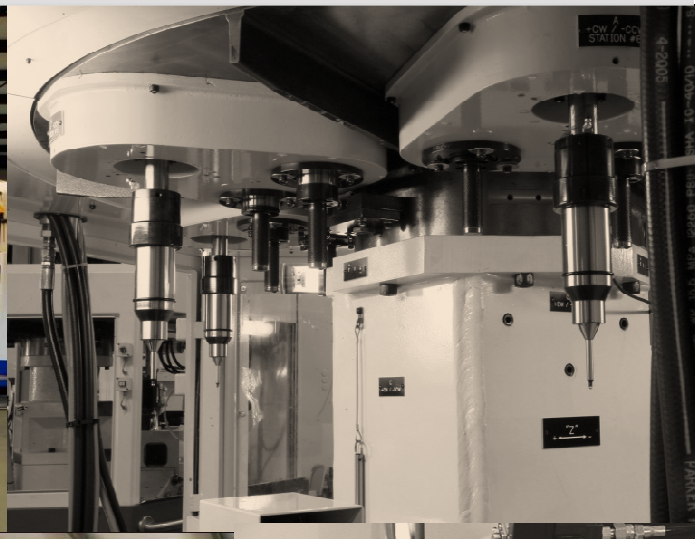
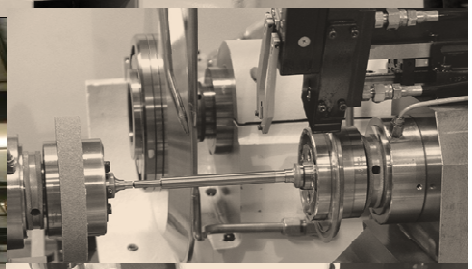
ITM

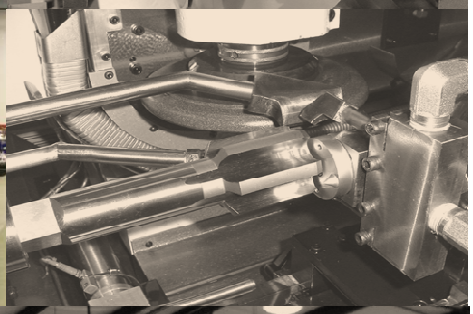
grind@itmfl.com
www.itmfl.com

PRECISION CNC GRINDING MACHINES

ITM HOLDS OVER 30 PATENTED MACHINE DESIGNS.







ITM Design & Manufacturing Facility
5 Industry Drive
Palm Coast, FL 32137
Tel.: 386-446-0500
Fax.: 386-445-5700

ITM Machines for your consideration:

FLUTE SERIES | PEEL SERIES | ROTARY SERIES | THREAD SERIES | FILTER SYSTEMS

FLUTE SERIES

Universal Flute Grinder

- *UFG-12, UFG-25, UFG-50*

UFG
4 CNC AXIS FLUTE GRINDING WITH CONVENTIONAL OR SUPERABRASIVE WHEELS

Universal Flute & Gunnose Grinder

- *UFGG*

UFGG
UP TO 7 CNC AXIS STRAIGHT FLUTES, RIGHT AND LEFT HAND FLUTES, GUNNOSE & CHAMFER

PEEL SERIES

Chamfer Grinder

Form Grinder

Peel & Plunge Grinder

- *PPG-250 & PPG-500*

CG	FMG	PPG
4 CNC AXES **TAPS:** CHAMFER WITH OR W/O RELIEF. COUNTERSINKS & ROUTERBITS	**MOTORSPINDLES UP TO 30HP** 2 CHUCKS FOR GRINDING BOTH PART ENDS MAINTAINS 0.01MM CONCENTRICITY	**GRIND BETWEEN CENTERS** HSS, CARBIDE & STAINLESS BLANKS GROUND TO HIGH TOLERANCE

ROTARY SERIES

Rotary Transfer Grinder - *Multi Station*

COMPLETE PRODUCTION OF TOOLS & PARTS IN UP TO 6 STATIONS

- ***For Automotive, Aerospace, Cutting Tool & Medical Industries***
- ***RTG Mini (Production of small tools)***
- ***RTG-3/2 & RTG-3/3 (Index Table with 3 Collets)***
- ***RTG-6/3, RTG-6/4 & RTG-6/5 (Index Table with 6 Collets)***

THREAD SERIES

UP TO 5 CNC AXES WITH MOTORSPINDLES UP TO 20HP

- ***Taps:*** *Thread and Chamfer in the same clamping*
- ***Thread Gages & Form Taps***
- ***Bone Screws***
- ***Thread Rolls*** *with up to 400 starts*
- ***General Thread Grinding with or without relief***
- ***Multi-rib or Single-rib Grinding***

