





CONTROL GAGING

World class in-process control

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Founder Jack Brown formed the Michigan-based Control Gaging Inc. in 1972 to address an industry need for more sophisticated instruments to control automatic machinery and produce higher quality products.

Even then, Control Gaging's industrial pioneer recognized the need to improve performance and reduce setup time.

He patented the world's first quick setup gage head that took in-process gaging to a new level of reliability and efficiency.

For over 40 years since the first innovation, Control Gaging has gained international respect by responding to the diverse needs of the machining industry with innovative gaging solutions.

Our accomplishments have led to continuous company growth with new products, expanded facilities and an expert team throughout North America.

We know from experience, that automatic control of your machining process through real-time measurement can cut your production costs through improved productivity and quality.

Today's highly competitive marketplace requires reliable gaging systems. Control Gaging responds to your needs with gages that are easy to setup, produce precise measurements and are extremely reliable.

Our dedication to fast customer response and continuous improvement combine to reduce your costly downtime.

As a vertically integrated company, we offer our customers a comprehensive solution and unmatched support.

Control Gaging Inc.'s trademark standards for high quality are reinforced by our ISO 9001:2008 certification.





SAVE TIME AND MONEY

with automated gage systems

In 2007 Control Gaging joined the Marposs Group. This has given our international customers access to a much larger sales and service network. Joining the Marposs Group has also enhanced our strength and given us access to a wider array of technologies.

Our broad customer base includes companies in:

aircraft/aerospace
bearing manufacturing
motorcycle manufacturing
pumps/compressors
small engines
automotive
electronic/electric
job shops
marine/outboard
truck/tractor and
medical industries

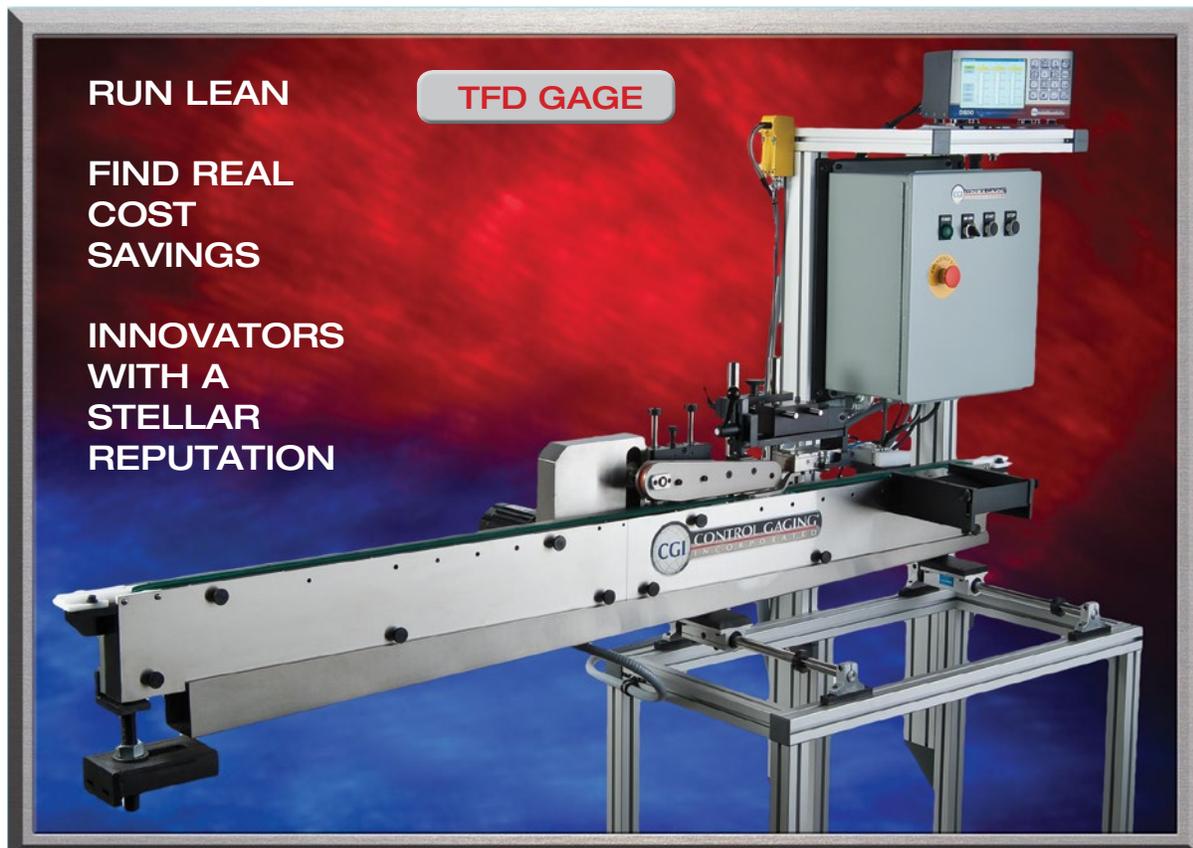
Through our extensive technical knowledge, innovative gage products and dedicated field service and support, we earn customer loyalty, one customer at a time.

