TOYODA

JTEKT

# GF32Mi SERIES

CBN Crankshaft Grinders

GF32Mi-35
GF32Mi-63


JTEKT
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Type of Machinery: Grinder
Model Number: GF32Mi


Cat. No. M2117E

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CBN Crankshaft Grinders

# GF32Mi-35
# GF32Mi-63

## Latest crankshaft pin grinders with linear motor drive.


The grinder in the photo is a GF32Mi-63.
The grinder in this photo has special specifications.
Note : Painting color shall be specified by mutual agreement.

### High-accuracy

- High-accuracy grinding promising a high accuracy grinding surface.
- High-rigidity bed reducing thermal displacement and improving chattering accuracy.

### Improvement of productivity

- Supports drive section diameter difference due to automatic center distance adjustment and wide range chuck
- Rich selection of grinding methods achieving machining flexibility

### Reassuring operation

- Improved reliability with TOYOPUC-GC70.
- Simplification of wheel replacement.

### C-X grinding method




### Roundness: 0.52μm




| | |
|---|---|
| Workpiece: Crankpin | (Crankshaft for automobile) |
| Workpiece material: S48C | Induction hardening (Hv 600) |
| Wheel: CBN wheel | OD × Width: ϕ430mm × 17.5mm |
| Wheel surface speed: 120m/s | |
| Stock removal of OD: ϕ1.2mm | (Including runout) |
| Actual grinding time: 19sec/pin | |

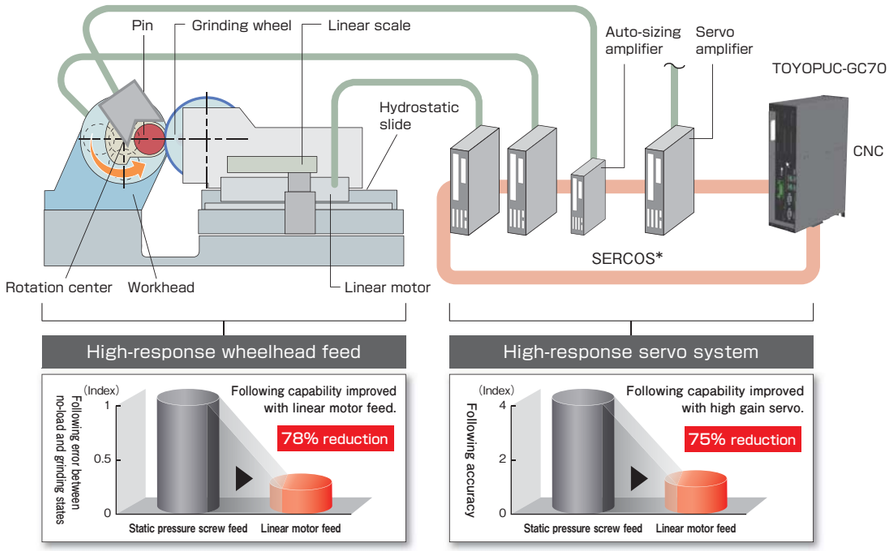
# High-accuracy

## Stable high-grade grinding

### High accuracy grinding assuring a high quality grinding surface.

● High-response wheelhead feed mechanism ● High-response servo system

Achieves a wheelhead feed that is not influenced by motion loss or backlash, due to a rapid response wheelhead feed mechanism utilizing a lightweight wheelhead, a static pressure slideway, and a linear motor drive.
The high response servo system and high response feed mechanism enhance the accuracy and quality of the pin grinding surface.
Also contributes to the improvement of dimension accuracy through the inclusion of an auto-sizing amplifier within the high response servo system, allowing for optimum control feed.

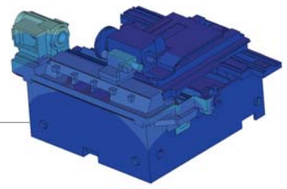



＊ A registered trademark of SERCOS International e.V.

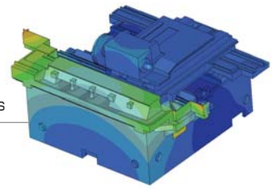
### High-rigidity bed reducing thermal displacement and improving chattering accuracy.