FILTRATION SYSTEMS

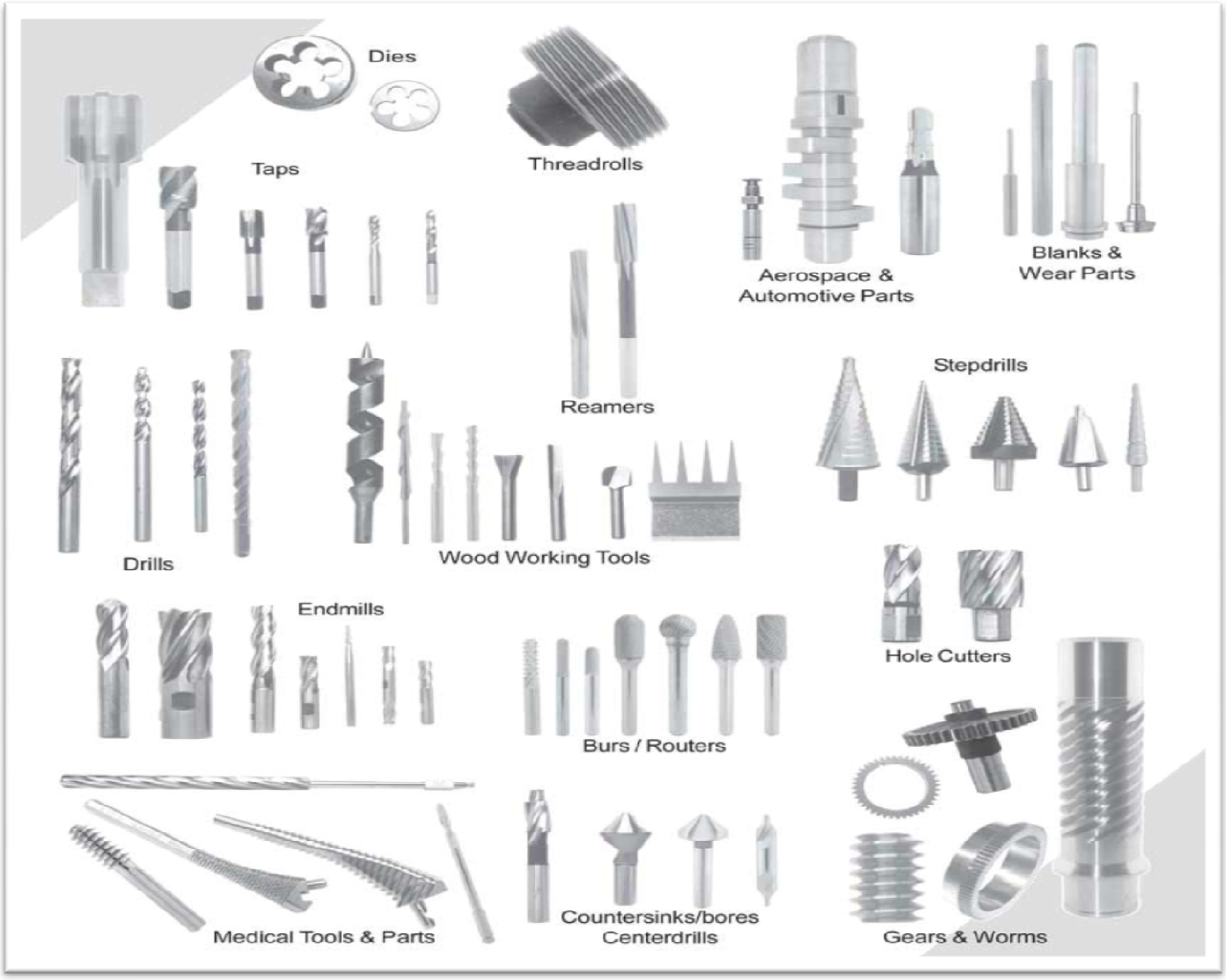
- ***AFS-8-200 Coolant Filtration System***
- ***Cleaning rate per filter dome 200-300 l/min (53-80gpm)***
- ***Up to 50 bar (800 psi) coolant pressure***
- ***Large Oil Reservoir up to 2000 liters (530 gallons)***
- ***Stand-Alone Sludge Drying Unit***
- ***Integrated Sludge Dryer to Recycle & Prolong Oil Usage***

Advanced 5µ Filtration

ITM Assembly Area

For over 30 years, ITM has been producing a variety of CNC grinding machines for worldwide customers from a variety of industry markets such as precision cutting tools, medical instruments, aerospace components, and the automotive industry. ITM designs the machines, develops software, assembles the components, and installs all the machine electronics at the Palm Coast, Florida facility. The machined and fabricated components are outsourced to carefully selected vendors in Florida, Connecticut, and Germany. Many of our vendors have been with ITM since the beginning of the company. By outsourcing these components, we are able to respond quickly when large multiple machine orders are placed and at other times of high demand.

Sample Applications for ITM Machines

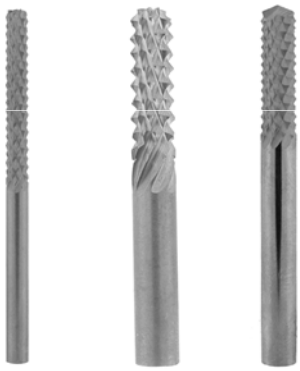


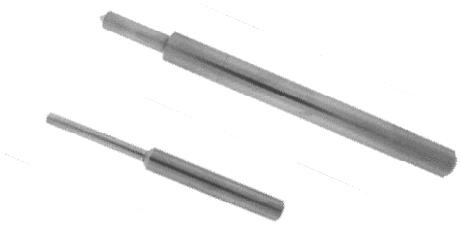
Success Stories

One of ITM's greatest success stories has been the development of our ever-expanding line of Rotary Transfer Grinders. Rotary Transfer Grinders divide up the operations to produce a complete part over up to 5 grinding stations. The end result is a high quality part at very high rates of production. The RTG is used in a variety of industry markets such as precision cutting tools, automotive industry, aerospace components and medical instruments.

CARBIDE DIAMOND CUT ROUTERS:

Finally, an ITM customer purchased a Multi Station Grinder to produce carbide, diamond cut, ball nose routers. ITM worked closely with this customer to optimize the machine and grinding technology for the production of these tools. Prior to delivery, the machine ran production for 3 months at ITM 24 hours a day, 7 days a week "lights out" and unattended operation overnight and on weekends. The machine is equipped with an automatic system to notify an attendant via telephone in the event of a machine alarm. With the ITM Multi Station Grinder, a complete part was ground every 72 seconds, and during the 3 month period a total of 85,000 parts were produced! During the same 3-month period, the customer's existing machine could produce a maximum of only 16,500 parts in a two shift five day operation!





CARBIDE DRILL BLANKS:

For a manufacturer of carbide drills, ITM built machines for preparing the carbide drill blanks that, with the use of high speed peel grinding, reduced the average cycle time to produce a complete blank from 25 minutes to 5!

CARBIDE TWIST DRILLS:

A customer who manufacturers carbide drills on an ITM Multi Station Grinder was able to reduce his cycle time to produce a complete high performance carbide drill from 10 minutes down to 2.5 minutes!

Success Stories

HSS TWIST DRILLS

The first ITM Rotary Transfer Grinder was developed for the production of HSS drills. One customer who selected ITM to be the main supplier of its HSS drill grinding machines purchased 41 Rotary Transfer Grinders over a 2-year period. The machines were purchased because of their small footprint, greatly reduced manpower requirements, and increased throughput. Throughput is increased by eliminating the scheduling difficulties associated with performing separate operations on multiple stand-alone machines.

HIP BROACHES

ITM was the first grinder manufacturer to develop a machine and automatic grinding process for producing stainless steel hip broaches used in hip joint replacement surgeries. Prior to purchasing ITM machines in 1985, the hip broaches were ground by hand using a labor-intensive process that required 11hours to produce a complete broach. With the new ITM process, the cycle time was reduced to 20 minutes and part quality was greatly improved!

HSS ROUTERS:

An ITM customer who manufactures HSS routers produces a complete router every 7.5 seconds with their Multi Station Grinders. This compares to over 60 seconds before the purchase of the ITM Rotary Transfer Grinders!

THREAD ROLLS

ITM developed a new machine and process for producing large high quality thread rolls. Prior to the purchase of the ITM grinders, the customer averaged 20 hours to produce one thread roll. With the ITM grinders, the customer was able to produce a complete thread roll in 50 minutes!