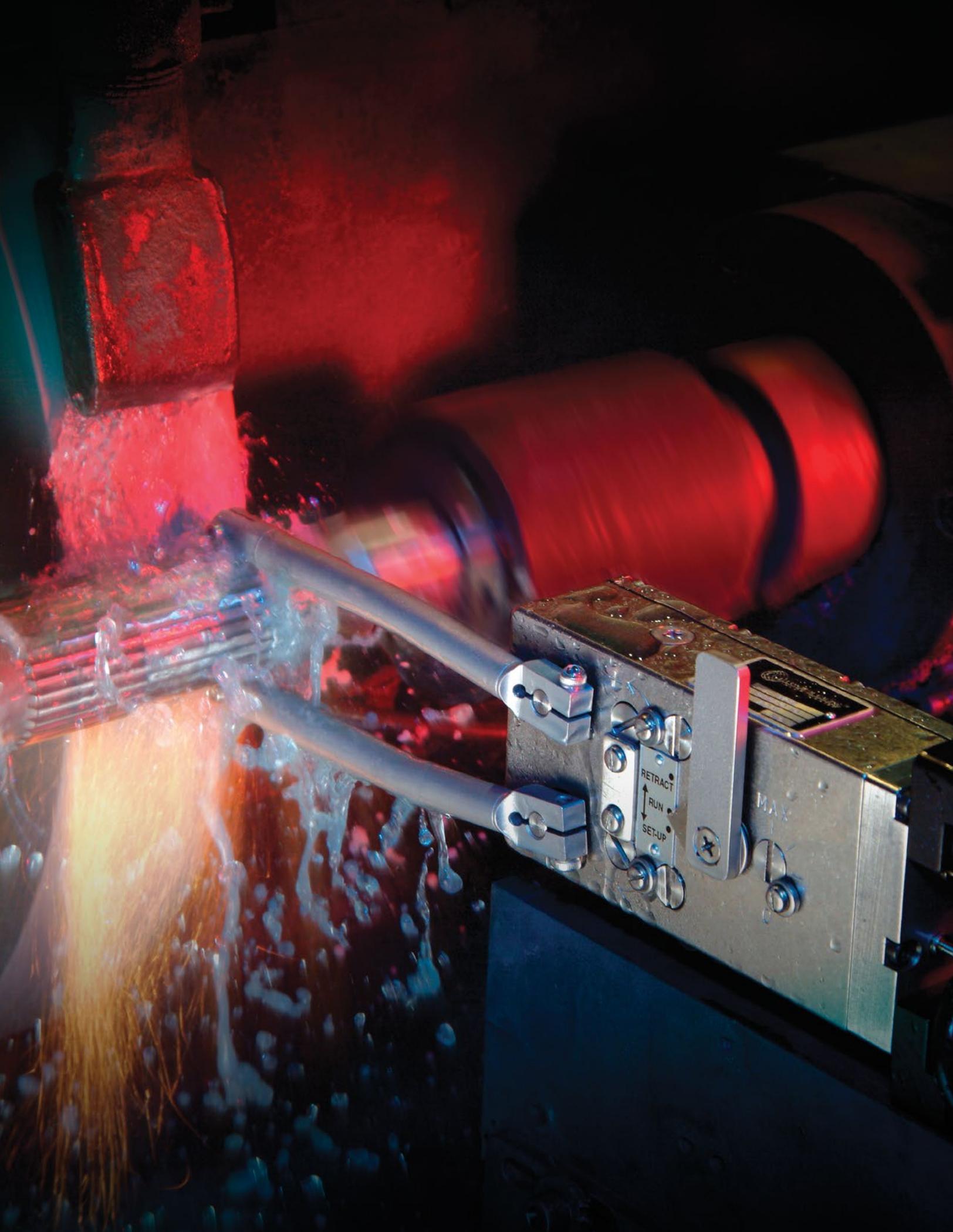
Machine Types

ID Grinders
OD Grinders
Universal Grinders
Stepgrinders
Form Grinders
Rotary Surface Grinders
Double Disc Grinders
Centerless Grinders
Turning Machines
Polishing Machines
Superfinishing Machines
Specialty Machines

Part Types

Bearings
Camshafts
Crankshafts
Splined Shafts
Connecting Rods
Drills & Reamers
Die Chaser Blanks
Pump Housings
Pistons
Armatures
And many, many, more





RETRACT
↑
RUN
↓
SET-UP

MAX



Quality

you can count on
every day
for over 40 years





QS100M GAGE

Control Gaging's single finger gages provide precise, reliable gaging for cost-effective measurement systems.

Available for smooth or interrupted surfaces, our single finger gages can be used for virtually any application.

Our QS100M Gage is an extremely precise and versatile single finger gage. The QS100M comes with an integrated quick set-up feature and is the first choice for most large ID, OD and length measurements.



DUAL WG1 GAGES (ID)

The Model WG1 Gage, available in both wide range or high retraction, provides high precision measurements in very tight spaces.

The WG1 can be used as a single point measurement for positioning or height measurement, or two can be paired to measure an ID, OD or length.

Control Gaging has developed hundreds of WG1 applications in both single and paired configurations for installations on many types of grinders, lathes and other machine tools.



31M GAGE

The Model 31M Gage is a single finger gage with integrated quick set-up.

The Model 31M is capable of handling applications that require a large amount of finger retraction.

Used with a standard finger length of 123mm, the Model 31M is capable of over 21mm of finger retraction. This high retraction feature makes the Model 31M the perfect choice for measuring deep ball tracks or for any application where a large amount of clearance is required.

SINGLE FINGER GAGE HEADS

Control Gaging's dual finger gages bring a new level of simplicity and reliability to the measurement world.

These gages feature stainless steel construction and are completely waterproof, suitable for use in the toughest environments.

The built-in quick set up feature of our dual finger gages minimizes part changeover time and also protects the gage from damage in case of a gage "wreck".

Downtime caused by part changeover and gage head problems is significantly reduced as is your on-site inventory of spare gages and gage components.

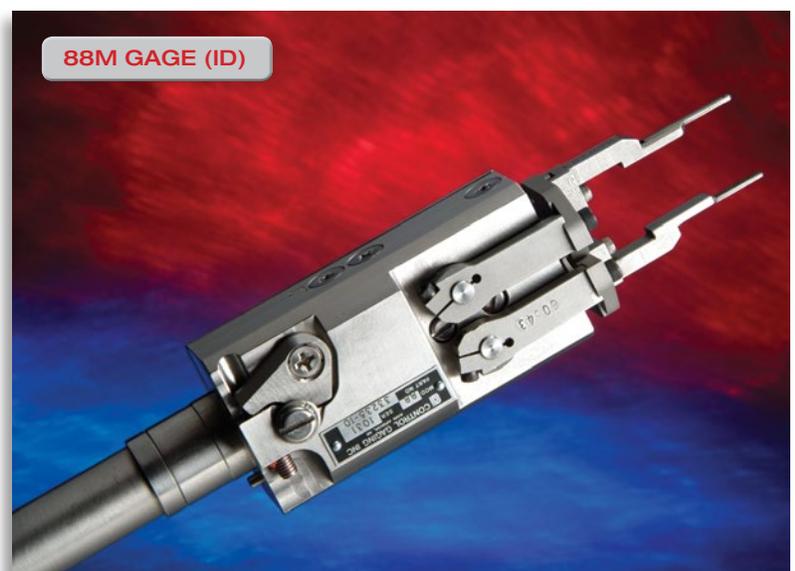
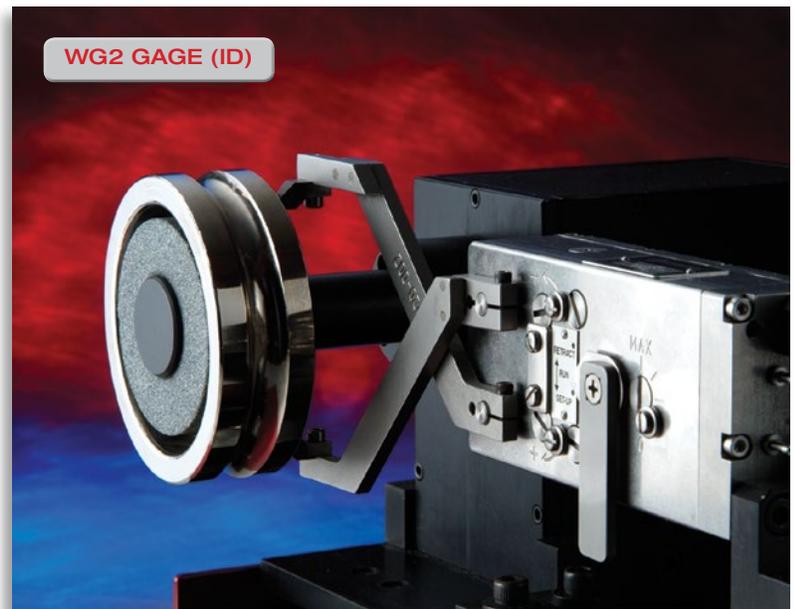
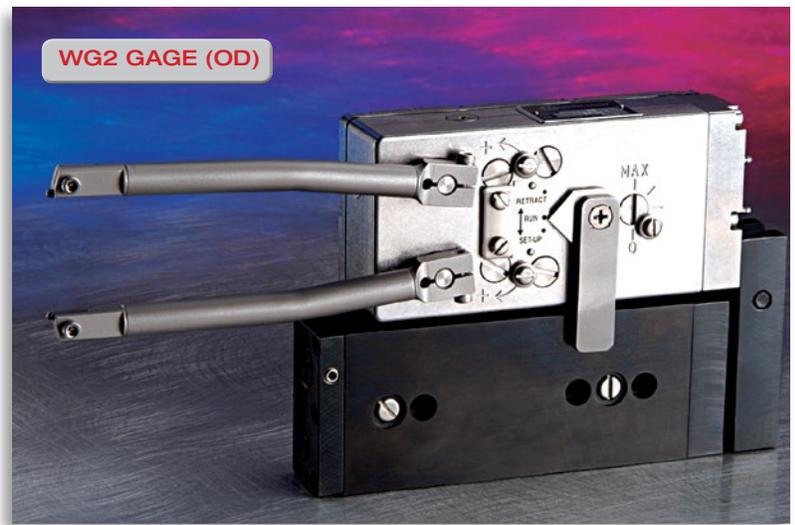
The **WG2 Dual Finger Gage** is the workhorse of our gage portfolio. The WG2 is cost-effective, easy to use and gives you years of trouble free performance.