In order to achieve high accuracy grinding over long periods of time, the bed supporting the moving area has been given sufficient rigidity through utilization of analysis technology, and is designed with consideration to frequency characteristics and heat displacement.

Achieves min. displacement by analyzing of natural frequency

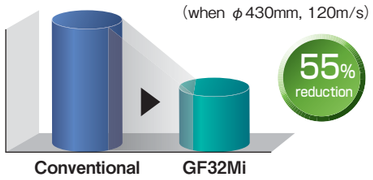


Minimizes the heat displacement between the wheel and centers through bed temperature analysis

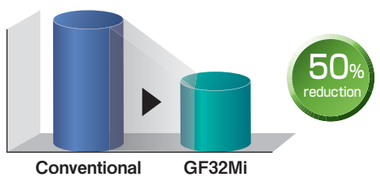


**Difference in relative displacement between workhead and footstock.**

(when φ430mm, 120m/s)

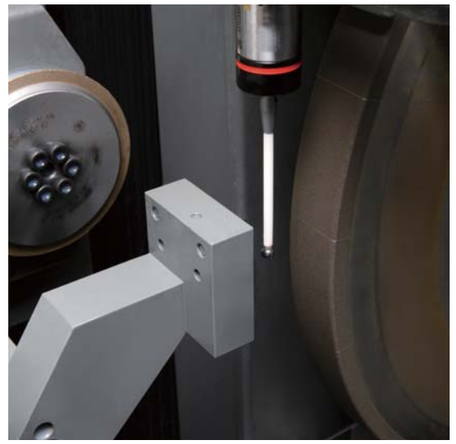



**Thermal displacement between wheel and centers**



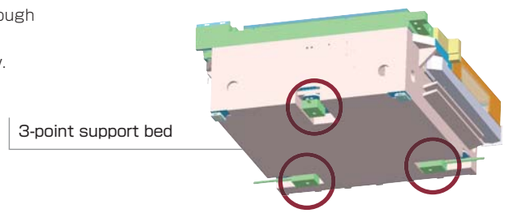

### Improvement of roundness with an exact grinding wheel diameter

Measures grinding wheel diameter exactly with a measuring system utilizing a touch probe, and applies the measured value during C-X grinding to improve roundness. Because grinding wheel diameter is correctly measured, CBN grinding wheels are able to be used for even the smallest diameters.



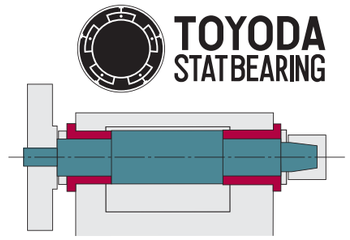
### 3-point support bed

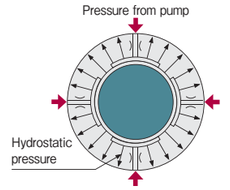
Minimizes the influence of ground change through the development of a 3-point support bed.
Keeps long period steady machining accuracy.



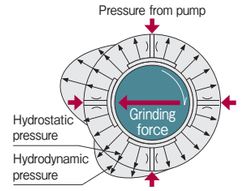

### Featuring the JTEKT original TOYODA STAT BEARING as the wheel spindle, the heart of the machine

Equipped with the extremely rigid hybrid-type TOYODA STAT BEARING which provides no metal-to-metal contact and has a high vibration damping capacity, this grinder assures high accuracy and a long service life.
High accuracy grinding and longevity of the machine is achieved by using proven JTEKT spindle technology.