MOVING FORWARD

ITM is an application driven company. Our grinding machines are designed to provide our customers with the best possible solution to their manufacturing challenges. We are experienced at the efficient utilization of our resources to design and manufacture very forward thinking, cost-effective, and innovative machines. We operate in an organized way that creates an environment where things get done right the first time. We strive to stay focused on our goals and achieve them in the most efficient way possible. We are not afraid to question the way things have been done in the past. By doing so, we are able to deliver high quality, high value machines to our customers.

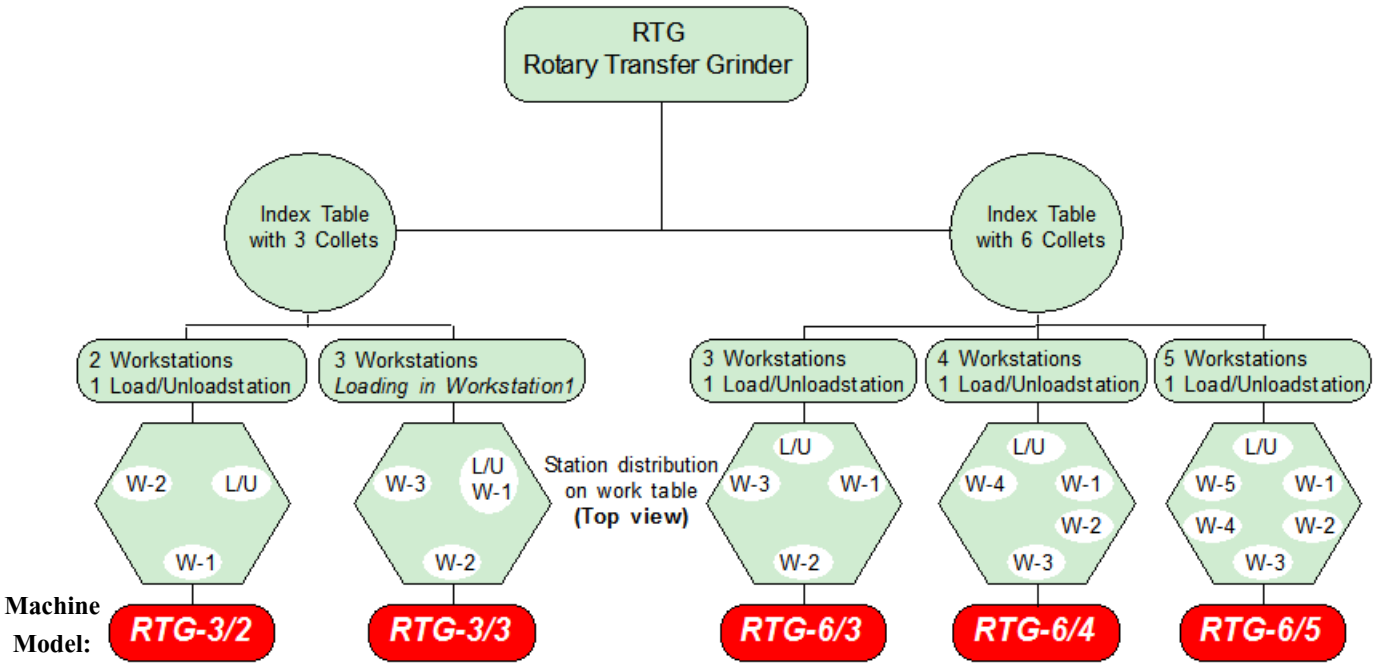
International Tool Machines

ROTARY SERIES

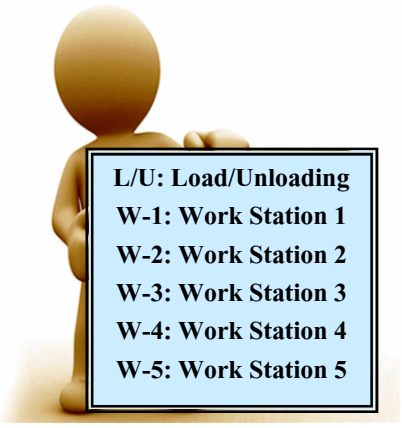
ADVANTAGE THROUGH KNOWLEDGE

Rotary Transfer Grinder

The RTG resembles a compact grinding cell consisting of up to 5 precision grinding stations connected by a high speed rotary transfer mechanism! The modular design of the RTG allows us to tailor each machine to the customers specific needs. The following schematic describes the variety of available machine models and the distribution of work stations and load/unload station on the worktable:



ITM holds over 30 patented machine designs.



MACHINE FEATURES

- *Modular Design of each Workstation*
- *All stations work simultaneously*
- *Part Transfer time 3-4 Seconds*
- *CNC Wheel Head Angle Flute 0-90°*
- *Water-cooled direct drive Motorspindles, 50HP, 20HP, 10HP with HSK quick change flanges*
- *Reliable FANUC Controls*
- *Inch/Metric switchable*
- *Bushing, V-Block or Tailstock Support*

MACHINE OPTIONS

- *CNC diamond roll dressers at each station*
- *Automatic Wheel Balancing*
- *Integrated Blank oversize check*
- *Integrated quality control*
- *Automatic Locating Probe*
- *Coolant Chambers and high pressure coolant*
- *including wheel scrubbers*