The WG2 is suitable for OD or ID applications on interrupted or smooth surfaces.

The **Model 88 Thru-Spindle Gage** mounts inside the workhead spindle, allowing easy access to the machine chuck for workpiece load and unload.

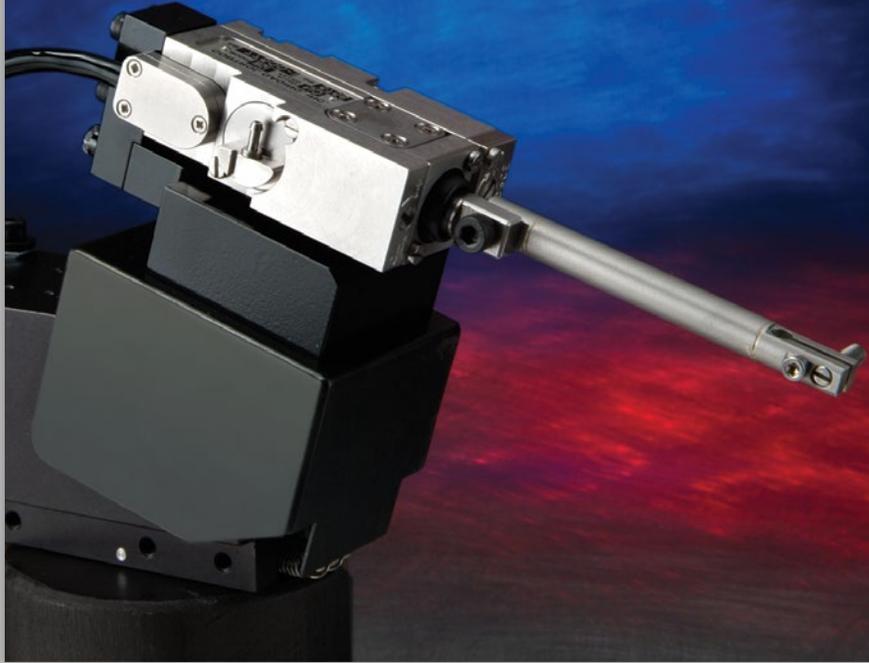
The Model 88 can be set up for a new part size without removing it from the spindle.

Precise reliable gage heads mounted to robust fixturing provide state-of-the-art process control on your machine tool.



DUAL FINGER GAGE HEADS

**WG1
ON TIP-UP
ACTUATOR**



When part locating is required, Model WG1 or Model 31M gages are perfectly suited for precise axial positioning of your workpiece prior to machining. Both gages are rugged and feature built-in pneumatic retraction mechanisms.

The WG1 or 31M can be mounted to a linear actuator or mounted on a DU95 "tip-up" actuator. The "tip-up" actuator advances the gage in an arc from underneath the workpiece for a quick and compact positioning solution.

Our gages can be used for either "active" or "passive" part location. With "active" part location, the part is moved into location while the gage is continuously reading the part position. With "passive" location, the gage provides a single reading showing the exact offset needed to properly position the part.

