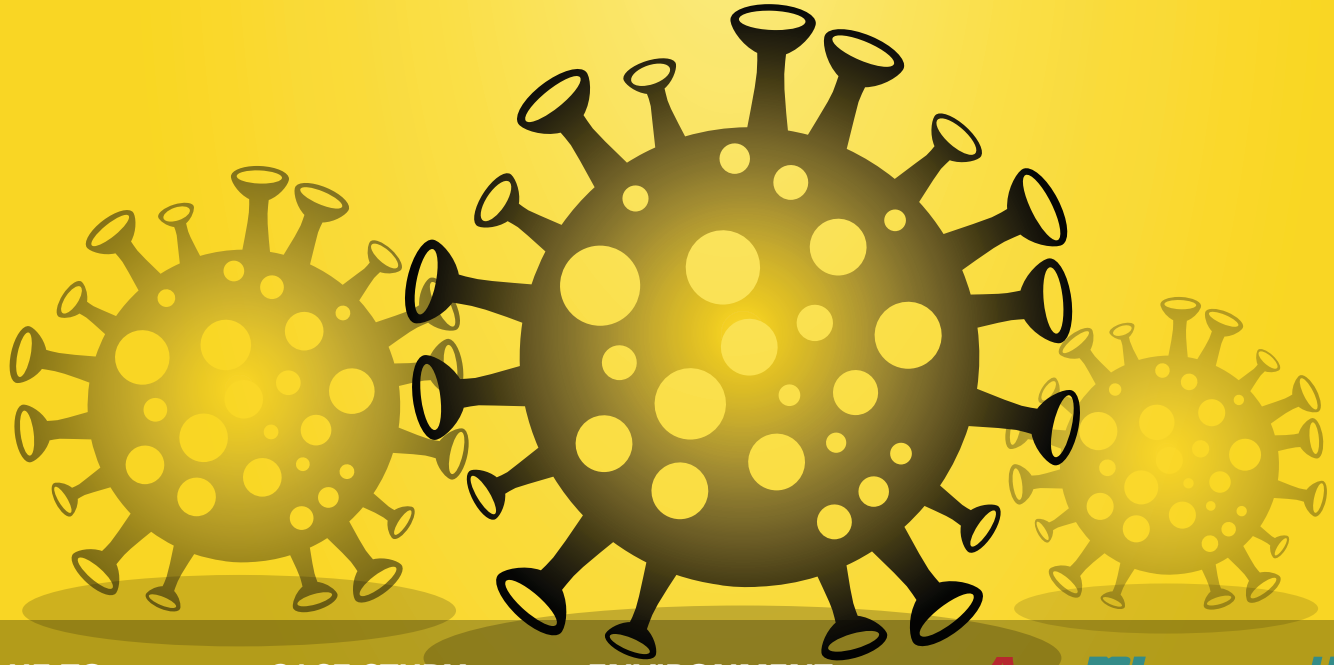
Micromatic Grinding®
In the Pursuit of Zero

Equilibrium

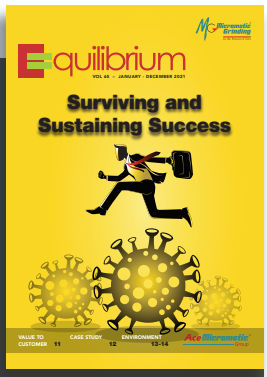
VOL 65 – JANUARY - DECEMBER 2021

Surviving and Sustaining Success



Ace Micromatic® Group

Equilibrium
Vol 65 – January - December 2021



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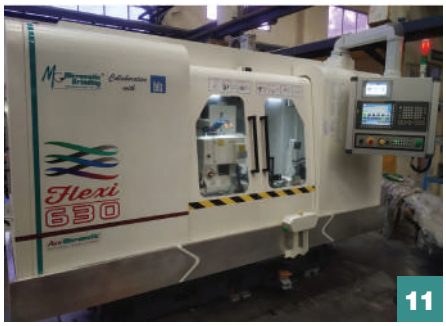

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From Surviving to Thriving

SURVIVING the Delta wave of COVID-19 in 2021 will undoubtedly remain one of the biggest challenges for individuals and organizations alike. Hence, 'Surviving and Sustaining Success' became prominent among the mantras MGTians followed during 2021.

Despite the setbacks we had experienced, ensuring our safety and that of our team members, as well as maintaining a positive mindset, took precedence.

We are utterly thankful to the divine power that saw us through the tough times and bestowed upon us, the MGTians, the strength to overcome the hurdles posed by the pandemic and, through extraordinary teamwork, demonstrate much-needed care to all our members and their families, customers, society, and the environment.

We took several innovative steps to ensure on-time delivery of machines despite several disruptions in the supply chain and production process (Pg 5). We also developed several new designs and machines as import substitutes (Pg 9).

MGT has taken up Sustainability Initiatives to a new level by adopting the concept of Circular Economy rather than the traditional Linear Economy. Numerous steps have been taken in this regard to reduce MGT's CO_2 emissions (Pg 13).

I take this opportunity to express my sincerest appreciation and gratitude to Team MGT, our customers, suppliers, and other associates who stayed by our side and helped us overcome these extraordinary challenges. This issue of EQUILIBRIUM is dedicated to all of them.

Happy Reading!

Surender Kumar Kakkar
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Towards Being Future-Ready

THE theme of this issue 'Surviving and Sustaining Success' reminds me of a phrase 'Survival of the Fittest' from the theory of Evolution by Charles Darwin. During the COVID-19 period, we witnessed that be it for people or organizations, fitness proved to be the most critical factor in survival and sustenance.

Having learned this lesson, we now need to keenly work on keeping our organization and ourselves fit to meet the challenges of today and the future. To be future-ready, one needs to quickly adapt to the changes in the environment. This requires a clear vision, an understanding of the challenges ahead, and a roadmap with clear milestones to build the capability of our people and processes. In this regard, planning and review processes have been made more robust, an apex committee in the Human Resource department has been formed to respond effectively to people's issues, and the whole organization is activated through various interactive and collaborative forums to realize its goals and objectives.