RTG – INDUSTRY APPLICATIONS

AUTOMOTIVE
** Gears * Drive train * Power train * Auto Parts * Cams **

AEROSPACE
** Aerospace * Parts & Tools **

MEDICAL
** Medical Parts * Medical Tools * Burs * Drills * Reamers **

TOOL & CUTTER
** Drills * Endmills * Inserts * Reamers * Stepdrills * Taps **

Partial Customer List

magafor

DIAMOND™ HOLE SAWS

SANDVIK

GREENLEE

Vermont American

KENNAMETAL

CATERPILLAR®

Balax

Sutton Tools

WILSON TOOL

WELDON

ONSRUD

DORMER

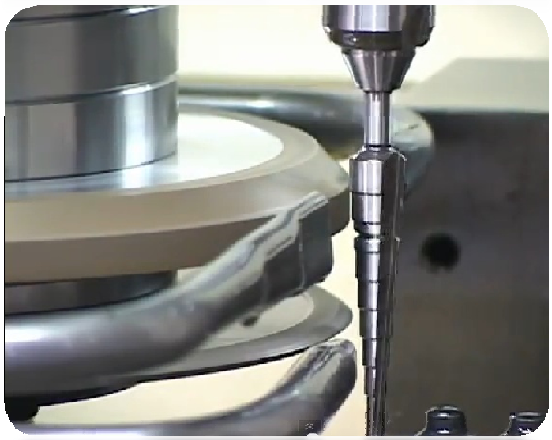
BorgWarner

Invented for life BOSCH

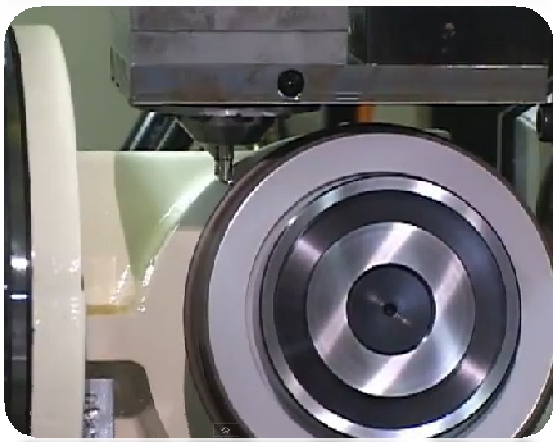
RTG for Tool & Cutter Industry

Sample Applications for Step Drills

FLUTE GRINDING STATION: To begin a production run, a part is presented to the rotary from the cassette loading system. The loader grips the part and transfers it via linear motion to the fluting station, where the part is parked in a position close to the collet. From the parking position the part is finally moved underneath the collet. Then the collet is moved downward controlled by the X-Axis and the part is clamped between the collet and the tailstock. Flute grinding begins, while the loader travels back to the loader to accept a new blank.



OD CLEARANCE / STEPS STATION: When the flutes are finished, the fluting rotary moves under the collet to accept the part and to transport it to the Step grinding station. While the Step grinding begins, the rotary table travels back to the parking position at the fluting station to accept the next part. The Steps can either be ground one after the other with one narrow wheel, or a wider wheel is used to grind all steps in one plunge grinding operation. To grind all steps at once, ITM offers two optional dressing systems: The two axis CNC dresser allows to generate all step forms on the wheels with one set of diamond tooling, whereas the one axis dresser requires a diamond form roll for each Step form to be ground.

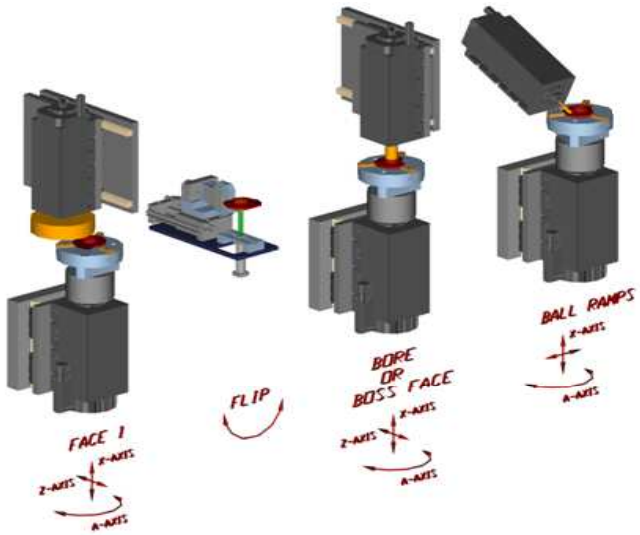


POINTING GRINDING STATION: The final operation is grinding the point at the third station. For maximum support a step bushing is used when the desired point configuration is generated with a 1-A-1 wheel in 5 CNC axes.

When the pointing is finished, the pointing rotary moves the finished tool to the loader, where it will be unloaded by the cassette loader followed by the immediate return of the pointer rotary to the parking position at the pointing station.

Rotary Transfer Grinder for Specialty Apps.

The RTG is geared towards tools and parts with multiple applications. The machine separates the grinding applications into different grinding stations all in one clamping. Below are some sample grinding applications we can perform on the Rotary Transfer Grinder for automotive parts.



RTG Applications for Inserts

Station 1: Locate & Finish Through Holes
Station 2: Locate & Cut Counterbores
Station 3: Through Hole Chamfer/Deburr

RTG for Twistdrills (Carbide, HSS & Stainless)

Station 1: Flutes Grinding Station
Station 2: Clearance Grinding Station
Station 3: Point (Split or Thinning) Station

For the production of Automotive Parts

Station 1: Face Grinding (Rotor & Sprocket)
Station 2: Bore/Counterbore Grinding (Rotor & Sprocket)
Station 3: Face Grinding (Housing Only)

RTG Applications for Annular Hole Cutters

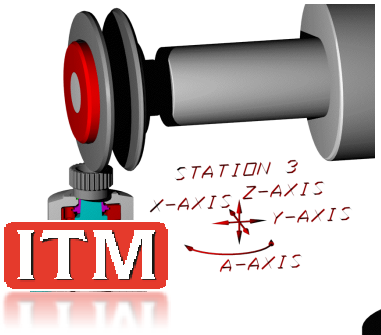
Station 1: Flutes Grinding Station
Station 2: OD Relief Grinding Station
Station 3: Endteeth Grinding Station

RTG Applications for Burs (Carbide & HSS)

Station 1: Flutes Grinding Station
Station 2: Chipbreakers Grinding Station
Station 3: Endface Grinding Station

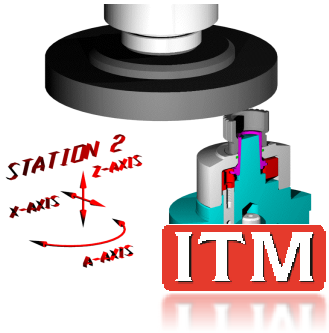
RTG for Endmills (Carbide & HSS)

Station 1: Flutes Grinding Station
Station 2: OD Relief Grinding Station
Station 3: Endteeth Grinding Station