**D90
BALANCING
SYSTEM**



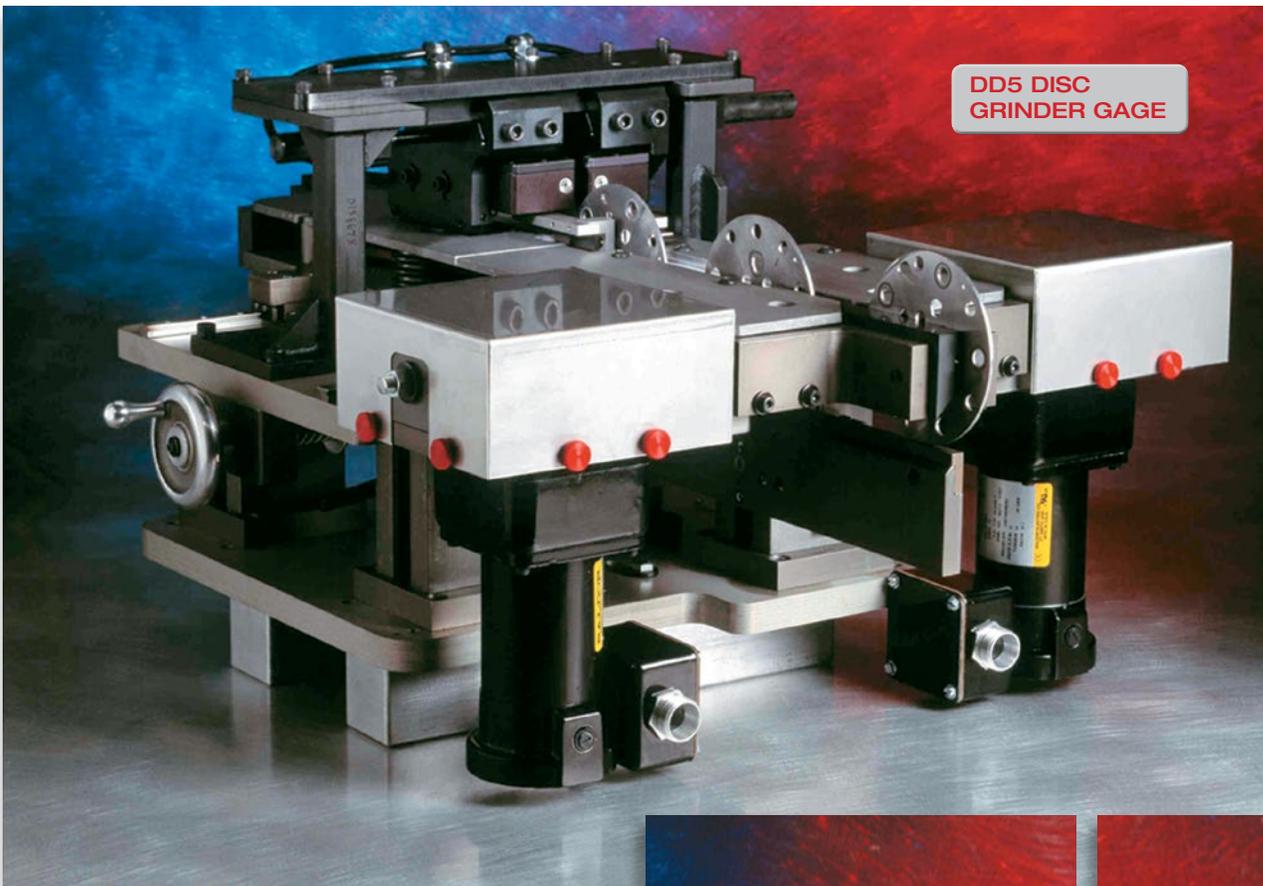
The D90 Grinding Wheel Balancing System reduces the vibrations caused by a grinding wheel, resulting in a better part finish and an extended machine life.

The D90 measures the vibration caused by an unbalanced grinding wheel and shifts weights attached to the wheel spindle until the vibration is neutralized.

The system can be applied to grinding operations over a wide range of wheel sizes, wheel speeds, machine types and wheel compositions.

The balancing head mounts easily to almost any wheel spindle with an adapter flange and nut. Machine downtime for installation is minimal.

LOCATING & WHEEL BALANCING



The DD5 Disc Grinder Gage System provides automatic grinder control based on real-time measurement of part thickness.

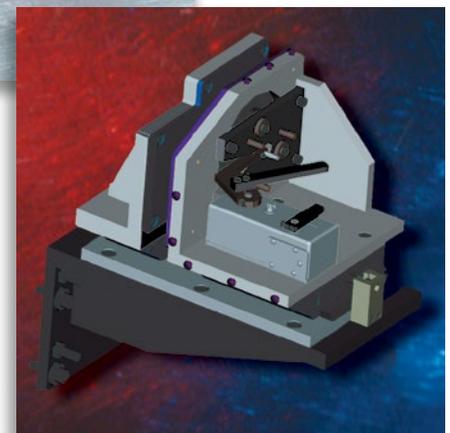
Machine compensation is optimized through statistical analysis of size data. The DD5 requires minimal maintenance and in most applications can be mounted on a linear slide to provide lateral movement for easy access to grinder exit guides.

As parts exit the grinder, they flow immediately into a urethane belt conveyor. Conveyor speed is set so that parts are accelerated and there is no back pressure to affect grinding. Each part is measured individually so part size data can be used to divert oversize or undersize parts from the part stream.

The DD5 is ideal for fine blanking parts, bearings, gears, washers, valve seat inserts and plates.



Dual Wheel-Position Gages



DDP Rotary Carrier Gage

Dual Wheel-Position Gages

The gage system controls workpiece thickness by measuring the position of the disc grinder's abrasive wheels during the plunge feed operation. Final positions of the wheel faces are consistent every cycle, regardless of wheel wear.

DDP Rotary Carrier Gage

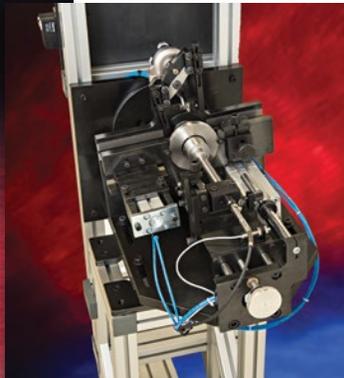
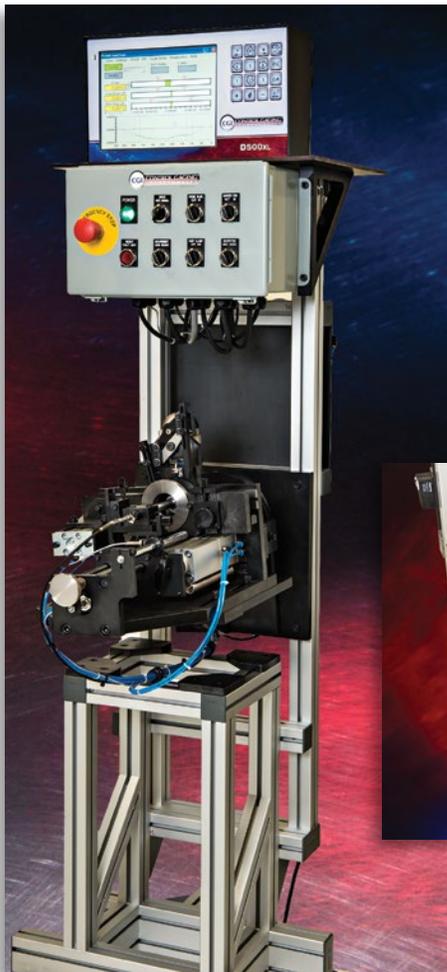
After grinding, the machine's rotary carrier drives the parts through a spring loaded gage fixture. The gage system sends compensation commands to the machine's control to compensate for wheel wear and maintain workpiece size.

DISC GRINDER GAGES

When it comes to in-line Post Process Systems, Control Gaging has the technology and innovation that sets us apart from the rest of the industry. We know that the job of a post process gage is extremely demanding and requires laboratory-precise, factory-tough measuring instruments, combined with extremely accurate mechanical location.

In addition to verifying (or rejecting) each part, the gage controller must also analyze the process trend and provide control outputs to the machine to optimize product quality. Control Gaging builds four decades of measurement knowledge and process experience into every post process system we produce.