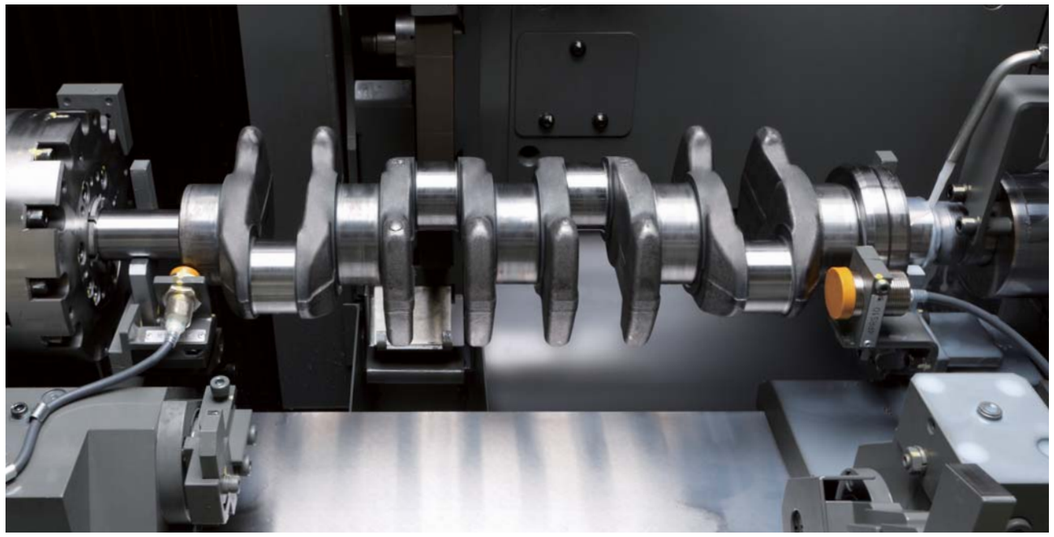

■Spindle at rest
Hydrostatic pressure lifts and holds the wheel spindle firmly at the bearing center position.




■Rotation spindle
Combination of hydrostatic and hydrodynamic pressures improves spindle rigidity and vibration absorbing performance.

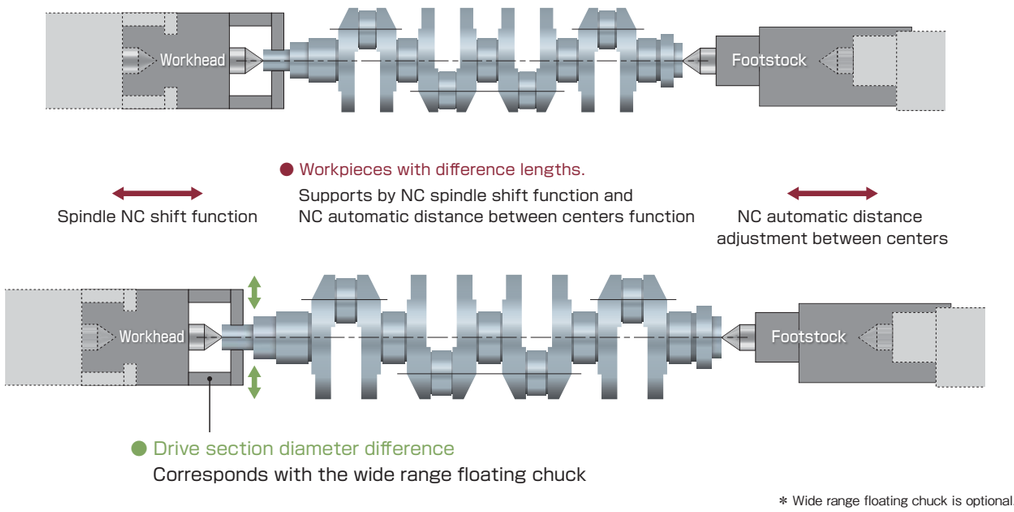
# Improvement of productivity

## Reduction of working time and truing time



### Supports drive section diameter difference due to automatic center distance adjustment and wide range floating chuck

We also have set-up changeover items prepared which can respond to workpieces with difference lengths and diameters. This significantly reduces set-up changeover time, contributing to productivity improvement.

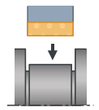
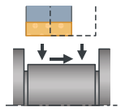
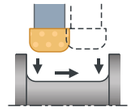


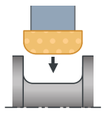
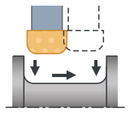

＊ Wide range floating chuck is optional.

