

GVI SERIES

Inverted Vertical Combination CNC Turning Center



THE ULTIMATE MACHINING POWER
WOODWAY

NO MORE EXPERIENCE IS REQUIRED FOR EFFICIENCY

GVI series *automated* *intelligent*

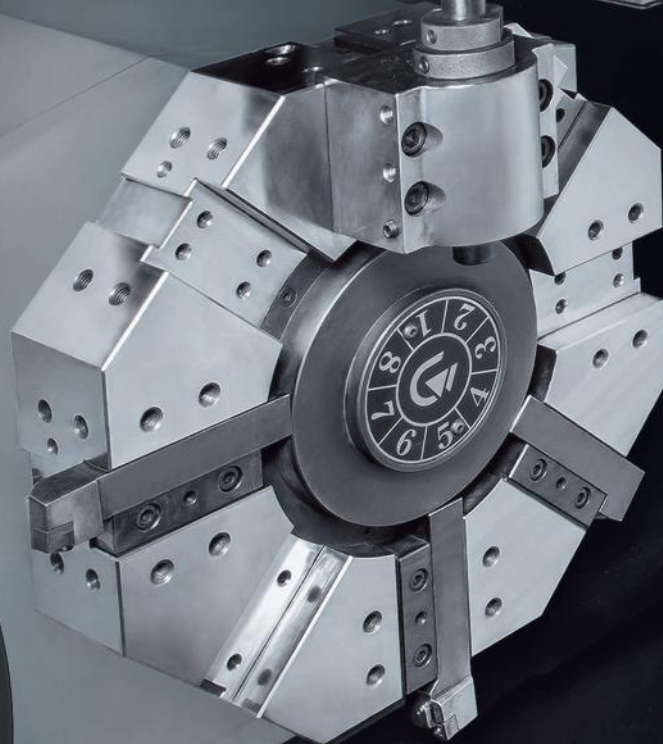
Advanced Inverted Vertical Design On Twin Spindle And Turret

To Simplify The Traditional Feeding, Clamping And Flipping Structure

To Process The Front And Rear Side Of Workpiece With High Efficiency And Precision

Reduce The Manpower Significantly

HAVING THE GVI SERIES,
YOU DON'T NEED ANY EXPERIENCE
FOR EFFICIENCY ANYMORE





INVERTED VERTICAL COMBINATION CNC TURNING CENTER

Advance Inverted vertical design on spindle

- ▶ 1st spindle can instead of the robot arm function which can clamp the material directly and more efficient on feeding.
- ▶ There is no complicate workpiece flipping device required on machine, workpiece also can be flipped very fast and reliable.

Multi-tasking, all in one machine

- ▶ To integrate two vertical turning centers and build up machining ability, no more manpower on workpiece flipping work.
- ▶ GVI series is available with live tooling turret and C-axis to perform multiple tasks on a workpiece, such as turning, milling, drilling and tapping.