We have a post process ideology that does not stop with just passing the Gage R&R, but has four primary components:



First, whenever possible we use our proprietary gage heads, which we have continued to refine and improve upon for over forty years. Our gage heads set the standard for factory floor accuracy, durability and quick set-up.

Second, our innovative parts-handling and dynamic part-locating mechanisms enable us to provide multiple measurements and calculations at remarkable, reliable throughput rates.

Third, every application in today's environment is unique. Our D500 Gage Controllers can be configured to exactly meet the run-time screen display, touch-screen operator interface and machine control output requirements for your specific process.

POST PROCESS SYSTEMS



And fourth, we provide a “partner-oriented” approach to all our service functions. From the earliest sales engineering steps to in-plant installation and field support, our flexibility and responsiveness to changing customer demands have won us many long-term customers.

Control Gaging has produced in-line post process systems for large and small companies in a variety of industries. Our applications have covered a wide array of part types and sizes with tolerances as low as a few microns. A few of our latest systems are shown here:

Pneumatic ID Scanning Gage (top left) – This gage system measures an engine lash adjuster with a 9mm blind bore ID and a 5 micron tolerance. The ID is scanned using a servo driven annular ring pneumatic plug, with size readings assigned to exact positions along the length of the bore. Parts are received, measured and segregated in under 8 seconds.

Contact ID Scanning Gage (bottom left) – Utilizing a contact style ID plug, this system checks the ID as well as the crown of a u-joint bearing cap following ID grinding. In addition to calculating the crown size, the crown profile is also traced and displayed on the gage controller.



Flexible OD Contact Gage Contact Gage (above) – For an application where part changeover times were very tight, Control Gaging produced a system that measures universal joint bearing journals following a hard turning operation. With the ability to change over between seven different part sizes in under five minutes, Control Gaging had the solution our customer was looking for.

Control Gaging also excels at rebuilding and retooling your existing post process systems. We have a proven track record of converting old and tired post process systems supplied by our competitors into new and durable assets at a much lower cost than a complete replacement.

POST PROCESS SYSTEMS



With hundreds of centerless gage applications operating throughout the world, Control Gaging is the world leader in measurement and process control for centerless grinders. Unlike other companies that attempt to force the same measurement technology onto every application, Control Gaging recognizes that each application has unique requirements and can offer all three of the most popular measurement technologies, depending on the specific needs of our customers.

Our solutions were all specifically designed for centerless grinder measurement, a testament to our focus and commitment to address the very specific needs of this market.

With the measurement technology to suit your needs and the vast experience to back it up, Control Gaging is the obvious choice for your centerless grinder.

A CHOICE OF MEASUREMENT TECHNOLOGIES TO SUIT YOUR NEEDS

	ACCURACY	FLEXIBILITY	ENVIRONMENT	SPEED	MAINTENANCE
CONTACT	Good	Good	Best	Best	Good
PNEUMATIC	Best	Inferior	Good	Inferior	Best
OPTICAL/ LASER	Inferior	Best	Inferior	Good	Inferior



In addition to being able to supply all three measurement technologies, Control Gaging has also developed many specialized solutions for parts that are difficult to measure. Whether it is the size of the part or the speed of the process, we almost always have a proven solution that will do the job and do it well.

A prime example of one of our specialized solutions is the TFR Gage (shown to the left). The TFR Gage was specifically designed for manufacturers of precision ground rings.

The TFR uses an innovative process to gage individual parts. As parts leave the grinder, they are laid flat onto the conveyor. As they move toward the gage, parts are centered via side guides and presented to the TFR. The TFR takes a diameter reading of each part as it passes through the gage.

CENTERLESS GRINDER SOLUTIONS

The TFD family of gages from Control Gaging leads the way when it comes to conveyor mounted contact solutions.

The mainstay, **TFD Gage** (inside cover) is ideal for small shafts and spools with tolerances of 8 microns or greater.

For tighter tolerances, the Control Gaging **PTFD Gage** (shown right) is our latest addition and is suitable for tolerances down to 2.5 microns.

The **TFD-24 Gage** (facing page) rounds out the family and is specifically designed for long shafts like shock absorber rods.



In cases where an optical or laser gage is the appropriate technology, Control Gaging offers the **TFO Gage**.

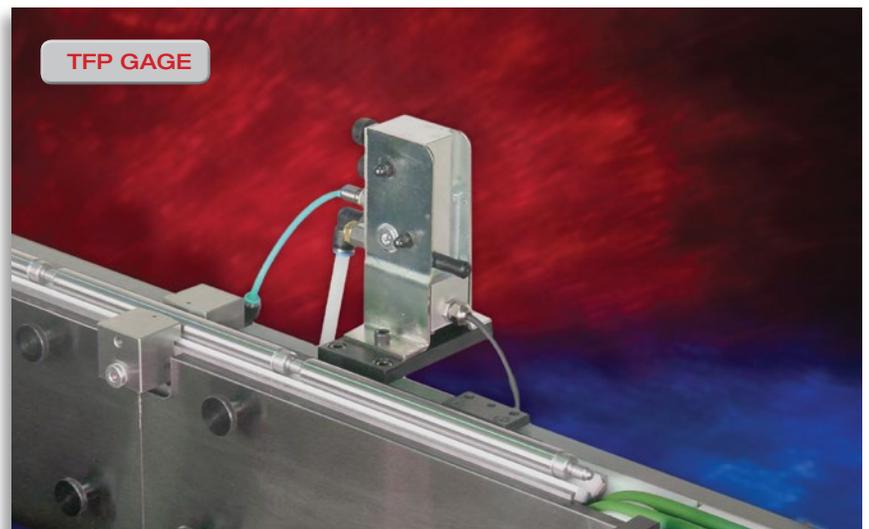
The TFO's emitter produces an infrared light curtain of aligned beams, which projects onto the workpiece; the shadow cast on the receiver is captured by the TFO's CCD sensor to measure the diameter of a part.

The TFO is able to measure a wide range of part sizes with no adjustments or tooling changes.