MGT has also taken several process improvement initiatives to keep itself fit for the future and face challenges head-on. These include On-Time delivery to the customer, Zero defects, New product development, Cycle-Time reduction, and People care, to name a few. All this could not have been possible without the active participation of MGTians and its associates. This issue of EQUILIBRIUM has compiled some of these initiatives. The others will appear in the following issues as we move into the 50th year of its founding in 2023.

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Together, in Crisis

THE year 2021 witnessed us battling two COVID-19 waves back-to-back – the most potent variant Delta and then Omicron. All our actions were primarily aimed at survival because only then could we have been able to sustain the success we had achieved. We ensured that our team members and their families got doubly vaccinated at the earliest. Free transport support was also provided to others in the community to get them to and back from vaccination centers.

Knowing very well that it was essential to build team resilience, we initiated team unity activities by:

- educating to question ourselves at work, instead of the advocated five times (5 Why's, a problem-solving Technique), only twice! When the problem arises, rather than shifting responsibility with a note 'Your problem', the team starts owning the issue by asking – 'Why Y'. With this, they do away with the 'Y'(the very root cause of perpetuating the problem) and make it 'Our problem', to resolve!
- instituting an SOP - 'MOM' - to learn the best from. MOM is an acronym for the Machine of the Month, that suffered unusual delays in completion/delivery. An analysis would be carried out every month on such delays. All the activities involved in building the machines would be reviewed and redressal activities initiated immediately to address the lapses. The involved members would meet, analyze and debate to highlight the challenges encountered in the building and shipping of the machines during the month. They would document and disseminate the knowledge among the team.
- training MGTians by a global faculty to turn 'Informal Practices into Documented Work'; a couple of zoom sessions were arranged to bring in a scientific approach and system adaption in grinding processes besides regular monthly reviews by our own Mentor Dr Subbu. The aim was to get the team to plan and work to acquire deep knowledge and ensure the acquired knowledge was documented and shared.
- recognizing those initial set of MGTians who had learned new technologies and would lead others and train them in skills/processes like the assembly of linear motors on CBN grinder, B axis Fibro roto-clamp assembly on Flexi grinder, Rohm chuck truing process on Internal grinder, Aeroel Laser post-process gauge with grinder control on Centreless, or even troubleshooting /resolving part reservation conflict in SAP HANA live project, etc.

We believe all these transformations will help our engineers to grow and sustain the growth by serving you better.

MGT also stands for 'May Good Triumph'. With this spirit guiding us, nothing can hold us back from standing first and always, by your side.

Surviving and Sustaining Success

WITH the last two years being dismal for most companies, MGT too suffered its share of setbacks. However, instead of mulling over the hurdles that seemed insurmountable at first, it chose a positive attitude that became its success mantra. Adapting to the culture of the new normal and with safety as its first priority, it set out to fulfill its customers' requirements with effective teamwork and collaboration, resulting in remarkable and ingenious innovations. The following are some snippets of the company's journey that it is proud of.

COVER STORY - TEAMWORK

Stronger Together

MGT takes pride in being a customer-centric company that not only meets its customers' needs but strives to exceed their expectations. However, the following unfortunate instance, leading to customer disappointment, could have been resolved only through teamwork, proving the maxim 'Together We Can' right...

SACHIN Gumaste of Harihar Industries, Ahmednagar, Maharashtra, bought his first two Hydraulic Grinders GCE 260X1200 in 2014 from MGT. Satisfied with their performance, he purchased another two GCE 350X1200 machines in 2016. In 2021, at the start of the second wave of COVID-19, he ordered another four of the same GCE 350X1200 grinders (Harihar Industries finish grinds Electric Motor shafts). The machines were ordered in March with a delivery commitment of two machines in August and the remaining two in September.

However, due to the disruptions in the production chain that severely impacted the industrial world during the pandemic lockdowns, there was a material shortage that led to the delay in machine delivery by nearly two months. Obviously disgruntled, Gumaste called in the middle of September and demanded to receive at least one machine in the same month.

By September 21, the machine was at the wiring stage, and it was to take another 15 days to complete. The challenge was to dispatch the machine before the end of the month without any compromises. Just like in a relay race, teams were formed to work on the machine 24/7 in three shifts. Many tasks were also finished in parallel. Every team member strived hard to extend their support and fulfill the customer's demand.

The winning team members (L to R): Sateesh Chandra, QA (Trail Parts & PDI); Sanjeev Sharma, QA (Q&R); Yatendra Kumar, Assembly (In-charge); Deepak Pal, Assembly (Assembler); Rakesh Kumar, Electrical Assembly; Shushil, Paint Shop; Majeed Ansari, Packaging

HIGHLIGHTS OF THE PROCESS

- Parallel activities of mechanical assembly and electrical assembly were carried out.
- Eight hours auto-run was completed during a full night shift.
- Soon after the 8-hour auto-run, Quality and PDI activity was started.
- Paint touch-up was completed within two hours as maximum care was taken during the assembly to minimize any damage to the machine paint.
- Machine packing was completed swiftly due to advanced preparations.

Toward a Common Vision

Great discoveries involve the cooperation of many minds. With this belief, MGT took BILZ Tool Pvt Ltd, the Indian subsidiary of BILZ Werkzeugfabrik GmbH & Co.KG, Germany, on board for the development of its first CNC Universal Grinding machine.

THE Flexi 630 Universal Grinder with tooling and process was developed in collaboration with BILZ Tool Pvt Ltd, Bangalore. BILZ India is a subsidiary of BILZ Werkzeugfabrik GmbH & Co.KG, Germany, with over 102 years of specialization in manufacturing precision components and high-precision holding systems for Tapping, Drilling, and Reaming since 2003. It is a 100 percent export-oriented unit, having 19 MGT Grinders since its inception till date.