GROVE GRINDING

FACE GRINDING



RTG FOR AUTOMOTIVE INDUSTRY

RTG with Robot Loader

RTG Applications for Auto Parts

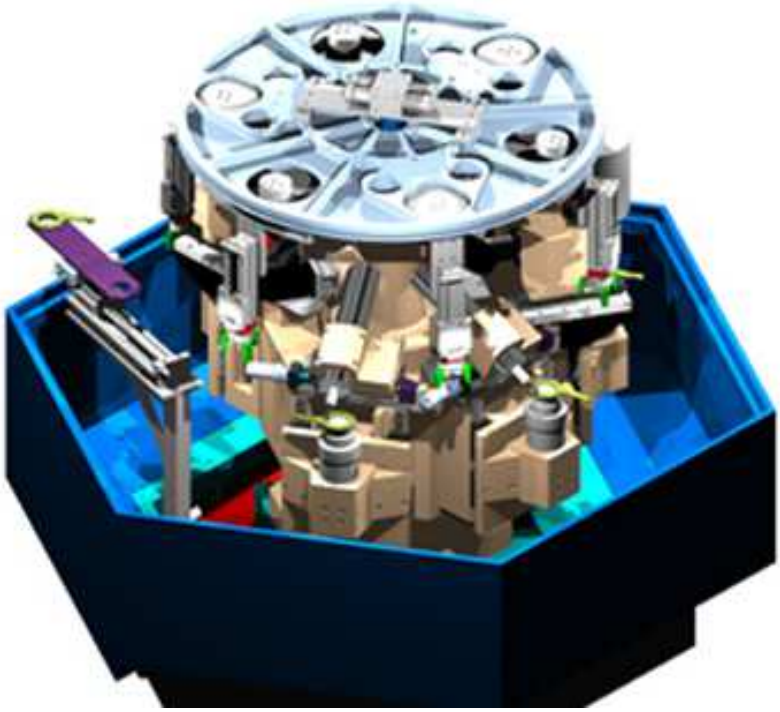
Station 1: Face Grinding Stations
Station 2: Face Grinding Stations
Station 3: Counterbore Grinding Station

For the production of Auto Components

Face Grinding Station(s)
Bore/Counterbore Grinding Station(s)

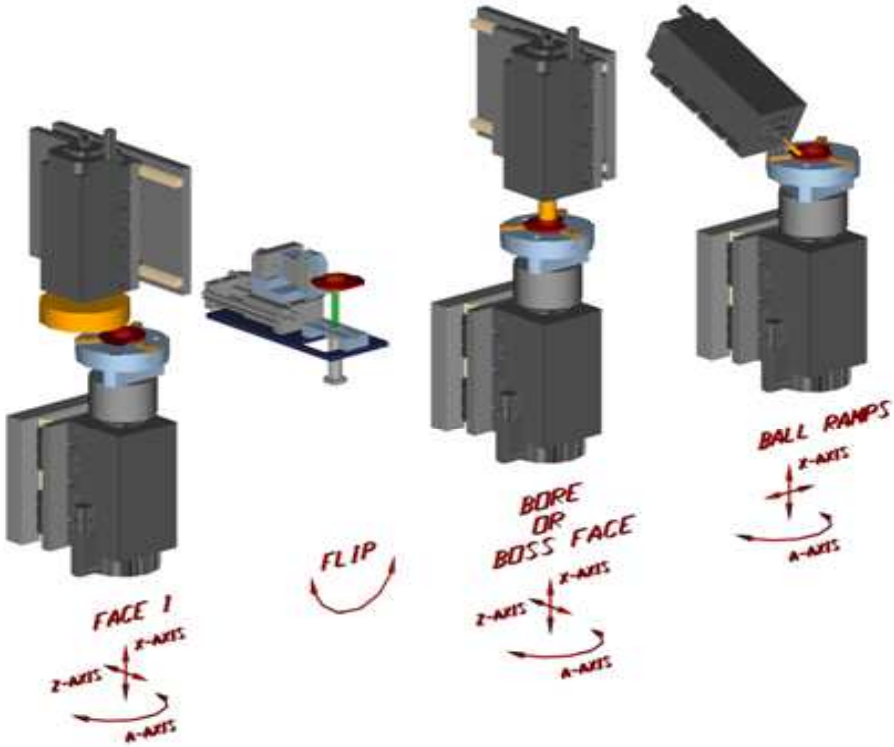
For the production of Auto Parts

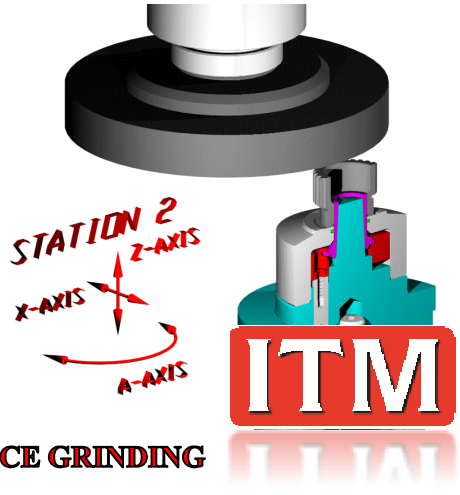
Station 1: Face Grinding (Rotor & Sprocket)
Station 2: Bore/Counterbore Grinding (Rotor & Sprocket)
Station 3: Face Grinding (Housing Only)



Rotary Transfer Grinder For Automotive Apps.

The RTG is specifically geared towards automotive parts with multiple applications. The machine separates the grinding applications into different grinding stations all in one clamping. Below are some sample grinding applications we can perform on the Rotary Transfer Grinder for automotive parts.





FACE GRINDING

GROVE GRINDING

Phone: 386-446-0500
Fax: 386-445-5700
Website: www.itmfl.com
Email: info@itmfl.com

ITM
International Tool Machines

FILTER SERIES

ADVANTAGE THROUGH KNOWLEDGE

ITM holds over 30 patented machine designs

Applications

Filter Panel

Advanced Filtration System

AFS-8-200 COOLANT FILTRATION SYSTEM

As a manufacturer of precision grinding machines, we know the importance of a precise, dependable coolant supply. Having this comprehensive coolant filtration system maximizes coolant effectiveness, longevity improving productivity and reducing disposal costs.

Filtration as small as 5 Microns

After a long period of research and testing, we selected DE coated candles in ITM Filter Systems enable filtration of particles as small as 5 microns versus 20 microns with conventional systems.

High Pressure Coolant Pumps

A variety of quality proven high pressure coolant pumps up to 800psi are available from selected manufacturers worldwide. Multiple pumps can be attached to each AFS-8-200 filter including pumps for "wheel scrubbing".

Operator Interface

Easy and safe operation by PLC or manual override with the use of simple controls and reference graphics and a LCD status panel that allows for manual adjustment of filter flush time and sludge dryer drying time.

Automatic Sludge Drying Cycle

ITM filters are equipped with a fully automatic sludge dryer in place of a standard vacuum system, to separate oil from the grinding sludge. After the filter has been dumped, the dirty oil with sludge is pumped into the dryer unit. The oil is separated and returned to the cleaning cycle by pressing it out of the sludge with the use of up to 6 bar (90 psi) air pressure. The cake, which is left, is then dried and automatically dumped into a disposal bin or further compressed by an automatic compactor.