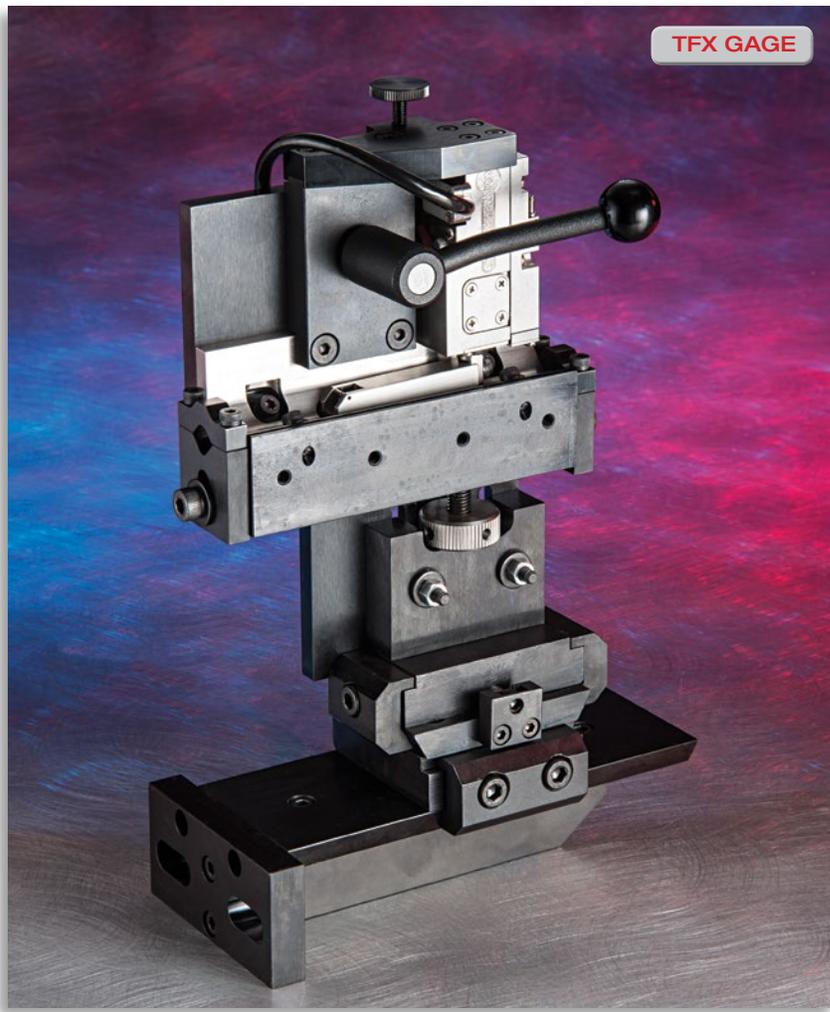


If the application requires a pneumatic measurement solution, Control Gaging has that covered also. Control Gaging's **TFP Gage** provides a highly repeatable measuring solution using pneumatic measurement technology to deliver superior accuracy.

Workpieces are driven by our dual belt conveyor through the precision gage fixture where they are measured with pneumatic jets. An air to electronic converter, working in conjunction with our D500 Controller, calculates the size of each workpiece.



CONVEYOR MOUNTED THRU-FEED CENTERLESS GAGES



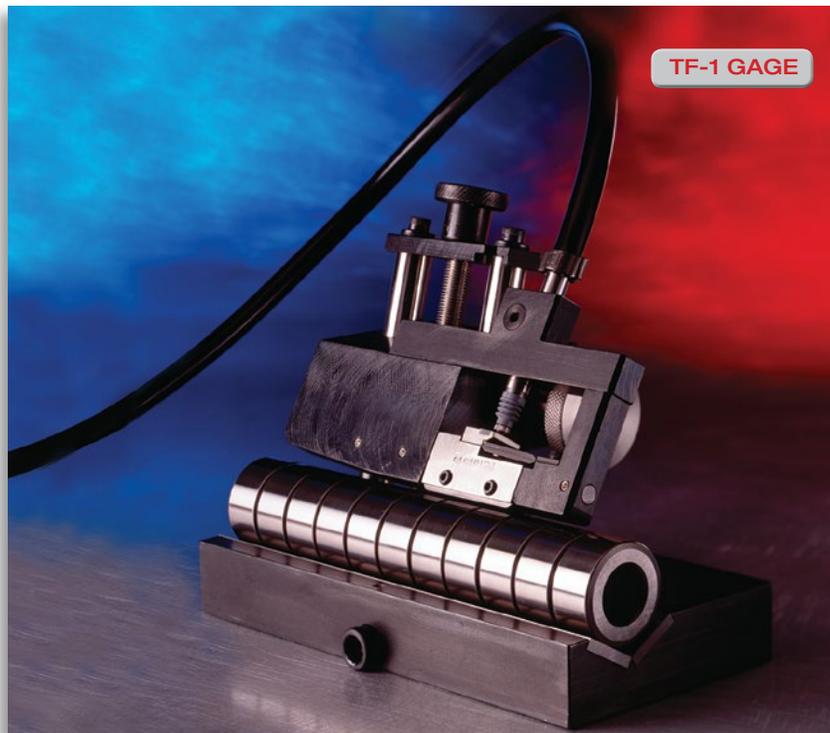
TFX GAGE

The TFX Gage is a high accuracy gage fixture that measures parts immediately after they exit a centerless grinder. Capable of measuring parts at speeds up to 20 meters per minute (800 ipm), with tolerances as low as .004mm, the TFX is your best choice for automatic grinder control of small diameter parts like needle rollers, pins and small spools.

The TFX utilizes a carbide vee for part stabilization and WG1 Gage for the active measurement. The simplicity of the TFX makes it a reliable and easy to use solution.

The TFX comes with an adjustable mount that attaches to the grinder's workrest. Parts can be transitioned into the gage using an adjustable part guide or can be tube fed directly from the machine's blade.

A part diverter is also available to remove oversize or undersize parts to increase your processing efficiency.



TF-1 GAGE

For your general purpose gaging, the TF-1 Gage adapts to almost any thru-feed centerless grinder. The gage fixture mounts to the grinder's exit workrest. As parts exit the grinder, a carbide vee channels the parts into the gaging portion of the fixture.

An adjustable height carbide shoe contacts the moving part, which transfers the displacement to an easily replaceable LVDT probe.

The TF-1 is suitable for parts with tolerances of .005mm or greater and is your best choice for automatic grinder control of parts like cam followers, piston pins, bearing rollers, spools and valve guides.