In 2019, just before COVID-19, the BILZ engineering team met MGT engineers to discuss their special requirements for a new high-precision yet flexible machine. Detailed discussions resulted in MGT building its first Universal Grinding machine of its kind to finish grind the component OD (Straight/ Taper) and ID bore (Straight/Taper) in a single set-up (see Fig.1) to achieve all geometrical parameters and form errors within 2 microns (see Fig 2).

MACHINE TOOLING AND THE COMPONENT

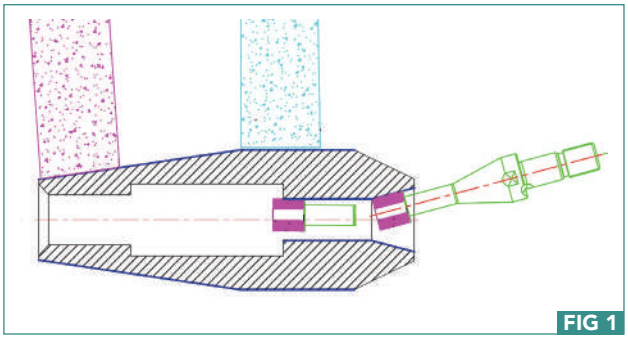


FIG 1

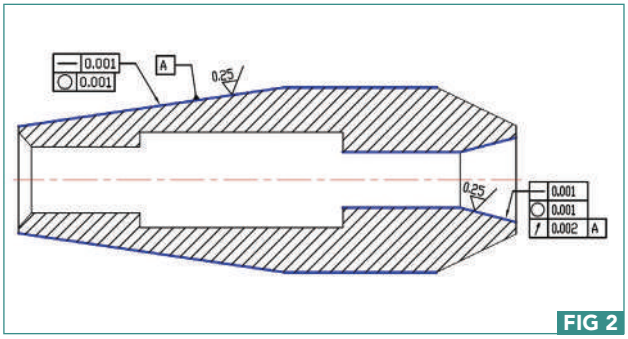


FIG 2

UNIQUE DESIGN AND FEATURES

- High precision live work head with Roundness < 1 micron.
- Fixed tail support with thru bore to enable the ID Grinding and Run-out < 2 micron w.r.t. OD.
- High precision B-axis with accuracy/repeatability of < 2 arc seconds and provision to accommodate one External wheel head and one Internal wheel head.
- High-precision OD and ID spindles are with the inbuilt motor.
- Special In-process Gauging for OD, ID, and Gauge plane.
- User-friendly, picture-based grinding cycles for ease of operation and flexibility in programming.
- Thirty percent reduction in the cycle time by standardizing the Wheel size, Tooling, and Optimization of Grinding parameters.

This development took a long time, more than two years, during which both teams were grappling with the pandemic-inflicted challenges and the critical subsystem and the tooling developments. MGTians' machine building skills and customers' component development skills came together to finally help arrive at the solution, defeating the technological as well as the unprecedented hurdles posed by COVID-19.

Flexi 630 Universal Grinder

COMPONENT: HOLDER–SINGLE UP GRINDING

Sl.No.	Parameters	Achieved (µm)
1.	ID & OD Straightness	2
2.	Roundness	1
3.	Runout in ID w.r.t. OD	2
4.	Surface Finish (Ra)	0.25

Changing with Times

With supply chain disruptions severely affecting the delivery timelines during the pandemic, MGT resorted to all means possible to match its customers' delivery requirements and keep their trust intact.

'Customer Centricity' is at the heart of everything at MGT. With market expectations rising exponentially each day, we are doing our best to create many new models/versions of our grinding machines.

The second wave of the pandemic last year posed a threat to the safety of our workforce and brought in supply chain disruptions that had never occurred in the 50-year history of MGT, as it was for the whole country. Many of our supply chain partners were not working or working with minimum resources. Hence, matching the customers' delivery requirements became one of our biggest challenges.

Team MGT, therefore, tried to strike a balance between productivity and improving the throughput time by focusing on the timely availability of the right parts/sub-assemblies at the right place and at the right time with the view to improving the throughput/delivery of machines to the customer. The following steps were taken during the year, mainly internally, to change the way MGTians worked:

SALES FORECAST INCLUDED IN THE PLANNING PROCESS

We started taking sales forecasts into our planning process. Overlooking just-in-time input deliveries, we initiated ordering long-lead items well in advance based on the three monthly sales forecasts.

DASHBOARD- AND PULL-BASED WORKING FOR SUB-ASSEMBLIES READINESS

Timely availability of sub-assemblies on the machines was a major concern. There were many challenges, including working overtime to meet the raw material demands of the operations team. Steel/Casting prices were soaring high. Our supply chain team was getting frustrated. At that stage, we started critically reviewing the requirements and focused on our planning of materials by creating a dashboard for each sub-assembly.

- Every morning, all functional heads would gather at each assembly line workstation.
- Every workstation was equipped with daily work plan and scheduled the availability of sub-assemblies.
- Managers visited the suppliers personally to understand their concerns and provided immediate support wherever needed.
- Senior leaders started meeting again at 2:00 pm daily for critical reviews of every machine on the assembly floor and those scheduled for delivery during the next two months.

Dashboard was created to visualize the status of material availability (see below figure)

DASH BOARD FOR SUB ASSEMBLIES AND LONG LEAD ITEMS

LEGENDS		AVAILABLE			WORK IN PROGRESS			MATERIAL PLANNED			MACHINE UNDER TRIALS		CRITICAL					
Machine No	Model	LT/TT	TBS	CBS	CRG	WLH	WKH	TS	CNC	COOLANT UNIT	GLASS SCALE	IPG/BALANCERM /FLAGGING	WHL MOTOR	GRINDING WHEEL	CENTER	DIA ROLL	POWER PACK	MIST
22156M	SG40	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE
16015M	GL4	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	Grundfross coolant pump EE09115-15/07	N/R	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE
16016M	GL4	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	Grundfross coolant pump EE09115-15/07	N/R	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE
20271M	SH40	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE
20272M	SH40	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE
20273M	SH40	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE
20274M	SH40	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE
22149M	SG40	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	Customer Supplied	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	N/R
22152M	SG100	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	N/R
22154M	SG40	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE
538M	GVS CNC	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE
20275M	SH 100	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	EE018220-10/06,15/06	AVAILABLE	AVAILABLE	EE099260(I.P-30/03)-10/06,15/06	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE
20276M	SH 100	22/04,10/05,25/05,06/06	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	EE018220-10/06,15/06	AVAILABLE	AVAILABLE	EE099260(I.P-30/03)-10/06,15/06	AVAILABLE	AVAILABLE	AVAILABLE	N/R	AVAILABLE	AVAILABLE
22150M	SG40	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE	MI6530170 -I.P-09/05	MI53626 (I.P-26/05)	N/R	AVAILABLE	N/R