### Rich selection of grinding methods achieving machining flexibility

Able to grind every crankshaft from gasoline engine to diesel engine, using C-X grinding and a rich selection of grinding methods. Contains a revolutionary flexible function that does not require wheel exchange even when grinding multiple types of crankshafts.

●: Standard □: Optional

| Type | OD grinding | | | |
|---|---|---|---|---|
| Name | Plunge  | Plunge + traverse grinding  | Plunge  | Plunge + traverse grinding  |
| Spec. | ● | ● | ● | ● |
| Shape | Fillet groove | Fillet groove | R | R |

| Type | OD grinding + shoulder grinding | |
|---|---|---|
| Name | Plunge  | Plunge + traverse grinding  |
| Spec. | □ | □ |
| Shape | R | R |

＊ May be restricted by tooling

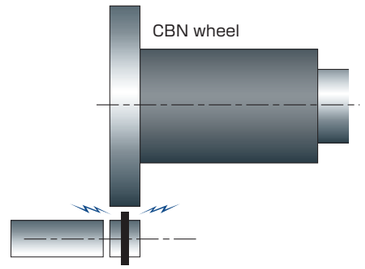
### Safety automatic position memory

Run-out removal, truing, position memory and so on is performed automatically after wheel replacement making work easy and alleviating the workload.

### Direct detection type truing system

Option

Directly detects contact between the wheel and diamond roll and cuts in a certain amount from that position, therefore the truing amount is optimal and a stable cut is achieved each time truing is performed.



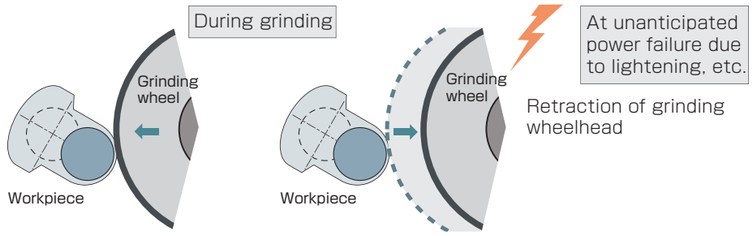
# Reassuring operation

## Improved reliability with TOYOPUC-GC70.

### Protection against grinding wheel damage during power failure

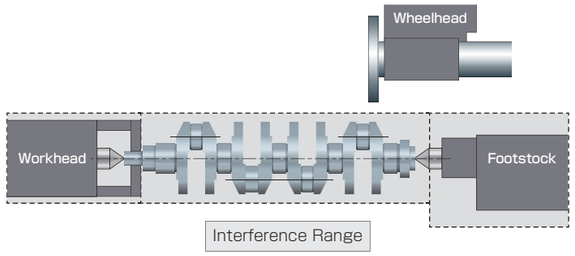
Option

The grinding wheel is separated from the workpiece if a power failure is detected, thereby protecting against grinding wheel damage.




### Stable operation at first-piece grinding and handle operation.

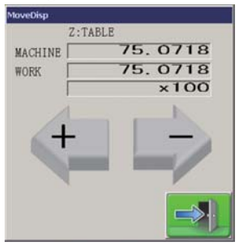
At first-piece automatic grinding and handle operation after set-up changeover, speed is limited within preset interference zones so operations can be performed with reassurance.




### Prevention of incorrect manual operation

This series is equipped with a support function which displays motion direction and notifies the operator of incorrect operations, in order to avoid interference by erroneous operation direction.

Inching / Handle Mode




Displays motion direction before operation

Axis in motion

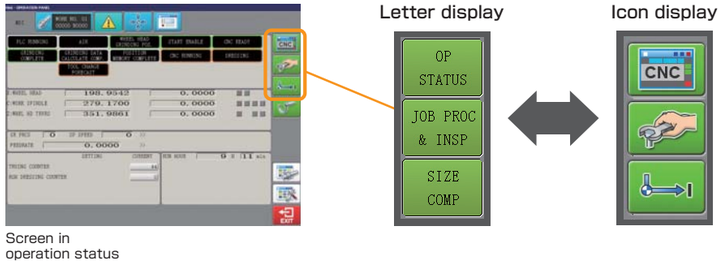

Shows motion direction in color

### Data batch backup function

Allows the batch saving of all data, including grinding conditions, compensation data, parameters, etc. This function can also be of use in fault analysis of machine stoppage.

