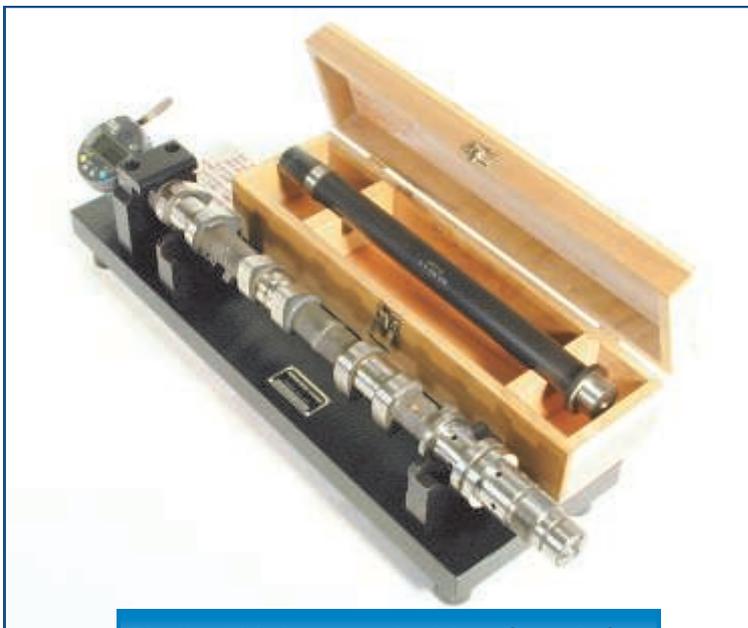
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# VARIABLE...



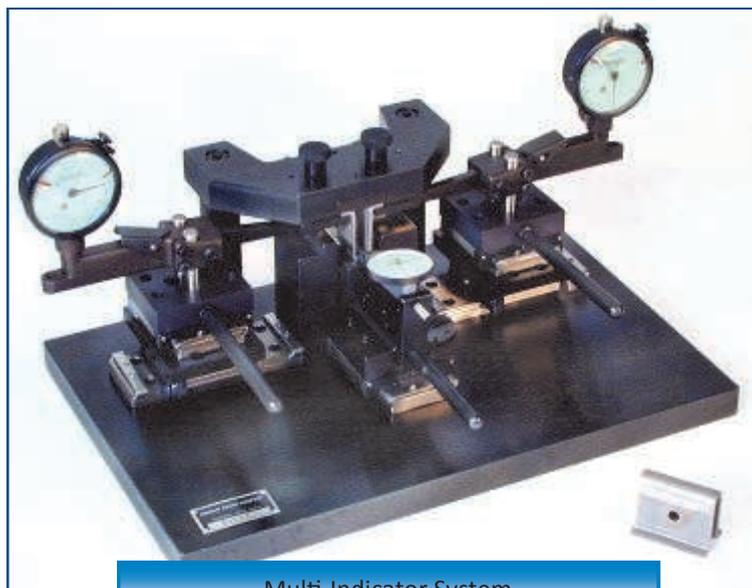
Checks face runout on engine block using custom precision ball arbor



Checks width between shoulders of camshaft



Checks phasing angle between spline and cross holes on universal joint yoke



Multi-Indicator System

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# VARIABLE...

## THE CUSTOMER:

Manufacturer of drums for  
printing industry

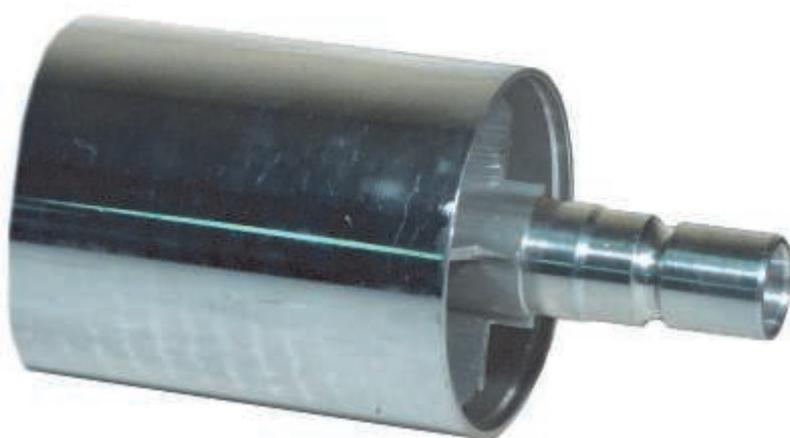
## THE PROBLEM:

Check shallow counterbore while the  
workpiece is still in the lathe. A post  
sticks from the end, so using standard  
caliper or bore gage is impossible.

## THE SOLUTION:

*ARNOLD GAUGE* designed  
and built this custom counterbore gage.  
The following features were included:

- Large cutout to allow clearance for  
the post and the lathe tailstock  
support
- Pilot diameter on gage body to help  
with loading and to protect the  
gage contacts
- Ruby gage contacts to keep from  
scratching the soft aluminum  
workpiece



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# VARIABLE...



Checks Small Electronics Component



Checks Diameters of Two Connecting Rod



Variable Sweep Gage Station  
Checks Crankshaft Oil Holes



Custom Ball Arbor Checks Runout

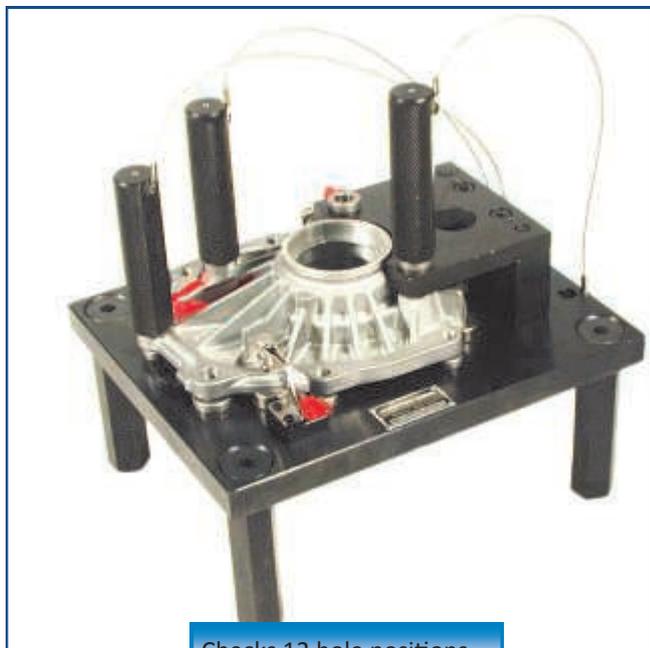
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# GO/NO-GO GAGES



Checks 12 hole positions



Checks clearance radii for brake caliper parts



Checks 18 hole positions



Checks 18 hole positions on mating part

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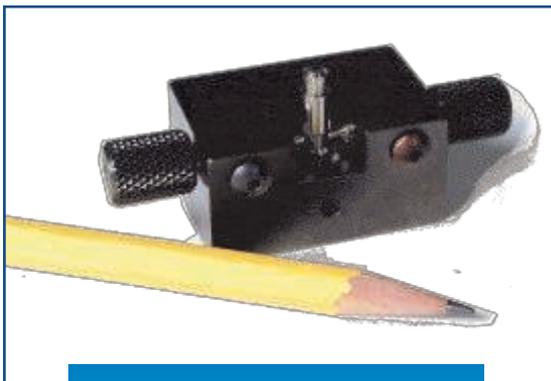
# GO/NO-GO GAGES