ASSEMBLY PROCESS MAPPING THROUGH VIDEO SHOOTING

Another important activity was reviewing the assembly process by video shooting the current stages and analyzing each process wherever time correction was needed. For one of the models, total machine assembly building time till dispatch was mapped. By eliminating the non-value-added activities, we could identify and modify our machine assembly planning sheet to save approx. 25 percent of the earlier allocated time for that model.

ALTERNATE SOURCING FOR BUSINESS DE-RISKING

Whenever the issue of supply constraints came up, alternate sourcing was also tried out. The focus was on delivering the machines by improving the stage-wise throughput from order to delivery (internal customers included). Since the situation was dynamic, identifying bottleneck areas was becoming a daily exercise before the criticality arose.

TIMELY COMMUNICATION, THE SUCCESS MANTRA

Some other salient new activities to reduce the throughput time still continue. Those include:

- PPC and the Sales team started sharing the daily status of machines through email and with the MMT Marketing team and the customer, for a focused approach on dispatches.
- This led to the Sales team discussing with MMT and customers regularly to find out their priorities and the customers' readiness for lifting the machine.
- In case there was any change in schedule due to customer or supply chain constraints, it was reported on a daily basis, thus rescheduling the plans internally.

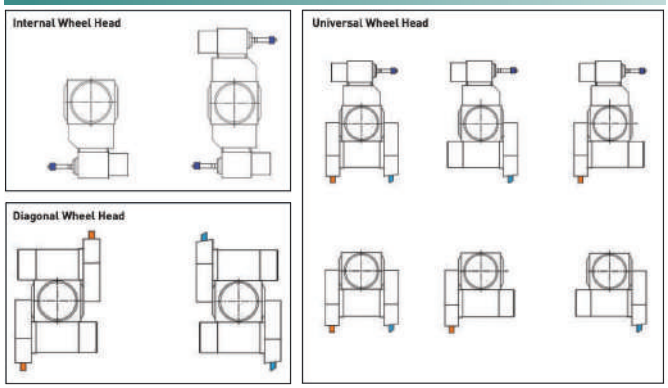
PRECISION WITH FLEXIBILITY

Flexi | CNC Universal Grinders

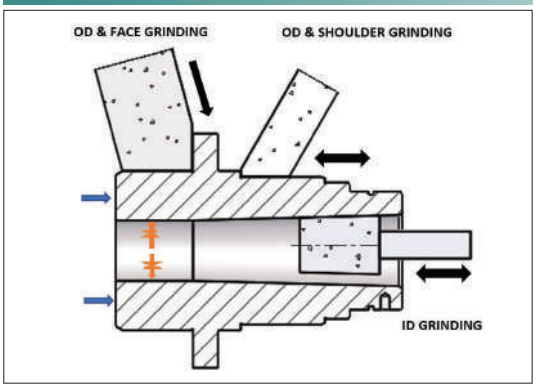
Scan to know more

- *EASE GRIND software for flexibility in operation and use*
- *Operator friendly customized screens*
- *Easy changeover, with quick setting provision*

TURRET WHEEL HEAD OPTIONS



ALL OPERATIONS IN A SINGLE CHUCKING



Doing New Things

Approached to develop a Broach Grinding and Re-Grinding machine in the midst of the pandemic, MGT came up with the Flexi 200 CBN – Broach, which has led to customer delight.

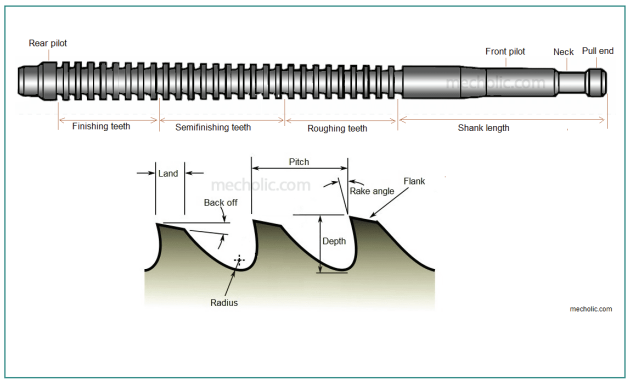
LEADING Broach manufacturing company Mitsubishi Heavy Industries India Precision Tools Ltd, Ranipet (now Nidec India Precision Tools Ltd) is the user of more than 10 MGT Conventional Grinding machines for the last 15 years. They approached us for the development of a high-precision 4-axis CNC machine for Broach Grinding.

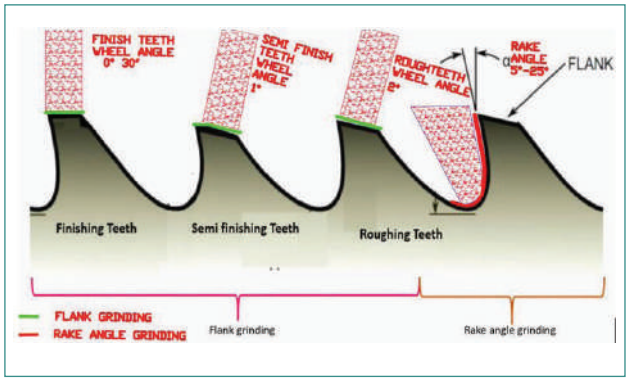
The machine requirements included CBN wheel and B axis for grinding Broach OD, rough (flank angle 0-5 deg.), semi-finish (straight and angle), and finish (straight) teeth grinding, all in one set-up to achieve the highest in-class precision and increased productivity.