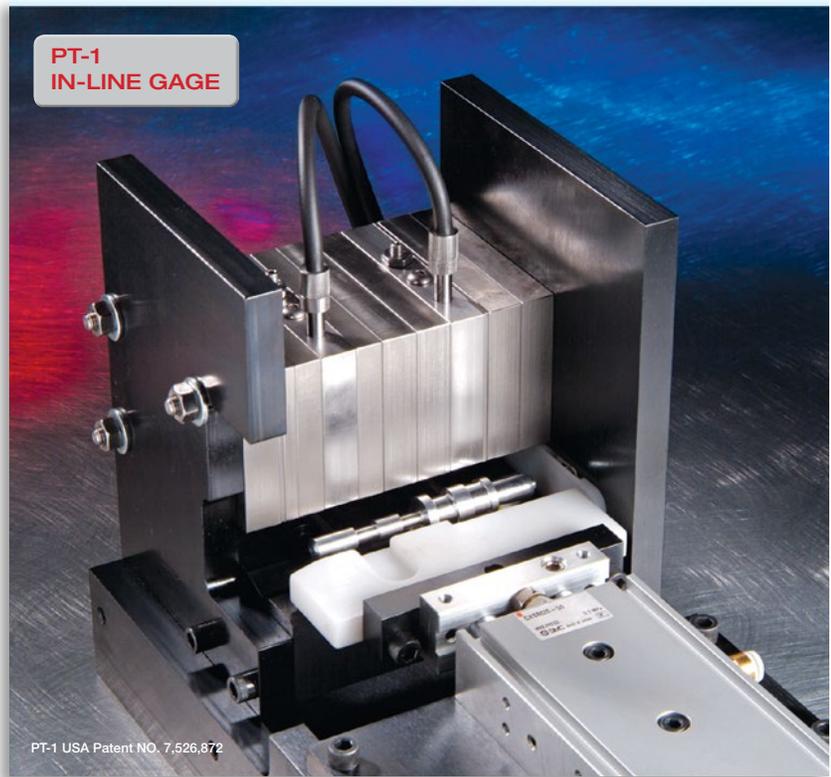
WORKREST MOUNTED THRU-FEED CENTERLESS GAGES

Control Gaging excels at designing and producing post process gages for in-feed grinder control.

Our design philosophy is that gages should be easy to use, easy to set up and easy to maintain. Our approach to gage design ensures that you will have operator acceptance and years of trouble-free operation.

The **PT-1 In-Line Gage** measures up to two diameters simultaneously. The PT-1 Gage is designed to be installed adjacent to the producing machine tool.

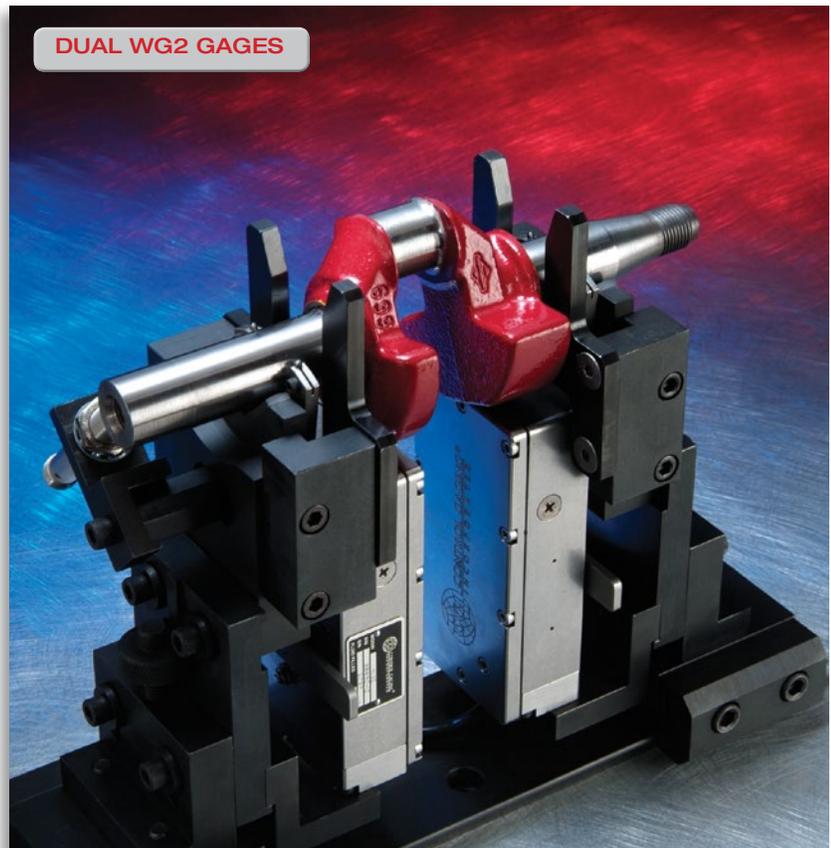
Parts are measured individually as they are pushed through the gage station. The PT-1 Gage is ideal for measuring small parts produced by in-feed grinding, turning machines or screw machines.



Control Gaging has many existing designs that can be adapted to your current application, or our experienced design engineers can create a new solution to solve your current measurement problem.

Dual WG2 Gages can be mounted in a reconfigurable fixture, providing automatic closed loop control of your in-feed centerless grinder.

The gages are conveniently mounted on a dovetail to allow for quick and simple lateral adjustment. Variable height part rests and the quick set-up WG2 gages make part changeovers simple. The fixture can be loaded by a gantry or a robot and is compact enough to mount close to your grinder.



IN-FEED CENTERLESS GAGES



D100

The brain behind every gage system is its gage controller. The gage controller processes the gage signals, communicates with the machine and interfaces with the operator. Accuracy, speed, durability and ease of use are important characteristics of a gage controller.

The D100 is suitable for in-process measurement of one diameter or surface. It can be used to process the signal from a single finger gage or two single-finger gages used in an "A + B" configuration.



D500

The D500 takes advanced technology to a new level providing solutions for today's needs and tomorrow's toughest applications. The D500 accepts up to eight gages and provides communications to meet virtually any machine's requirements.

Equipped with a 5.7 inch color LCD display and an easy to navigate operator interface, the D500 is a powerful tool that your machine operators will appreciate and your quality department will insist on.



D500XL

The D500XL is an enhanced version of the D500. Utilizing a 10.7 inch color touch screen, the D500XL takes the user experience to a new level.

With up to 16 gage inputs and the increased screen size, the D500XL is perfectly suited for the most complicated post process systems.

The D500 and D500XL come equipped with a USB port so SPC data can be easily transferred to a flash drive.

Both controllers are also available in a stand alone chassis, panel mount chassis or in a remote front panel mount package.

CONTROLLERS



D500 Controller with IPC Software

Control your grinder to the best of its capability with **Intelligent Process Control Software (IPC)**.

Cutting cost and improving performance is what Control Gaging's IPC Software is all about. It controls your machine using real-time statistical analysis of part size data.

Optimum part size control continuously produces parts to the best of the machine's capability.

Our IPC Software employs a statistical process control technique which includes progressive adjusting of the Upper and Lower Control Limits.

Progressive adjusting of the control limits is accomplished by interpreting the ranges within part sub groups to determine the current stability and capability of the machine.

By progressively adjusting the control limits, the best response without over-compensating is insured.