Checks widths and ODs on rubber stopper for medicine manufacturer



Custom flush pin gages to check deep hole and chamfer depths



Checks multiple features on tiny component for defense contractor



Checks hole location for transmission housing

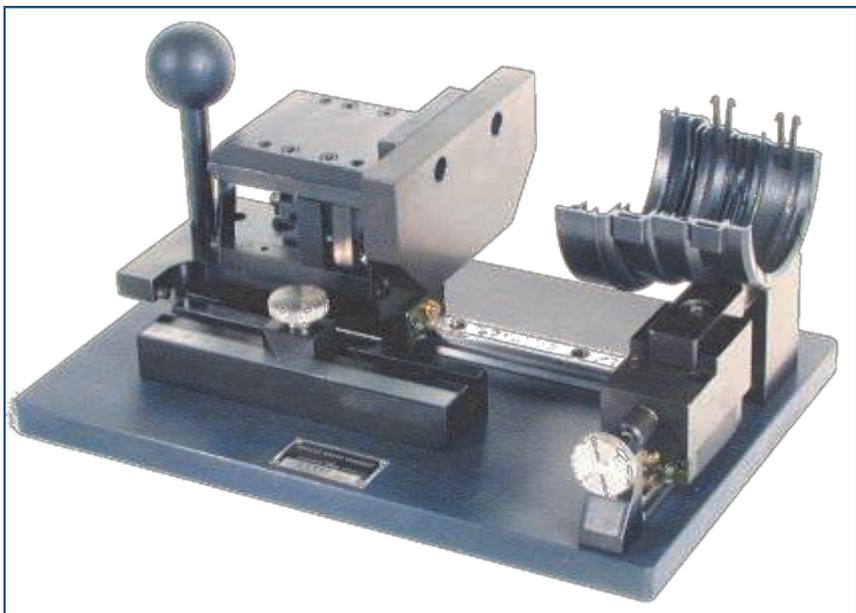
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# CMM FIXTURES...



## THE CUSTOMER:

Home electronics supplier

## THE PROBLEM:

Hold and mechanically align a plastic workpiece accurately without spending extra time for electronic alignment

## THE SOLUTION:

We designed this fixture with a sensitive, spring loaded aligning plate. It delivers the same amount of light spring force regardless of operator. Previously, the customer had to spend several minutes electronically aligning each part before inspection. This fixture aligned each part in seconds, allowing much higher CMM capacity.

## THE CUSTOMER:

Diesel truck engine manufacturer

## THE PROBLEM:

Hold an intake manifold vertically, with maximum clearance around part for CMM probe and no pinch points

## THE SOLUTION:

A simple, lightweight fixture with plenty of clearance for both the CMM and the operators hands.



WHAT CAN WE MEASURE FOR YOU?

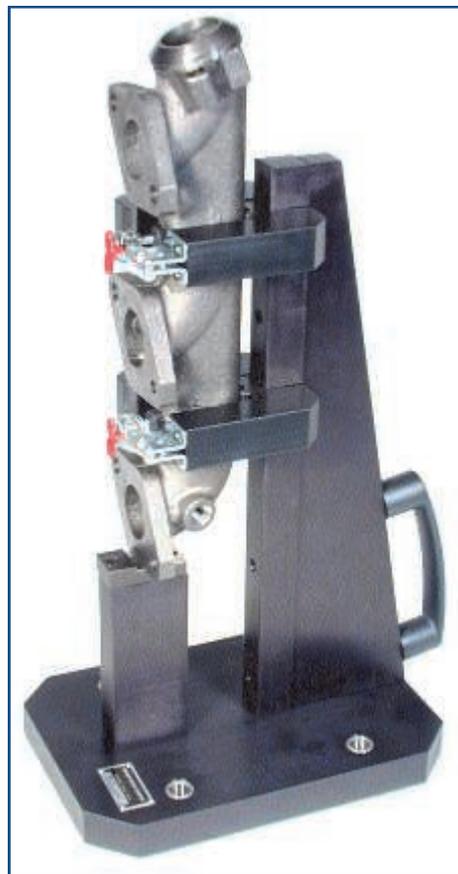


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# CMM FIXTURES...