### Iconized operation buttons

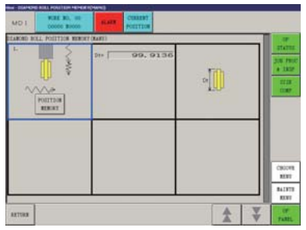
Operations can be easily recognized through iconized operation buttons. Buttons can be switched from icons to letters.




Screen in operation status

### Perfected guidance function

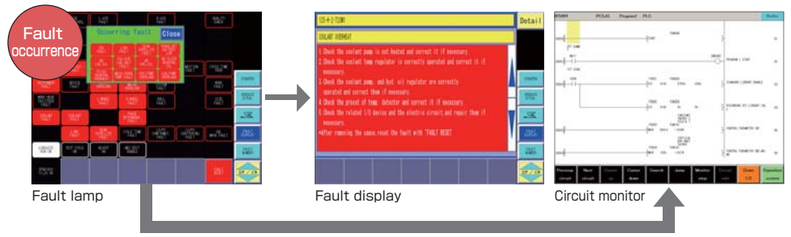
Setup change, maintenance details, input data explanation, etc. can be easily understood from the graphical operation screen, and operations can be carried out smoothly.



Position memory screen

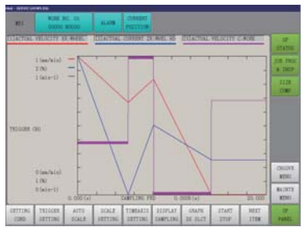
### Simple fault diagnostics

Fault locations are diagnosed directly on the CNC screen from the error display and the circuit monitor.




### Perfected preventative maintenance support function

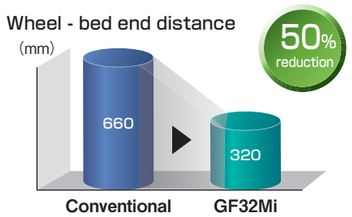
Defective workpieces and machine malfunctions can be discovered early by comparing normal values sampled from electrical current, position deviations, speed data, etc.



# Reassuring operation

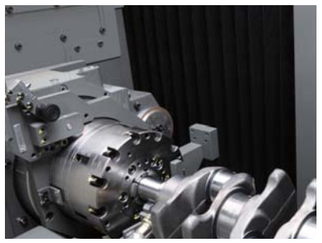
## Simplification of wheel replacement.

Improved proximity to wheel at wheel replacement and adopted a slide method for the upper cover on the wheel replacement side, improving workability.




## Best design limiting coolant splash range

A local cover is used to limit the coolant splash range, and the workhead and wheelhead, where motors, pressure switches and other electronic devices are concentrated, have been located outside the coolant splash range



Vertical cover preventing coolant splash

Front side

Rear side

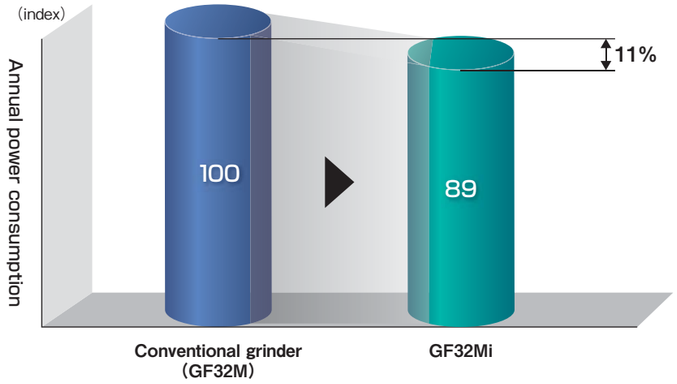
## An excellent machine configuration for coolant collection.

