



GS 400
Tool reshaping machine

GS 400 - top efficiency and versatility



Samputensili began producing gear cutting tools in 1949. The need to constantly improve the quality of the produced gears has spurred the development of tool reshaping technology. To fulfil these production needs, from the 60's on Samputensili has started to design and produce reshaping machines for shaving cutters currently known for their reliability, efficiency and accuracy.

The new GS 400 is the 4th generation of this type of machine, setting new standards in accuracy, productivity, reliability, versatility and ease of operation.

The profile to be ground is calculated by Samputensili interpolation software which coordinates the linear movement of the workpiece slide with the rotation of its spindle.

The rotational-translational movement generated is fully adjustable via software. It allows to obtain the requested involute with any pressure angle placed on the grinding wheel. Rolling and indexing of the workpiece are numerically controlled and both generated by the same axis.

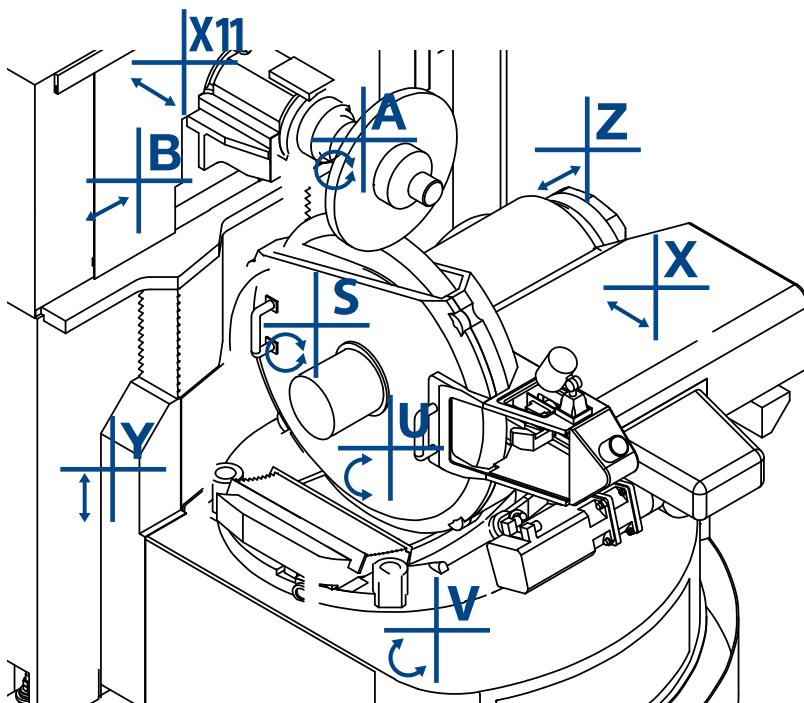
Linear motors drive all axes involved in the generation of the profile.



Fully NC controlled process with additional X11 axis

An additional NC-controlled axis has been integrated on the work spindle group to move workpieces axially in relation to their own bores.

- Grinding of workpieces with large face widths up to 70 mm, obtaining a correct profile in all points and also along the helix thanks to the sliding X11 axis
- Accurate planar positioning of the workpiece by avoiding accumulated errors caused by mechanical spacers
- Minimum set-up times thanks to the HMI
- Precise location of the exact centre of the workpiece tooth, the point over which the maximum outside diameter of the grinding wheel has to pass
- Higher accuracy on both the helix and involute profile
- Reduction of runout errors (Fr)
- Automatic balancing system (Marposs), with integrated touch sensor for a better management of the dressing and grinding process
- Ergonomic cabin ensuring the operator complete safety
- Electrowelded, heavily ribbed machine bed filled with polymeric cement for vibration-free operation even at highest stock removal rates
- Transducer with 0.1 micron resolution
- Low centre of gravity for extreme stability and easier tool handling
- Easy and fast workpiece change with quick-change mechanism
- Integrated checking unit