Various CMM Fixtures

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# SPECIAL SOLUTIONS



Checks reamer OD using laser scan micrometer



Complete gaging workstation



Checks length, width, and squareness on 15 foot long sheet-metal for home appliance manufacturer



Checks tensile strength using precision weights and spring loaded release handle to eliminate shock load

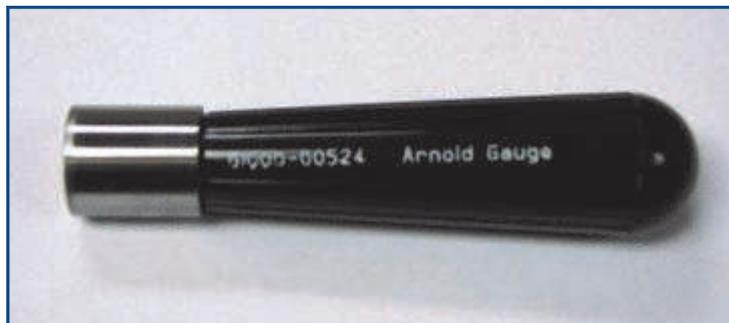
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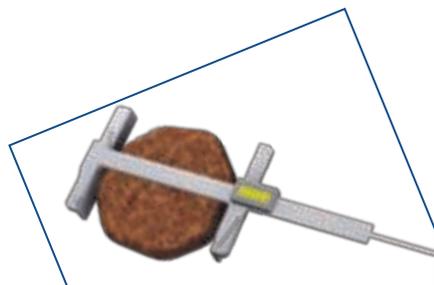
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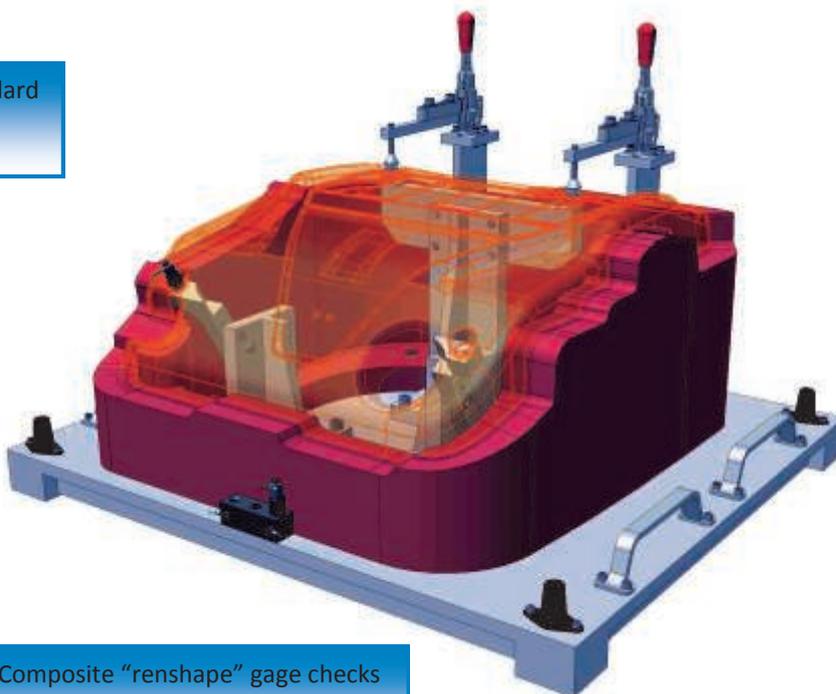
# SPECIAL SOLUTIONS



Custom plug gage with a close tolerance (.0001") slot. The customer received over a dozen "no-quotes", but we specialize in these types of high-precision solutions



Custom food-safe composite jaws on a standard caliper to measure hamburger patties



