GL5Pi-32 CNC Cylindrical Grinder

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This machine is a CNC cylindrical grinder optimal for mass production machining of medium and small size shaft components within areas such as automobile components and consumer electronics.

Since the birth of the GL5 (released in 1992), the medium size cylindrical grinder has evolved into the GL5 II and GL5 III, receiving high evaluations from many of our customers.

To fulfill customers' demand for "stable accuracy", this machine has been given a machine structure in consideration to heat capacity balance, similar to the GE4i, a previously introduced machine.

This machine also allows for the specification selection of a CBN wheel, which achieves stable machining accuracy and improved rate of equipment operation. The CBN wheel specification can be achieved at minimal cost through the employment of a CBN wheel with normal surface speed specification (45 m/s), without changing the standard machine structure specifications.

Features

(1) Responds to a wide range of workpiece requirements
- Expansion of the variations in distance between centers

(2) Includes a dual-center drive workhead
- Requires no setup change time for the driving dog
- Addition of a calculation function for grinding conditions
- Integration of dual work spindle end machining processes

(3) CBN wheel specification for normal surface speed (45 m/s)
- Stabilization of machining accuracy
- Wheel change cycle is four times longer

Structure

2. 1 Series creation

This machine was developed as a G5i series (medium size cylindrical grinder) cylindrical grinder to be used for mass production. The platform of this machine is common to the (G5i series, **Fig. 1**) GE4i (large variety/small lot type) and GL4i (medium variety/medium lot type), and the structures of main devices such as the bed, wheelhead, table feed and wheelhead feed are identical, improving equipment reliability.

Furthermore, the distance between centers has been expanded from the two conventional types of 320/630mm to five types of 250/320/630/1 000/1 500mm, enabling further support for the wide range of customer demands. The 250mm distance between centers achieves a machine width of 2 000mm, and a full cover-type machine can be accommodated with 1 000/1 500mm distances between centers.

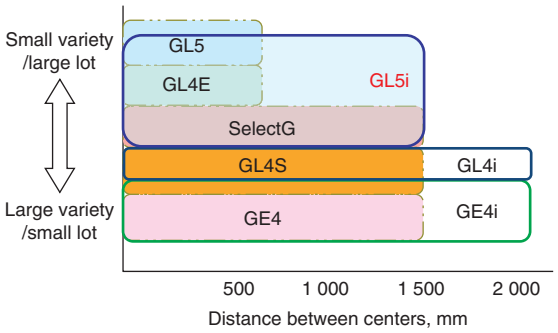

Fig.1 G5i series

2. 2 Workhead

This machine includes a dual-center drive workhead specification. With a dual-center drive workhead, friction generated between both center holes of the workpiece and both centers supporting the workpiece maintains a center pressure able to overcome tangential grinding resistance during grinding. This enables grinding without the use of a driving dog through synchronous drive of the left and right work spindles. Setup change time for driving dog change to support multiple types of workpieces is no longer necessary as a driving dog and chuck are not needed (**Fig. 2**).

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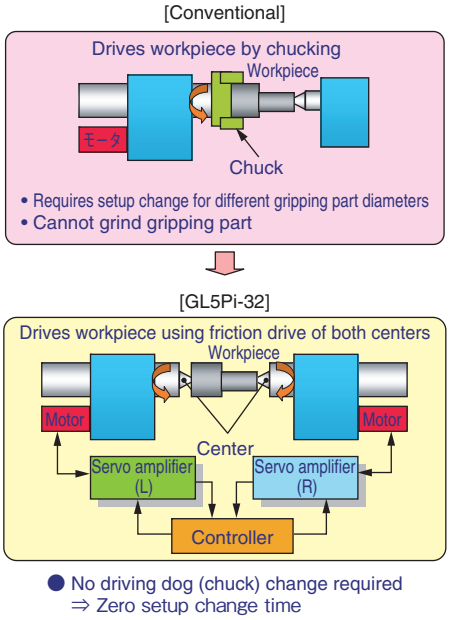

Fig. 2 Dual-center drive headstock

Although it is necessary to set grinding conditions that will prevent workpiece slip for the dual-center drive workhead, it was previously difficult to set grinding conditions required by customers within a short time. This machine has been equipped with a function to automatically calculate grinding conditions that will not cause slip, through the input of workpiece conditions by the operator. This function enables grinding conditions for new workpieces to be set quickly, easily and safely.

For a workpiece which receives grinding on both ends, grinding could not conventionally be conducted on the work spindle ends used by the driving dog or chuck. Therefore, either the process was divided and workpiece grinding conducted on two machines, or the workpiece was reversed with a loader or the like and grinding conducted on a single machine. However, the workhead on this machine allows grinding of both ends with one chuck, on a single machine (**Fig. 3**).

2. 3 Grinding wheel

In addition to normal wheel specifications, this machine also allows the selection of a CBN wheel specification of normal surface speed (45 m/s).

The merits of employing a CBN wheel of normal surface speed (45 m/s) are listed below.

• Stabilization of grinding accuracy

For a normal wheel, there is a great difference in the surface roughness of the workpiece immediately after and immediately before wheel dressing. The surface attributes of CBN wheels are maintained for a long

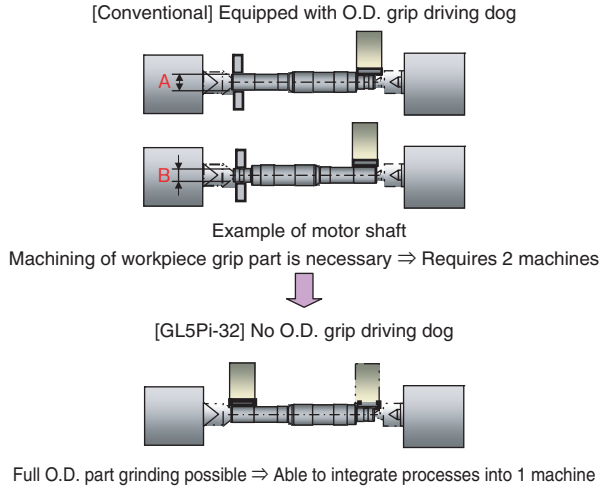

Fig. 3 Process integration through a dual drive workhead

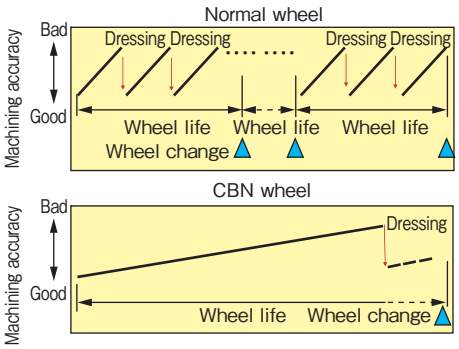

Fig. 4 Machining accuracy

time immediately after wheel dressing, ensuring stable workpiece machining accuracy over long periods (**Fig.4**).

• Wheel change cycle is four times longer

The wheel dressing interval for CBN wheels can be extended to approximately 30 times that of normal wheels. When converted to wheel change cycle, wheel change which is conducted once every three months for normal wheels is able to be extended to once every twelve months for CBN wheels (**Fig. 5**). This in turn improves the operation rate of the equipment.

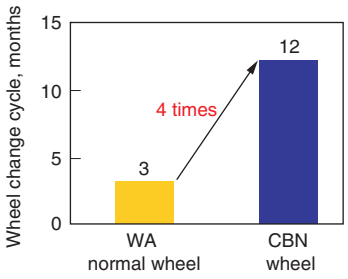

Fig. 5 Wheel change cycle

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