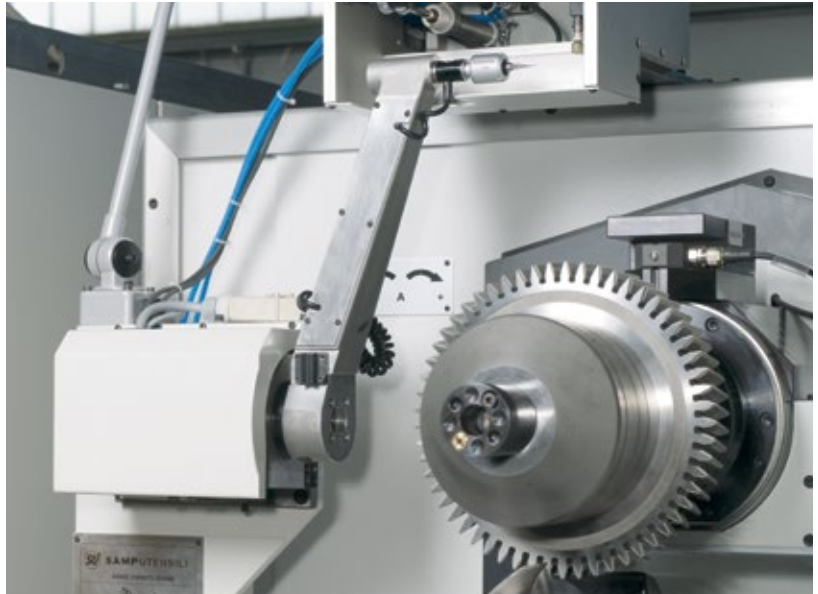


- A: Work spindle rotation/indexing
- B: Horizontal work slide movement
- X: Dresser radial stroke
- Z: Dresser axial stroke
- Y: Vertical work slide movement
- U: Pressure angle adjustment
- V: Helix angle adjustment
- S: Grinding spindle rotation
- X11: Work spindle feed axis

Integrated checking

Integrated measuring unit with electronic probe for on-the-machine checking of profile, lead and pitch errors. The CNC provides automatic feedback if corrections are required.

During the grinding process the checking unit is stored away safely, protected from heat and grinding dust.

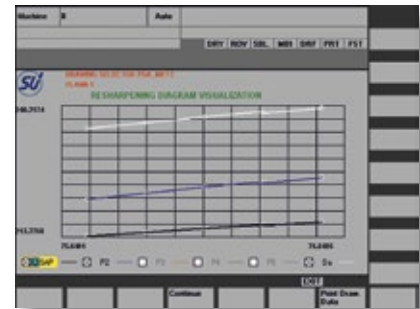


precision



Easy and intuitive operator guidance

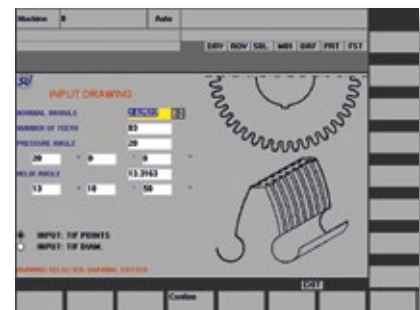
- Samputensili Dialogue Software for full operator guidance including plausibility checks, management of grinding/dressing processes and storage of process and profile data.
- Siemens 840 D Solution line CNC with high-level geometric programming for simplified profile and helix angle generation.
- “Autotuning” function during the grinding process.
- Profile, lead and topological modifications are freely programmable.
- Twisted flanks (BIAS) are generated by simple data input for electronic profile generation.
- Remote diagnostics system for software upgrades and troubleshooting.
- Interface between the machine control programme and the reshaping programme for automatic correction of some geometric parameters (For example: $fH\alpha$, α , $fH\beta$, β)



Reshaping diagrams



User-friendly input screens (shown: twisting profile correction)



Input drawing



Flexibility at your service

The GS 400 is extremely flexible and user-friendly, and this allows meeting a wide range of requirements with simple options.

The module for grinding the shaving cutter external diameter is available upon request to fulfil any production request of the customer.

Furthermore, this machine ensures incomparable results also in particular applications like, for example, the grinding of **master gears** for which Samputensili is recognised and known all over the world.

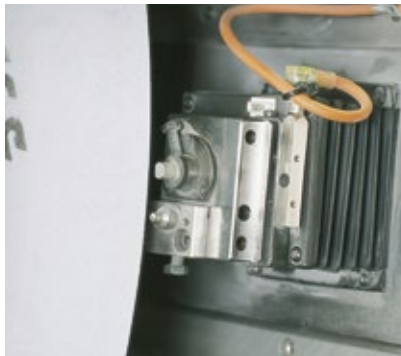


Dressing for fast and reliable profile correction

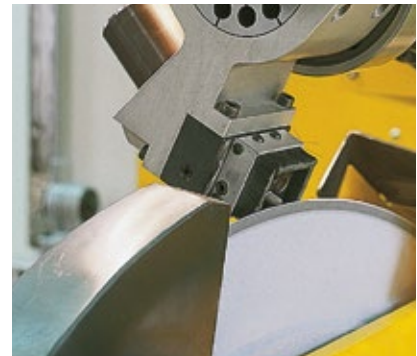
The new concept of the dressing unit with its high-speed dressing axis significantly cuts down dressing time while assuring maximum accuracy. The active profile is defined by an unlimited number of points of the theoretical involute form (TIF).

Five different wheel dressing operations are managed entirely by the CNC, employing special software cycles for: active profile, undercut, outside diameter, reduction of wheel tip and wheel back thickness.

The control of the grinding wheel correct position and geometry is detected without sensors.