Composite "renshape" gage checks profile of a large molded plastic part

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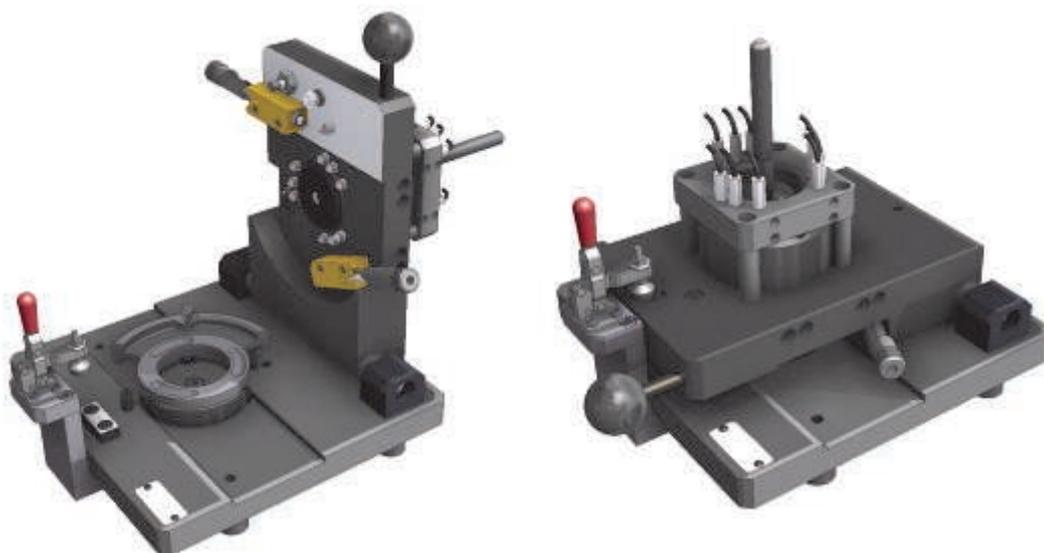
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# FROM MANUAL TO AUTOMATIC

## MANUAL SOLUTION

This gage checks complex profile geometry on a transmission component. The part is loaded, and the "lid" closes like a waffle iron. This allows the operator to check a part in just a few seconds.



## AUTOMATIC SOLUTION

When our customer ramped up production, they wanted a more automated solution. We adapted the proven measurement features of the manual gage into a fully automatic gaging machine.

We also added new features such as engraving parts for traceability.

Several critical components are shared between the two gages, simplifying the task of stocking spare parts.

The operator is now freed up to spend more time on the machining process.



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# IN-PROCESS GRINDING GAGES

In addition to custom gages, we make the world's best in-process OD grinding gage.

The *ARNOLD* In-Process Grinding Gage saves you time and money by measuring your workpiece at the same time it is being ground.

Now, there is no need to stop your grinder to measure a part. Simply grind until the indicator reads "zero". Higher productivity, and precision sizes every time.

Since 1918, over 75,000 satisfied customers have been saving time and money with *ARNOLD* grinding gages.



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# ARNOLD GAUGE

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[www.arnoldgauge.com](http://www.arnoldgauge.com) [info@arnoldgauge.com](mailto:info@arnoldgauge.com)

Do you have a tough gaging problem?

**Mikes and Calipers just don't cut it?**

**Another CMM is Not the solution?**

We have tackled hundreds of gaging problems for our customers in many industries:

- *Aerospace*
- *Medical*
- *Automotive*
- *Appliances*
- *Electronics*
- *Consumer Goods*
- *Technology*
- *Energy*
- *Defense*

## A brief history of **ARNOLD GAUGE**

In 1918, Henry Ford asked one of his trusted quality engineers, Philip S. Arnold to improve the quality of his automotive parts. In the basement of his home, Philip invented and began building in-process grinding gages for Ford and other automotive companies. These gages became so popular that he founded the *ARNOLD GAUGE* Company in Flint, Michigan.

In 1973, the Bruns family brought *ARNOLD GAUGE* to Cincinnati, Ohio. Since then we have expanded our offerings to include custom gages of all types and sizes: simple GO/NO-GO gages, complete automated solutions, and everything in between.

### **Send your part print today.**

We'll work with you to provide the best measurement solution for your needs. Whether your solution requires simple GO/NO-GO tooling, digital contact measurement, or the latest in laser and optical technology, *ARNOLD GAUGE* is ready to tackle your gaging problems.

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