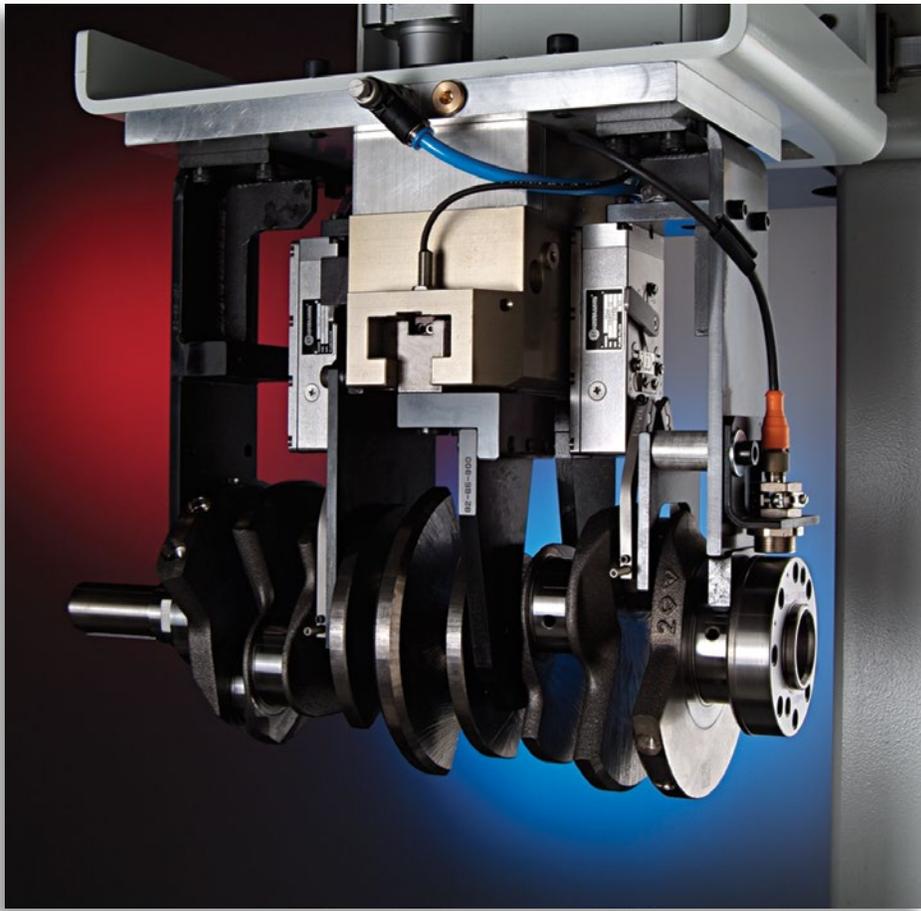
In order to provide quick response when your part size starts to trend away from nominal, IPC employs a scaled response time combined with proportional compensation.

As the average part size differs from the nominal size, compensation is initiated and sent to the machine to get your parts back to nominal size.

As a safeguard against erroneous compensations within production runs, the IPC software keeps track of the sequential part sizes and can be programmed to exclude anomalous part size readings from the compensation algorithms.

By progressively adjusting the control limits, scaling response time, sending a proportional compensation and using only good data points, the system creates a very narrow part size band, as tight as the machine's mechanical capability can produce.

IPC SOFTWARE



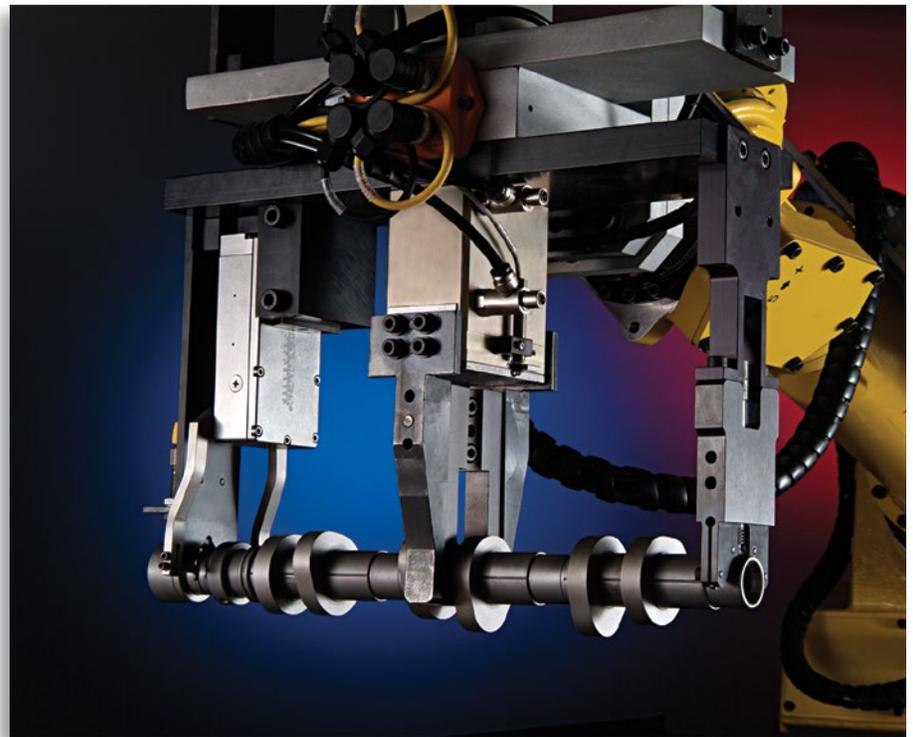
Gantry Mounted WG2 Gages

Control Gaging's **Grip-Gage-Go** brings lean manufacturing to a new level by integrating quick setup gages into part transport automation. The gages are mounted to robot or gantry end-effectors to automatically measure part size during the part load/unload cycle.

This gaging technique can be applied to turning, grinding and other metal cutting processes where automation is used to speed production. Rather than using the robot, gantry or pick-and-place machinery to simply move the part from place to place, precise part measurement is now available while the part is in the grip of the automation.

Each and every part is measured and size readings are used for tool compensation, statistical process control, part sorting and Cpk analysis.

Parts are pre-checked to avoid tool damage and post-checked to insure that out-of-spec parts are removed from the part stream.



Robot Mounted Quick Setup WG2 Gage and Chordal Gage

GRIP-GAGE-GO SYSTEMS



Integrating the lean manufacturing principle of “value-added flow”, the Grip-Gage-Go solution requires no additional floor space, reduces cycle time and eliminates the need for hand-loaded or robot-loaded bench gages.

Grip-Gage-Go handles a range of parts and quick setup features reduce part changeover costs. Designed for the harsh measurement environment found on production grinders, these precision gages provide years of trouble-free performance.

The electronic controls are “factory tough” with a simple-to-use interface.

Gage configurations are available for outside diameter measurement on drivetrain parts, electric motor shafts, crankshafts, camshafts and many others. Additional applications are under development.

GRIP-GAGE-GO SYSTEMS



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Published in the USA
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Design by Ralph Volk
Star Media Group, Inc