Benefits of ITM's Coolant Filtration Systems:

- ***Large Oil Reservoir up to 2000 liters(530 gallons)***
- ***For filtration of steel, carbide, ceramic, glass & other materials***
- ***Filtration of particles as small as 5 Microns***
- ***Cleaning rate per filter dome 200 - 300 l/min (53-80 gpm)***
- ***8 m² (86 ft²) filter area per dome***
- ***Up to 50 bar (800 psi) coolant pressure***
- ***Recovers more coolant than vacuum or centrifuge systems***
- ***Extends coolant lifecycle***
- ***Chiller rating 92,000 btu/h (options available)***
- ***Coolant temperature maintained within 0.5 °C (1°F) for precision grinding***

Tel.: 386-446-0500
Mob.: 386-742-2152
Email: info@itmfl.com

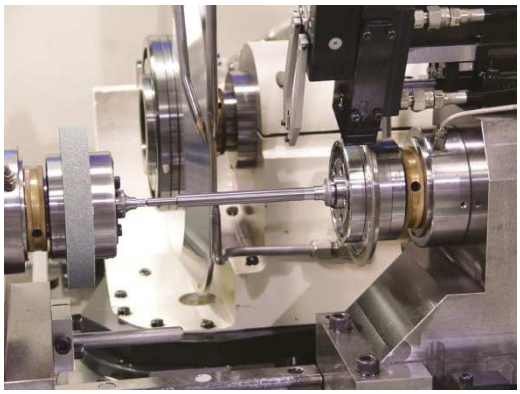
YOUR RESOURCE FOR ITM MACHINES

ITM holds over 30 patented machine designs

SERVICE

Shown Above:
Peel Grinder (PPG) & Flute Grinder (UFG)

SPARE PARTS



CNC-REBUILD

ITM developed a CNC rebuilding program that offers true OEM quality rebuild work to its customers. Complete rebuild projects have been performed on machines as old as 30+ years. To the utmost satisfaction of our customers, the retrofit program offers replacement controls as well as reconfiguring highly responsive drives and motor spindles. Many heavy duty and well engineered ITM machines re-gain new life with new electronics provided by FANUC.

SCOPE OF THE CNC-REBUILD

- Disassemble machines completely down to components
- Rebuild / repair ball screws, spindles, tailstocks and slides
- Retrofit machines with new controls, drives etc.
- Provide completely new electrical schematics
- Rebuild spindles, replace old grinding spindles
- Repaint complete machines professionally
- Add accessories, provide automation solutions

RETROFIT PACKAGES TO OFFER

- Fanuc controls on Window based platform, drives and motors as a turnkey package
- CNC controls which can be integrated both with analog and digital drives
- Replace old PDM and frequency variable drives with new digital drives (ABB, SIEMENS, etc.)
- Rewire and install new relay panels in electrical cabinets

In today's economic climate, some companies have opted to retrofit their existing machines. CTE writes some articles with a good mix of machine builders and their customer's experiences.

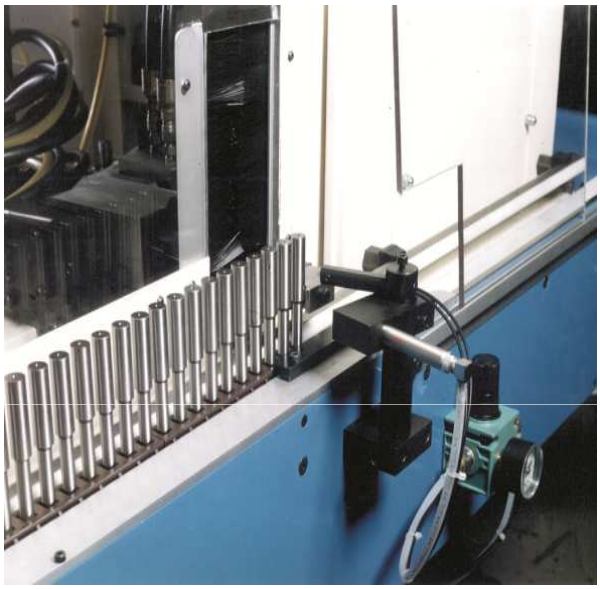
Click to read
CTE Retrofit Articles

Cutting Tool Engineering's editorial package has made it the must-read magazine for decision-makers who cut and grind metal and other materials.

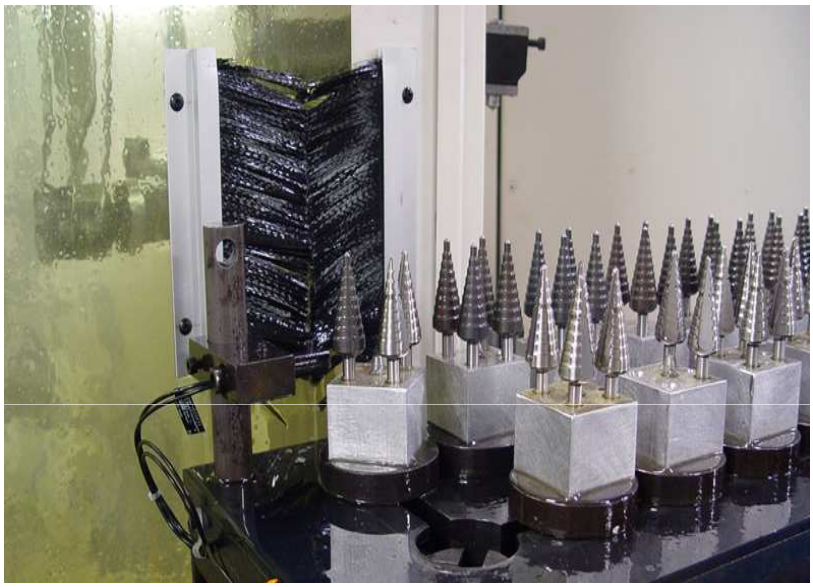
Address: 5 Industry Drive
Palm Coast, FL USA
Phone: 386-446-0500
Email: info@itmfl.com
Web: www.itmfl.com