Broach Grinder is a new segment for MGT as it calls for the indigenous development of a high-precision multiple-axis CNC machine with a user-friendly, screen-based programming capability. MGTians took the challenge and developed such a machine with 4 axes CNC with CBN wheel and high-precision B axis. A CBN wheel with the right process helps to produce a high surface finish and close size tolerance consistently. This is absolutely essential for the new broach production. These factors finally determine the life of a broach, along with the process capability and economic efficiency over the entire service life of the broaching tool.

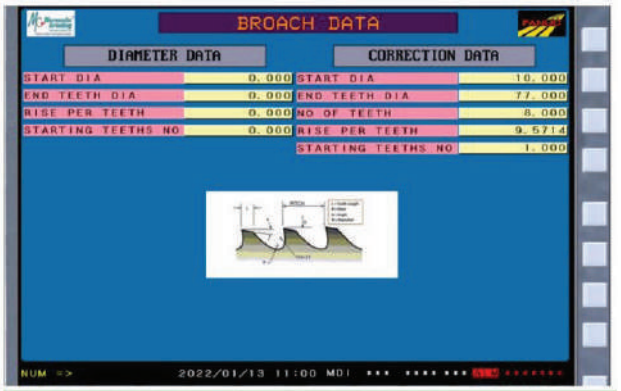
BROACH FLANK (TEETH OD) AND RAKE 4 GRINDER – 4-AXIS CNC MODEL: FLEXI 200 CBN – BROACH

Broach Flank Grinder – model Flexi 200 CBN – Broach – has two linear (X, Z) and two rotary (C, B) axis with the capacity to accommodate max 2,100 mm length components. The machine is suitable for New Broach manufacturing.





Broach Nomenclature



Broach Diameter - start dia, End dia and Starting Teeth number input screen.
Broach correction – Correction input data screen.

Machine Model: Flexi 200 CBN – Broach

SPECIAL FEATURES

- The machine is suitable for Component Ø20-Ø200 mm Diameter, Length 100-2100 mm, Flank angle 0-5 degree, and Rack angle 5° to 25 ° (Optional feature).
- The wheel head is with an inbuilt motor and 60 MPS wheel surface speed and also has the provision for mounting grinding wheels on LH or RH side.
- It is equipped with Vit. CBN wheel with 60 MPS cutting speed for higher productivity and high surface finish.
- The wheel head is mounted on high-precision B axis (<2 arc second) to facilitate rough semi-finish and finish teeth grinding in one set-up.
- It has a special in-situ component setting arrangement with a number of steady rests based on L/D ratio of the broach.
- User-friendly, picture-based grinding cycles were developed for broach grinding application. The software MGT MacZen has been developed to upload/download program code from a PC or LAN for handling a large variety of parts and Broach data.

OPTIONAL FEATURES

- For Rake angle grinding, the second wheel head with a built-in-motor Spindle 20000 rpm/7.5kw, suitable for small wheel dia. 45-150 mm, can be mounted at 180 deg with programmable angle.
- Helical Broach grinding can also be offered with a Direct Driven C axis and Screen-based easy programming for Helical Broach up to four starts.

BROACH RAKE ANGLE GRINDER – 5-AXIS CNC MODEL: FLEXI-200 CBN BROACH_RAKE

The Broach Rake Angle Grinder - Model Flexi 200 CBN Broach_Rake has three linear (X, Y, and Z) and two rotary (C, A) axis machine. The machine can be used for new Broach manufacturing as well as re-grinding in a toolroom of production shops.

CELEBRATING SUCCESS

It is not a mean feat that this extraordinary development took place when everyone was struggling with the COVID-19 challenges. MGTians' machine building and software development skills, along with the customer component setting and grinding process development knowledge, all came together to help arrive at the solution.

The machine is currently in production and running successfully. The MGT Team visited the customer for his feedback on this new development. He responded that he was extremely satisfied with the machine accuracy, the consistency of results, and the increase in productivity, which is approx. 30 percent.

He was also highly comfortable with the PC-based software MacZen developed for the programming code for the new varieties of Broaches. Discussions are on for a repeat order from the same customer, who is also recommending us to his peers.

MGT, after building customer confidence with the Flank and Rack grinding machine development, is moving towards 'The Helical Broach Grinding' solution. Stay tuned for updates.

RESULTS ACHIEVED

Input Details	
Component:	Broach tool
Material:	HSS
Hardness:	>60 HRC
No. of teeth:	300 Max
Flank angle:	0°-5°
Land width:	0.2-5 mm

Required Grinding Parameters	
Surface finish Ra:	0.2
Flank angle:	0°, 0.5°, 1°, 2°
OD size tolerance within 3-5µ	

Achieved Grinding parameters	
Surface finish Ra:	0.12
Flank angle:	+/- 1°
OD size tolerance – within 3µ	

Maximizing Efficiency

With the aim of making our grinding machines more efficient and intelligent, we have developed the MGT-IIoT solution, which is to be launched soon.

MGT-IIOT development was started in 2020 by first researching the business needs of some of our significant customers/actual users. MGT then firmed up the architecture (Fig 1- Data Flow Architecture) to address the gaps in current generic solutions available in the market.