Dressing unit with diamond for rough and finish dressing



Dressing unit for grinding wheel back

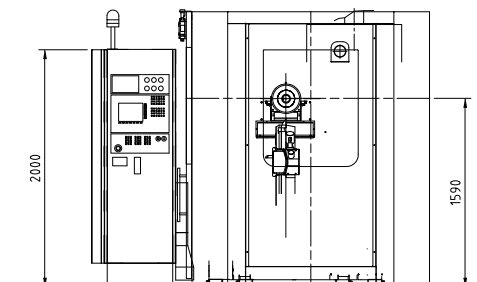
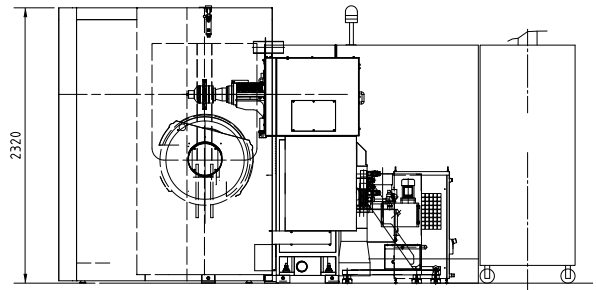
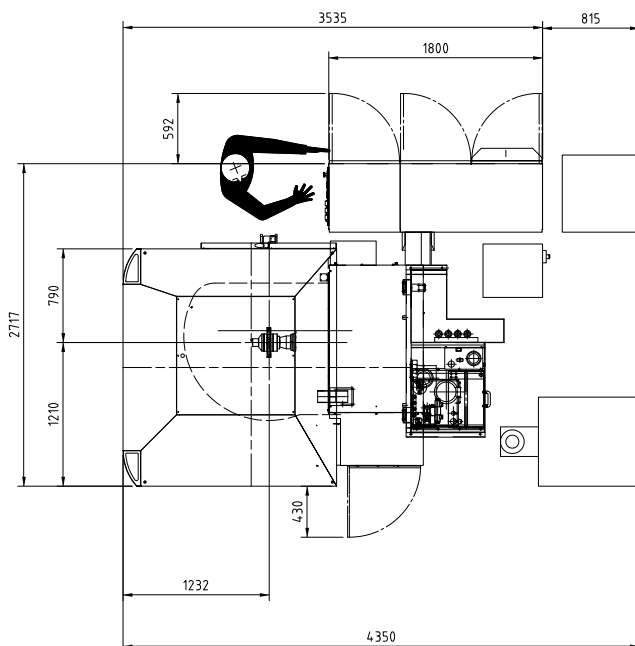


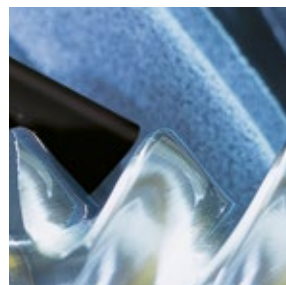
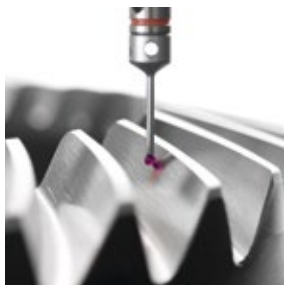
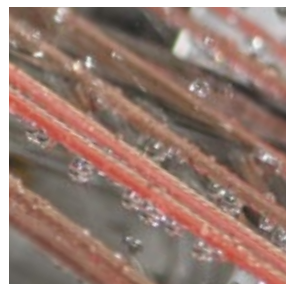
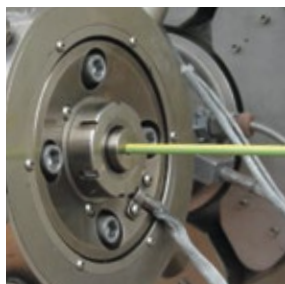
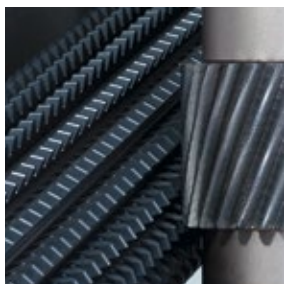
Optional dressing unit

Technical data

Workpiece diameter	mm	68 - 400
Module	mm	0.5 - 15
Face width, max.	mm	70
No. of teeth		unlimited
Speed of work spindle slide, max.	m/min	18
Stroke rate of work spindle slide, max.	rpm	80
Diameter of grinding wheel	mm	630 - 760
Speed of grinding wheel	rpm	0 - 900
Stroke of vertical slide, max.	mm	250
Swivel range of grinding spindle	degrees	RH 38 / LH 60
Pressure angle range	degrees	-5 / +30
Dresser speed	mm/min	0 - 500
Stroke of dresser, max.:		
Z-axis (parallel to grinding spindle)	mm	40
X-axis (perpend. to grinding spindle)	mm	110
Maximum absorbed power	kW	< 5
Machine weight, approx.	kg	6,000

Technical data is subject to change, maximum values depending on application





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