ITM Loaders & Robot Loaders

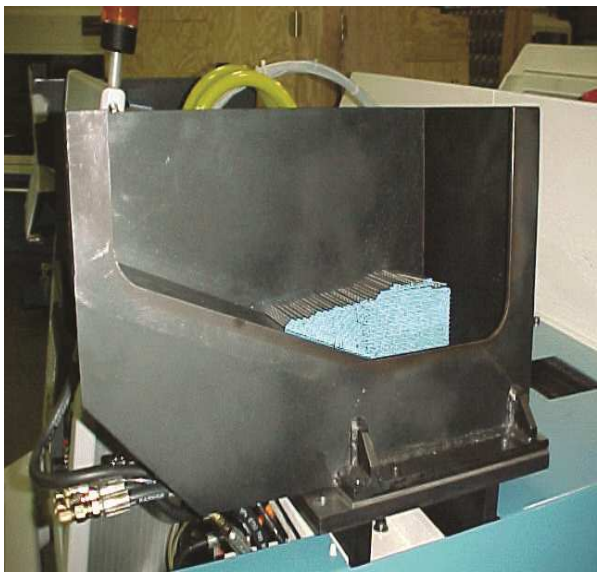
Conveyor Type Cassette



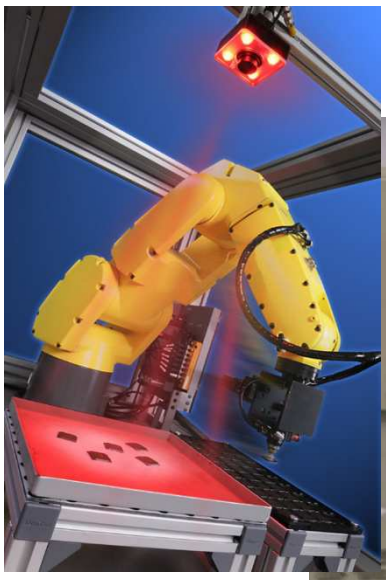
Loader Cassette Loader

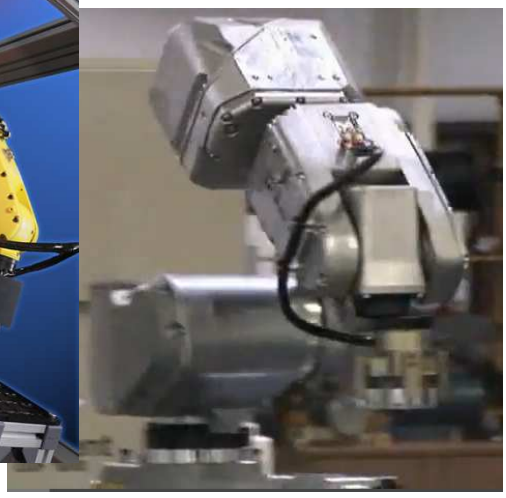


Hopper Loader



Robot Loader





QUALITY MACHINES – SINCE 1981

- Quality Components
  - From Germany, Japan & USA
- Assembly in Palm Coast, FL. USA
- Pre-assembly Procedures
- Assembly Procedures
- Machine Calibration
- Test Grinding
  - Pre Acceptance at ITM
  - Final Run Off at Customer's Facility

PPG

UFG

UFGG

RTG

AFS-8-200

Phone: 386.446.0500
Web: www.itmfl.com

Customer's Facility

PRE ASSEMBLY

- **Refined tolerances**
  - **most part tolerances were tightened**
  - **assigned critical tolerances for manufacturing emphasis**
  - **selected manufacturers for tolerance and inspection capabilities**

- **Working with part manufacturers**
  - **visiting during part manufacturing**
  - **improving lead times**
  - **proper installation of complex components**
  - **maximizing efficiency and utility**

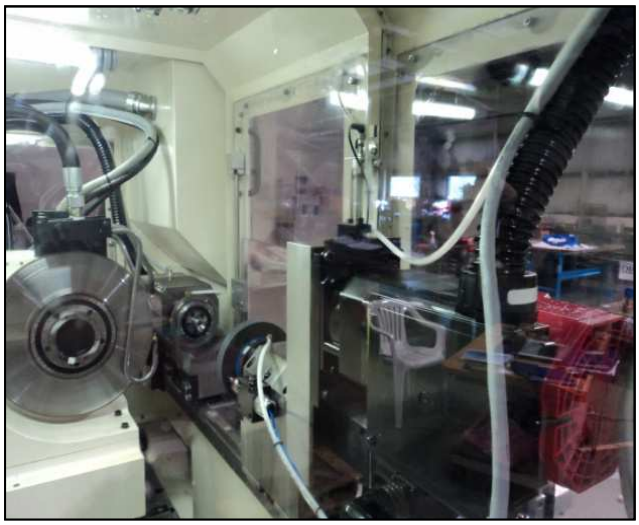
- **Complete part inspection**

ROTARY SERIES

Phone: 386.446.0500
Web: www.itmfl.com

ASSEMBLY

- **Assembled within the US**
  - **American, Japanese and German parts**
- **Machine inspection during and after assembly**
- **State-of-the-art laser inspection as well as,**
  - **Precision granite and indicator testing**
  - **Axes: Perpendicular, Parallel**
  - **Rails: Parallel, Flat and Straight**
  - **Key surfaces**
  - **Repeatability, accuracy, etc.**



ROTARY SERIES

UFG Phone: 386.446.0500
Web: www.itmfl.com

MACHINE CALIBRATION

Static positioning accuracy

– The machines ability to move to move to an exact XYZ coordinate

Dynamic performance

– The machines ability to precisely follow a programmed path

– Vibration, velocity, acceleration

For Automotive Industry , Aerospace Industry, Medical Industry and Tool & Cutter

ROTARY SERIES

Phone: 386.446.0500
Web: www.itmfl.com

DESIGN & DOCUMENTATION

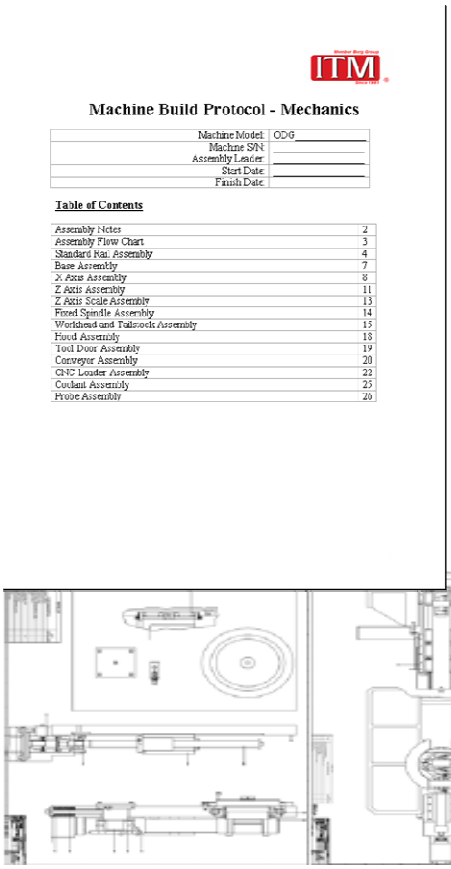
- **Assembly documentation**

  - **manufacturer and ITM part inspection results**
  - **machine inspection results**
  - **all problems and issues relating to part manufacturing, print details and customer feedback**