Designed with optimum slope and a coolant collection route structure that does not disturb chip flow. This has improved coolant flow, reduced chip accumulation and contributed to the shortening of cleaning time.

## Reduction in power consumption per workpiece.

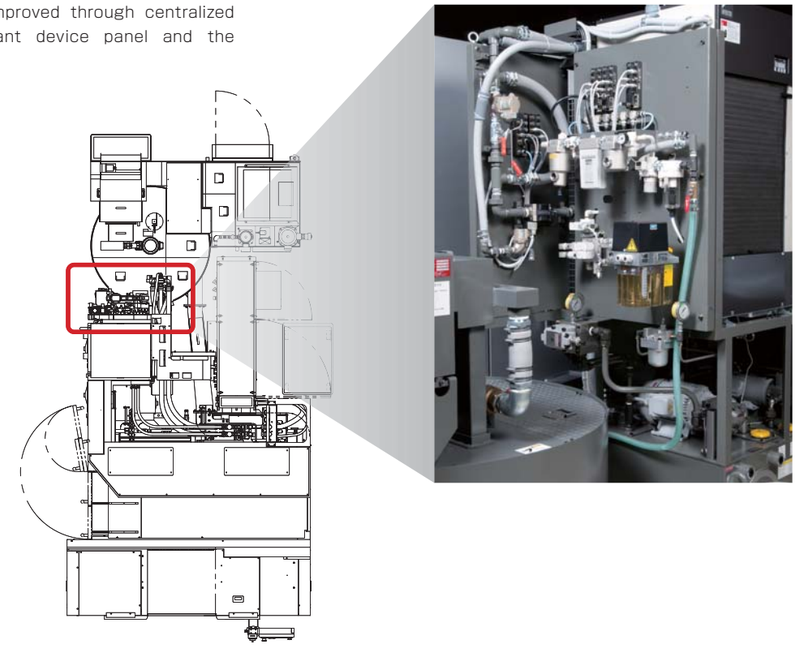
Reduced power consumption by 11% of conventional grinder GF32M through the following measures:

- Adopting an energy-saving pump
- Eliminating the circulating filter circuit pump by improving cleaning level
- Shortening warm-up operation through a low thermal displacement bed
- Shortening cycle-time by a wheel with high grinding efficiency and improved sharpness



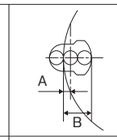

## Centralized arrangement of devices considering workability.

Maintainability has been improved through centralized arrangement of the coolant device panel and the pneumatic device panel.



# Machine specifications

[ ] : option

| Item | | | Unit | GF32Mi-35/63 |
|---|---|---|---|---|
| Swing over table | | | mm | ϕ320 |
| Distance between centers | | | mm | 350/630 |
| Center height | | | mm | 1,120 |
| Grinding diameter | | | mm | ϕ35～ϕ70 |
| Wheel insertion amount |  | A | mm | 30 |
| | | B | mm | 115 |
| CBN wheel | OD | | mm | ϕ430 |
| | Maximum width | | mm | 45 |
| | Surface speed | | m/s | 120 [ 80 ] |
| Wheelhead | Feed method | | | Hydrostatic box slide, linear motor drive |
| | Rapid feedrate | | m/min | ϕ40 |
| | Minimum input increment | | mm | ϕ0.0001 |
| Wheelhead traverse | Feed method | | | V-flat slide, ballscrew drive |
| | Rapid feedrate | | m/min | 20 |
| | Minimum input increment | | mm | 0.0001 |
| Workhead | Type | | | Live spindle |