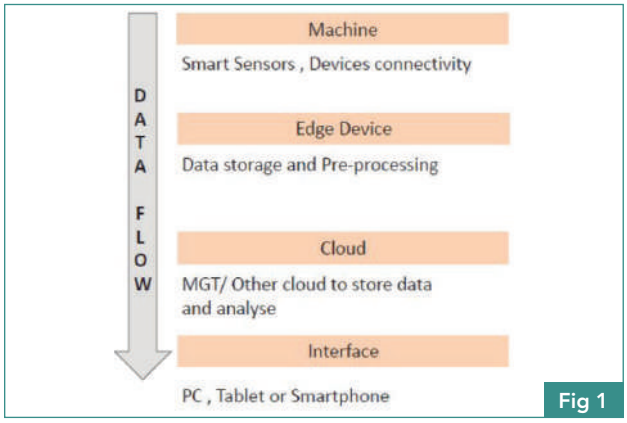
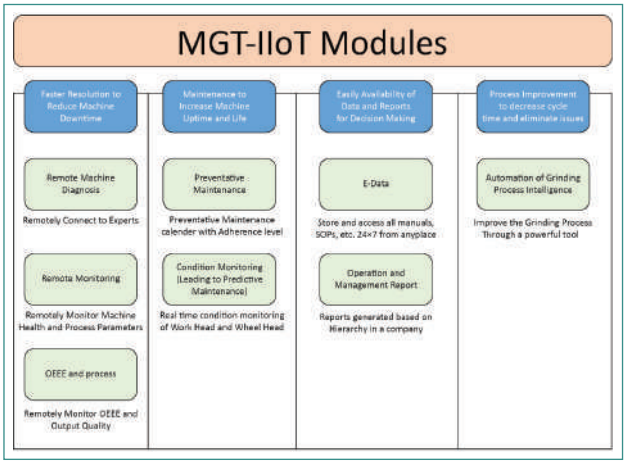


Fig 1



PROGRESS IN 2021

Unforeseen pandemic-inflicted challenges made our resolution to have an IIoT solution stronger as it is the only way to tend to a machine remotely.

Rigorous testing within the company, in a mode akin to a field run, has helped Team MGT to make the product wholesome in all respects – hardware, software, and cloud connectivity. In the next phase of Beta testing, full-fledged IIoT solutions were integrated into MGT-built machines at an American MNC and a Japanese MNC—both in the production environment in the automotive sector. This has been going on for over six months now!

The real-time data from the customers was used to monitor and address the machines' uptime issues and improve their processes and health. A customer was facing machine time loss due to certain alarms appearing multiple times. In the absence of 'local monitoring' and machine uptime data analysis, it was difficult to get to the root of the issue. This was successfully addressed by 'Remote Monitoring' of the consolidated data. This proves that the MGT-IIoT solution will make the manufacturing processes robust and enhance the customer experience.

The Beta testing is in the final stages, and AMG-IIoT will be launched shortly.

Fig 2

IIoT Hardware integrated on a machine (1 - Edge Device for Data Acquisition, Data Pre-processing, and Cloud Connectivity, 2 - PLC for Data collection from Hardware, 3 - Vibration Sensors for condition monitoring of Wheel Head and Work Head, 4 - Energy Meter for Monitoring Energy Consumption, 5 - Hydraulic Pressure, Pneumatic Pressure, and other IO-Link Sensors for Process and Health Monitoring)

Attuned to the Market Needs

Cognizant of the ever-evolving grinding demands of the domestic market, MGT delved into the development of Conventional Centreless Grinders in 2021. The machines not just surpassed the imported ones in quality but also saved costs, leading to high customer satisfaction.

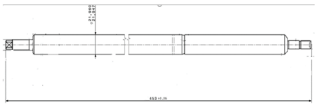
AFTER the successful supply of more than 100 Precision CNC Centreless Grinders of up to 8 axes in various sizes (wheel width up to 500 mm and 45 Kw power) since 2013, for domestic as well as export markets, MGT ventured into the development of the economical series of Conventional Centreless Grinders in 2021. This was prompted by the precision component grinding requirements of the domestic market.

ACHIEVING CUSTOMER SATISFACTION

PISTON ADVANCE grinding on CLG 5020

Component	**Piston advance** 
Stock removal (mm)	0.15
No. of pass	2
Process output	Surface Finish: Ra 0.15 Size tolerance: 0.003mm Roundness: 0.0015mm Taper: 0.001mm
The customer was looking for an imported machine to achieve the above quality parameters consistently. MGT demonstrated the machine's capability and received a repeat order from the same customer.	

PISTON ROD grinding on CLG 5025

Component		
	Existing process	**Micromatic Machine Process**
Stock Removal	0.25	0.25
No. of Machines	4	3
Process output	Ra: 0.15 to 0.18 Size: 0.005mm Taper and Roundness: 0.004mm	Ra: 0.15 to 0.18 Size: 0.003mm Taper and Roundness: 0.003mm

Conclusion:
- **Existing four Hydraulic machines are running on line 1.**
- **Three Micromatic machines are running on line 2.**
- **Achieved Better Quality than the existing line**
- **Total cost, including space, energy and consumables cost reduced by 25%**
- **Customer satisfaction resulted in repeat order for 2 more lines.**

MGT has already supplied seven machines in various sizes, and ten are being built to order. These machines, some equipped with a different types of automatons, are serving critical applications in various industry segments, thereby serving the cause of 'Atamnirbhar Bharat' and import substitution successfully.

FEATURES CONSIDERED

Looking at the key requirements of the value-conscious customer segment, the below salient features were considered:

- **Low life-cycle cost** – Anti-friction grease packed spindles
- **High material removal** – Turcite-lined heavy-duty guideways
- **Close size tolerance** – Anti-friction guideways (optional)
- **Size stability** – Structurally stable cast iron base and heavy weight of the machines
- **Finer finish and consistency** – Hydraulic template copying dresser
- **Plug & play and compact layout** – Elect cabinet and Powerpack mounted on the machine bed itself.

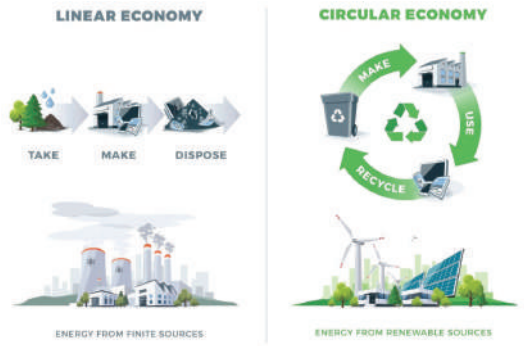
FORK PIPE/INNER TUBE grinding on CLG 6030

Component		
	Existing process	**Micromatic Machine Process**
Stock Removal	0.25	0.25
No. of Machines	4	3
Process output	Ra: 0.05 to 0.06 Size: 0.005mm Taper and Roundness: 0.005mm	Ra: 0.05 to 0.06 Size: 0.004mm Taper and Roundness: 0.004mm

Conclusion:
- **The number of machines was reduced from five to three with input control and machine process development.**
- **Better quality was achieved on the existing line.**
- **Space and spares consumed cost reduced by 40%.**

Mission Net Zero

The transition from a linear to a circular economy needs all of us to be on the same page to work towards saving the planet.