- **Rigorous grinding tests improving:**

Benefits

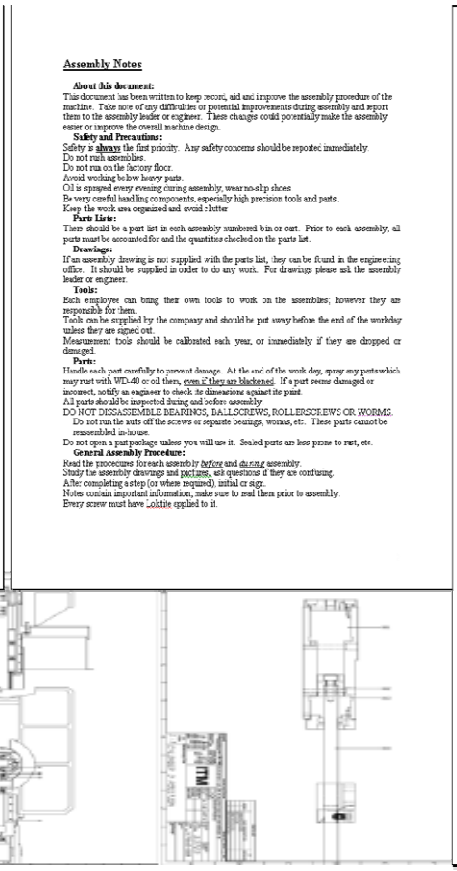
- **cycle times**
- **surface finish**
- **part-to-part accuracy and repeatability**



Machine Build Protocol - Mechanics

Machine Model:	ODG
Machine S/N:	
Assembly Leader:	
Start Date:	
Finish Date:	

Table of Contents



Assembly Notes

About this document:
This document has been written to keep record, aid and improve the assembly procedure of the machine. Take note of any difficulties or potential improvements during assembly and report them to the assembly leader or engineer. These changes could potentially make the assembly easier or improve the overall machine design.

Safety and Precautions:
Safety is **always** the first priority. Any safety concerns should be reported immediately
Do not rush assemblies.
Do not run on the factory floor.
Avoid working below heavy parts.
Oil is sprayed every evening during assembly, wear no-slip shoes
Be very careful handling components, especially high precision tools and parts.
Keep the work area organized and avoid clutter

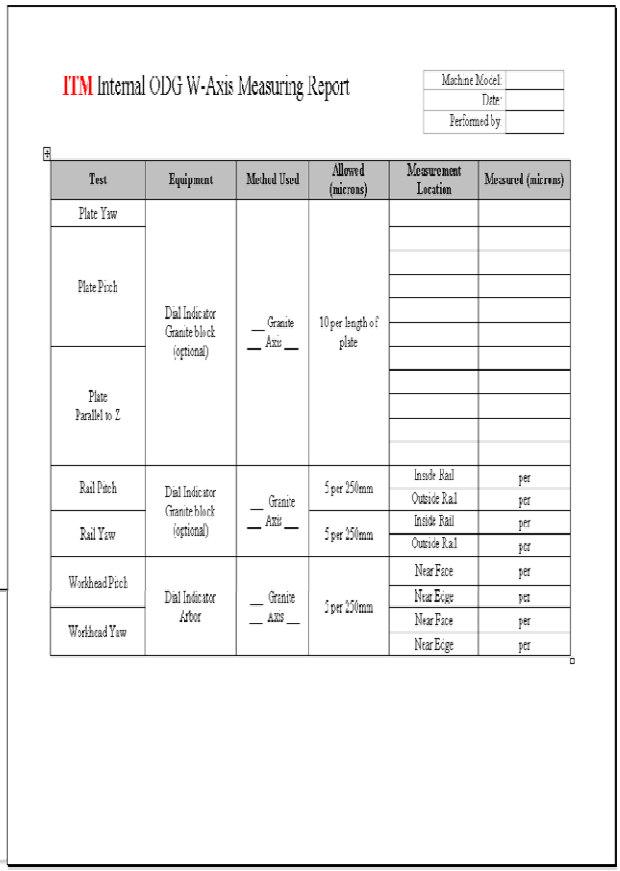
Parts List:
There should be a part list in each assembly numbered bin or cart. Prior to each assembly, all parts must be accounted for and the quantities checked on the parts list.

Drawings:
If an assembly drawing is not supplied with the parts list, they can be found in the engineering office. It should be supplied in order to do any work. For drawings please ask the assembly leader or engineer.

Tools:
Each employee can bring their own tools to work on the assemblies; however they are responsible for them.
Tools can be supplied by the company and should be put away before the end of the workday unless they are signed out.
Measurement tools should be calibrated each year, or immediately if they are dropped or damaged.

Parts:
Handle each part carefully to prevent damage. At the end of the work day, spray any part which may rust with WD-40 or oil them, even if they are blackened. If a part seems damaged or incorrect, notify an engineer to check its dimensions against its print.
All parts should be inspected during and before assembly
DO NOT DISSASEMBLE BEARINGS, BALLSCREWS, ROLLERSCLEWS OR WORMS.
Do not run the nuts off the screws or separate bearings, worms, etc. These parts cannot be reassembled in-house.
Do not open a part package unless you will use it. Sealed parts are less prone to rust, etc.

General Assembly Procedure:
Read the procedure for each assembly *before* and *during* assembly.
Study the assembly drawings and pictures, ask questions if they are confusing.
After completing a step (or where required), initial or sign.
Notes contain important information, make sure to read them prior to assembly.
Every screw must have Loktite applied to it.



ITM Internal ODG W-Axis Measuring Report

Machine Model:	
Date:	
Performed by	

Test	Equipment	Method Used	Allowed (microns)	Measurement Location	Measured (microns)
Plate Yaw	Dial Indicator Granite block (optional)	__ Granite __ Axis __	10 per length of plate		
Plate Pitch					
Plate Parallel to Z					
Rail Pitch	Dial Indicator Granite block (optional)	__ Granite __ Axis __	5 per 250mm	Inside Rail	per
				Outside Rail	per
Rail Yaw			5 per 250mm	Inside Rail	per
				Outside Rail	per
Workhead Pitch	Dial Indicator Arbor	__ Granite __ axis __	5 per 250mm	Near Face	per
				Near Edge	per
Workhead Yaw				Near Face	per
				Near Edge	per

High Precision & High Production Grinding

ITM

International Tool Machines

5 Industry Drive
Palm Coast, Florida 32137 USA

info@itmfl.com **www.itmfl.com**

Tel.: (+1) 386-446-0500 Fax: (+1) 386-445-5700