| Item | | Unit | GF32Mi-35/63 |
|---|---|---|---|
| Workhead | Center | | MT No.4 |
| | Maximum spindle speed | $min^{-1}$ | 250 |
| | Minimum input increment | ° | 0.0001 |
| Footstock | Type | | Automatic center adjustment type [Hydraulic type] |
| | Center | | MT No.5 |
| | Stroke | mm | 60 [ 190 ] |
| Drive motor | Wheel spindle | kW | 22 [ 30 ] |
| | Wheelhead feed | kW | 9.8 |
| | Wheelhead traverse feed | kW | 2.9 |
| | Work spindle | kW | 2.5 |
| | Truing roll | kW | 0.75 (2P) |
| | Wheel spindle bearing oil pump | kW | 3.7 (4P) |
| | Hydraulic oil pump | kW | 0.75 (4P) |
| | Lubricating oil pump | kW | 0.4 (4P) |
| Power supply voltage | | V | 200 |
| Tank capacity | Spindle bearing lubricant | L | 70 |
| | Hydraulic oil | L | 25 |
| | Lubricating oil | L | 40 |
| Machine weight | | kg | 11,500 |

※ The specification may be restrained according to the accessories and the tooling of customer.

# TOYOPUC-GC70 CNC specifications

●: Standard □: Optional

| Division | Item | |
|---|---|---|
| Controlled axes | X: Wheelhead feed | ● |
| | Z: Wheelhead traverse | ● |
| | C: Work spindle rotation | ● |
| | WF: Footstock quill stroke | ● |
| | WW: Work spindle stroke | ● |
| Display unit | 12 inch color TFT | ● |
| File management | Structured data management | ● |
| | Lift data memory 500 | ● |
| | Maximum of 64 grinding data | ● |
| | Process data/each workpiece: 30 | ● |
| Coordinate setting | Position memory (Wheel OD, Truing roll OD, Detection pin length) | ● |
| Compensation function | Wheel diameter follow-up compensation | ● |
| | Measuring error correction function | ● |
| Display | Operation monitor | ● |
| | Manual operation switches and lamps | ● |
| | Work procedure | ● |
| | Inspection,Maintenance data | ● |
| | Sequence circuit monitor edit | ● |
| | Back light off function | ● |
| Operation | Canned cycle | ● |
| | Test cycle | ● |
| | Return cycle | ● |
| | In-process startup function | ● |

| Division | Item | |
|---|---|---|
| Operation | Single block | ● |
| | Rapid feed override | ● |
| | Feed override | ● |
| Maintenance | Wheel replacement prediction/min.wheel dia. display | ● |
| | Truing roll replacement prediction/Wheel minimum diameter display | ● |
| | Contact detection pin replacement prediction/ Pin minimum length display | ● |
| | Self-diagnosis function | ● |
| | Alarm history display | ● |
| | Production maintenance data output | ● |
| | Batch backup function | ● |
| | Servo sampling function | ● |
| Counter | Production counter | ● |
| | Wheel truing counter | ● |
| | Quality check counter | ● |
| Cycle time display | Processing cycle time | ● |
| | Grinding cycle time | ● |
| | Wheel truing cycle time | ● |
| Others | Manual pulse generator | ● |
| | MDI on/off key switch | ● |
| | USB flash drive I/F | ● |
| | Automatic workpiece data processing changeover | □ |
| | Host computer connection | □ |
| | Wheelhead return at power failure | □ |





# GF32Mi Recommended package accessory list

## Standard accessories

■Supports one type of workpiece ■Center distance 630mm

●: Standard accessory ○: Optional A accessory □: Optional B accessory

＊ When an optional A accessory is chosen, the corresponding standard one is not supplied.