NET Zero or becoming carbon-neutral means not adding to the number of greenhouse gases in the atmosphere or balancing emissions of carbon dioxide with its removal.

Today's global economy is only 8.6 percent circular. A rapid transition to a more circular economy could dramatically reduce resource use and, when coupled with decarbonization, can reduce our ecological footprint and have a positive impact.

WHAT IS A LINEAR ECONOMY?

A Linear Economy relies heavily on large quantities of cheap, easily accessible materials and energy. This linear model focuses on a take-make-dispose approach and has been used since the dawn of the industrial revolution.

WHAT IS A CIRCULAR ECONOMY?

A Circular Economy, on the other hand, embraces a make-use-return approach. In stark contrast to a linear economy, it keeps materials and products in use indefinitely. This eases the burden on natural resources because materials are continuously re-purposed until they are finally recycled.

WHY CIRCULAR ECONOMY?

It is proven by research that 75 percent of energy is used in raw material processing and 25 percent is in manufacturing. In contrast, in a circular economy, 25 percent of manpower is used in raw material and 75 percent in manufacturing, as most of the material will be recycled as raw material for the next manufacturing cycle. Thus, a circular economy supports energy conservation and job creation.

WHAT IS OUR PRESENT STATUS?

In our machines, at the end-of-life, the following materials are used:

- Castings parts, which are the major portion of our machines, are generally recycled as per our experience.
- Steels parts are also recycled.
- Wires and motor parts are also recycled for copper.
- Materials like Plastic and Rubber need attention.
- E-waste produced from the machine at the end of its life is taken back by the supplier.

HOW IS MGT CONTRIBUTING TO MISSION NET ZERO?

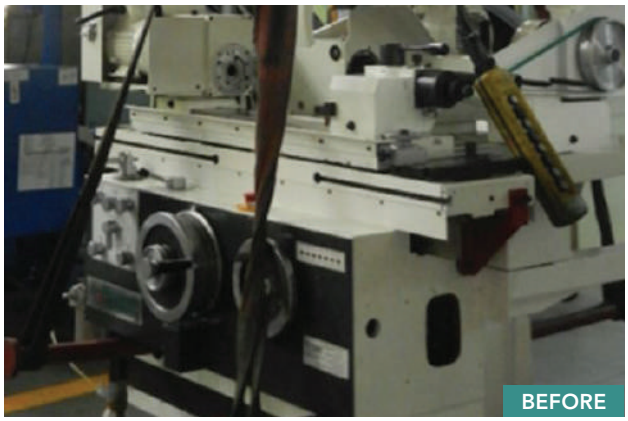
- We, at MGT, have installed a 413 kWp Solar Power Plant at our Ghaziabad facility, which will provide 50 percent of the plant's requirement. This will help reduce approx. 300 tonne of carbon emissions annually.
- Water-saving devices are installed in all our washrooms.
- MGT treats around 24 lakh liters of sewage water in a year, which is used for gardening, sprinkling, and flushing.
- Using rainwater harvesting, the two operational plants in Ghaziabad save about 56 lakh liters of water annually.

STEPS FOR THE FUTURE

- We are working on reusable packing for the machines.
- MGT is also focused on the use of biodegradable packing materials.
- Plans are in place to make the majority of our machines out of recycled materials.

In Pursuit of Zero Emissions

MGT has implemented several green initiatives to meet its sustainability goals and contribute to resolving environmental concerns...


BEFORE


AFTER

SUSTAINABILITY and climate protection are becoming more and more central to the industry.

At MGT, we review our machines at all stages of their life—Production, Use, and End of Life. Many other initiatives at different levels have been started. Below are two examples of how we strive to reduce our carbon footprint and use paper in the filter media to protect the environment.

REDUCING WEIGHT/STEEL BY ELIMINATING LIFTING PINS IN MACHINES

MGT delivers nearly 300 machines annually to our customers in India and abroad. Each machine is shipped with three or four lifting pins and one hanger to facilitate loading, unloading, and moving it to the site of installation. All the lifting pins and hangers sent along with the machine are used only once and scrapped after the machine installation.

Impact on the environment: 1 tonne of steel produces 1.85 tonne of CO_2 emission.

Aligning with our goal of Zero Emissions, an initiative has been taken to eliminate machine lifting pins. An alternative lifting arrangement by reusable rods has been developed and implemented.

A total of 151 machines, which is nearly 50 percent, were delivered without lifting pins and hangers in the financial year 2021-22. This step contributed to reducing approx. 7 tonne of steel, which, in turn, resulted in the reduction of 13 tonne of CO_2 emissions into the atmosphere.

ELIMINATING THE USE OF PAPER IN FILTER MEDIA IN THE COOLANT FILTRATION SYSTEM

The grinding process needs a highly clean coolant to avoid surface defects, for which special paper is often used in the coolant filtration system with any grinding machine. Since manufacturing and using paper means cutting trees, this should be considered a loss to the environment throughout the machine's service life.

Industry experts indicate that while using the chemical pulping to produce 1 tonne of printing paper, approximately 24 trees are required. In a grinding machine, for a paper band filter in the coolant filtration unit, an average of one paper roll of 100 gsm (0.8x50 meter), which is 4 kg, is consumed in 21 days, considering three working shifts. Replacing paper filter media is time-consuming and expensive. Besides, there is the disposal issue of the used paper. Therefore, an alternative solution is required to save paper/environment and running costs.

MGT is now offering a cleaner alternative filtration system (Hydrocyclone) to replace the paper band type filtration. The Hydrocyclone creates ascending and descending vortexes in a cylindrical feed that separates contaminants from coolant without using the filter media. This design results in consistent, long-term filtration.

It's estimated that for the average machine service life of 20 years, consuming the filter paper on a machine running three shifts a day, approx. 35 trees will be required to produce the paper for filtration of the coolant. So, using this alternative of Hydrocyclone type filtration, 35 trees can be saved per machine.

Lending a Helping Hand

In times of crisis, MGT has always stepped to the fore and helped its surrounding communities. Realizing that assistance in healthcare is crucial amidst the ongoing pandemic, the company, with the aid of Gram Niyojan Kendra, started a COVID-19 response program in three villages of Ghaziabad – Bapudham, Kanawani, and Nandgram – to make the natives aware of the effects of the virus and ways to keep it at bay.

EDUCATION AND AWARENESS GENERATION

Enlightening women:

- Meetings were organized among the women of the community to educate them on how to prevent COVID-19, protect children from violence, trafficking, and child labor, and the importance of formal education for children.
- In all, 721 people were sensitized and vaccinated.

Educational support to children:

- Three educators were appointed, one for each village (Kanawani, Nandgram, and Bapudham).
- Educational activities for 100 children (aged 3 to 6 years) were started in all three villages.

Sensitizing children to adopt COVID-19 preventive measures and distribution of masks:

- Children from childcare centers, or balwadis, were taught effective handwashing techniques with practice sessions.
- Masks were distributed to encourage wearing them as a means to limit the spread of the virus.

HEALTH AND NUTRITION

Generating awareness on good nutrition in children and pregnant women:

- Twelve small group meetings were held that covered 176 mothers in the area. They were explained the importance of nutrition in children and pregnant women.
- Nutrition kits were distributed to 68 children (aged 3-6 years).
- Thirty-three pregnant women from the underprivileged section were also provided nutrition kits. Each kit comprised Rice and Chana Dal - 1.5 Kg, Soyabean - 370 gm, Jaggery (Gur) - 1 Kg, and Porridge (Daliya) - 1.5 Kg.

Vaccinating community children and pregnant women:

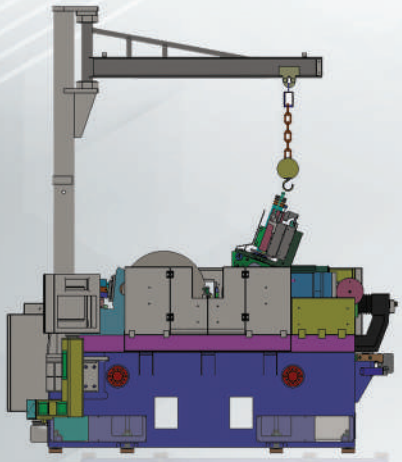
- Immunization of children and pregnant women was done through an ANM (Auxiliary Nurse Midwife).
- A total of 255 people, including children, were vaccinated in 17 days.

Women's Day celebration at three childcare centers:

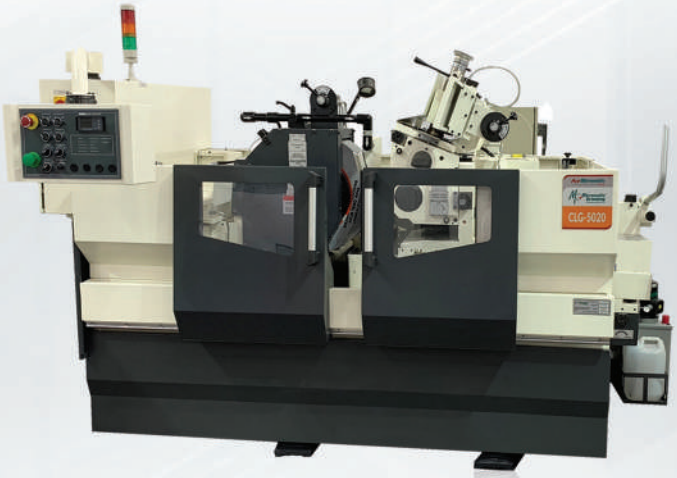
- Women's Day was celebrated in Bapudham, Nandgram, and Kanawani with 125 women from the community.
- The issues discussed on the day were: the importance of women's day celebration, laws related to women, government schemes, the importance of birth certificates and Aadhaar cards, the importance of COVID-19 vaccination, and less use of polythene.

CONVENTIONAL CENTRELESS GRINDERS

- Low life-cycle cost- Antifriction Grease packed spindles
- High material removal- Turcite lined heavy duty Guideways
- Close size tolerance- Antifriction Guideways (Optional)
- Size stability- Structurally Stable Cast Iron base & High weight of the machines
- Finer finish & consistency – Hydraulic template copying dresser
- Plug & play and compact layout - Elect. cabinet and Powerpack mounted on the machine bed itself



CLG 6030/6050



CLG 5020

CLG 4015

GRINDING APPLICATIONS

Gudgeon Pin

Bushes

Steel Drill Blanks

Bearing Culer Races

	unit	CLG 4015	CLG 5020/5025	CLG 5025 FWR	CLG 6030 TG	CLG 6050 TG
Machine concept		Fixed GWH	Fixed GWH	Fixed workrest	Fixed GWH-Twin Grip	Fixed GWH-Twin Grip
Component Size-Outer Dia	mm	02-60	02-80	02-80	03-120	05-160
Grinding Wheel OD × Width	mm	Ø405×150	Ø510×200 Ø510×250	Ø510×250	Ø610×305	Ø610×510 (600)
Max. Wheel Surface Speed	m/sec	33 max	45 max	45 max	45 max	45 max
Grinding Wheel Power Max	Kw	7.5	15	15	30	45
Machine Weight	Kg	2500 (Approx)	5000 (Approx)	5000 (Approx)	8000 (Approx)	12000 (Approx)

Micromatic® Grinding
In the Pursuit of Zero

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