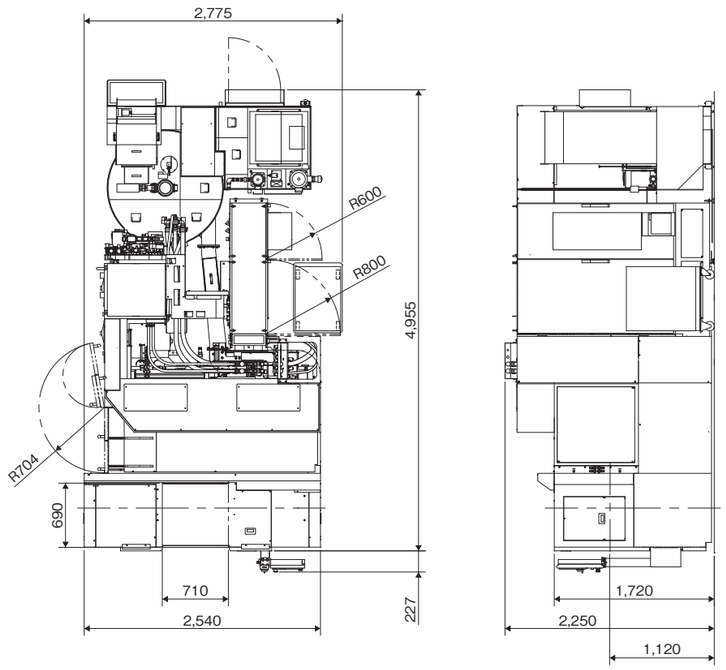
| Item | | No. | Recommended package accessories | |
|---|---|---|---|---|
| Standard package | Workhead | 1 | Live spindle workhead with NC spindle travel function (MT No.4, NC process: 100mm) | ● |
| | Footstock | 2 | Footstock with NC automatic center adjustment (MT No.5, NC process: 190mm) | ● |
| | Truing device | 3 | Truing device | ● |
| | Workpiece | 4 | Workpiece rotation fault confirmation unit (proximity type) | ● |
| | Cover | 5 | Automatic open/close cover | ● |
| | | 6 | Duct opening for dust collector | ● |
| | Electrical control | 7 | Control cabinet cooler | ● |
| | | 8 | Machine transplant detection | ● |
| | | 9 | Warm-up operation circuit | ● |
| | | 10 | Electric-saving circuit | ● |
| | | 11 | TOYOPUC-GC70 grinding status display | ● |

| Item | | No. | Recommended package accessories | |
|---|---|---|---|---|
| Select option | Wheel surface speed | 1 | 22kW, 120m/s | ○ |
| | | 2 | 22kW, 80m/s | ○ |
| | | 3 | 30kW, 120m/s | ● |
| | | 4 | 30kW, 80m/s | ○ |
| | Coolant supply unit | 5 | High accuracy filtering coolant unit (Magnetic separator processing ability: 180 L/min) | ○ |
| | | 6 | High accuracy filtering coolant unit (Magnetic separator processing ability: 180 L/min, Cooler for coolant temperature adjustment) | ● |
| | | 7 | High accuracy filtering coolant unit (Magnetic separator processing ability: 180 L/min, Cooler for coolant temperature adjustment, Cyclone) | ○ |
| | | 8 | Centralized coolant processing | ○ |
| | Drive method | 9 | Collet chuck | ● |
| | | 10 | Floating chuck | ○ |
| | | 11 | Wide range floating chuck (diameter difference ϕ5 mm.) | ○ |
| | Electrical control | 12 | 200V power voltage | ● |
| | | 13 | 380V, 400V, 415V power voltages | ○ |
| | Nameplates | 14 | Japanese | ● |
| | | 15 | English | ○ |
| | | 16 | Chinese | ○ |
| | Paint | 17 | Standard paint color (dark grey/silver metallic) | ● |
| | | 18 | Designated color | ○ |

| Item | | No. | Recommended package accessories | |
|---|---|---|---|---|
| Additional option | Hydraulic-related | 1 | Air gun | □ |
| | | 2 | Coolant splash gun (for cleaning) | □ |
| | Wheel balance unit | 3 | Wheel balancing unit - Marpos | □ |
| | Tools | 4 | Standard tools | □ |
| | | 5 | Wheel hoisting bracket | □ |
| | Jig crane | 6 | Jig crane | □ |
| | Temporary holder | 7 | Workpiece temporary support | □ |
| | Dust collector | 8 | Dust collector CRD-750 | □ |
| | Electrical control | 9 | 100 V outlet inside control cabinet | □ |
| | Submitted documentation | 10 | Instruction manual (on CD) | □ |
| | | 11 | Instruction manual Additional submission (1 copy) | □ |

# Machine layout & dimensions

## GF32Mi-35
## GF32Mi-63





The grinder in this image has standard cover specifications.

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