To simplify the manpower requirement

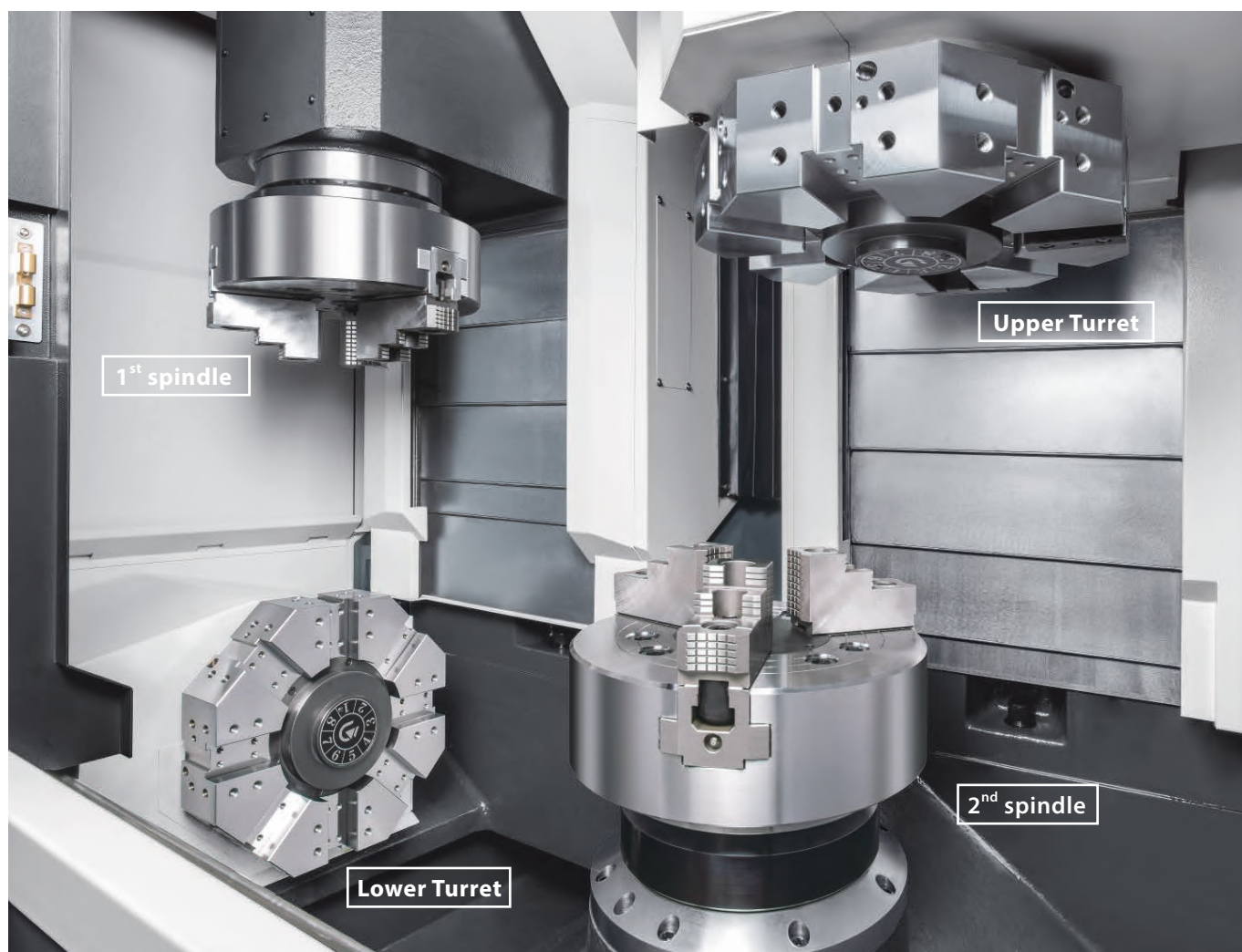
- ▶ Complete interface of peripheral equipment, available to equip different type of automatic device according to actual demand.
- ▶ To integrate with industry 4.0 easily, you can choose GOODWAY G.LINC 350 intelligent system (OPT).

Compact machine design

- ▶ Workpiece loading and unloading system, flipping device are MULTI-IN-ONE
- ▶ Because of the optimized structure design with rear out chip conveyor, the machine floor plane is only 8.2 m²



(GVI-350 model shown with optional accessories)



- Twin spindles and twin turrets are adopted with the same design and they can suitable for the machining requirement of disk type and short shaft type workpiece.

SPINDLE

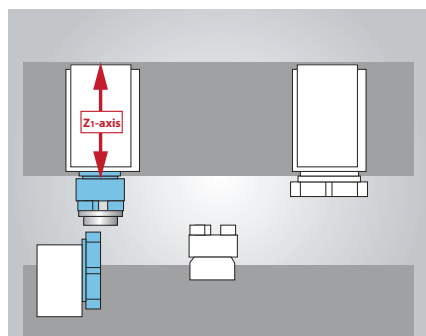
- Chuck size : 12"
- Spindle nose : A2-8

TURRET

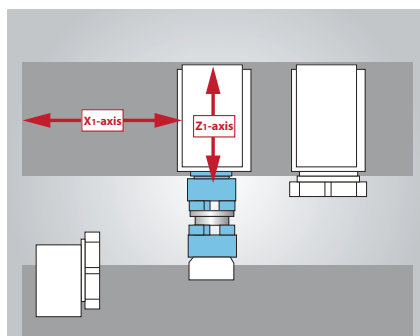
- Tool shank size : □ 25 / Ø 50 mm
- Stations : 8

- Standard FANUC Oi-TF controller dual system is available to program and control independently on each system. Bring more efficient on the machining.

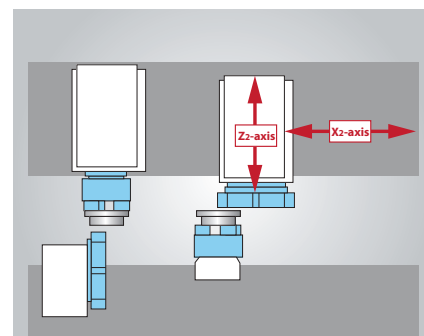
MACHINING MODE



Lower turret can cutting on 1st spindle



Both spindles can be programmed for synchronized parts catching



Dual system can be programmed for synchronized turning.

AUTOMATIC PRODUCTION SYSTEM

GVI machine with automatic loading system, flipping device and TRV series tapping center is the best automation production system with optimized efficiency for brake disk on the market nowadays. (GOODWAY can provide you the solution for the different machining requirement)



Automatic feeding ▶

OP10 ▶

Synchronization on twin spindle ▶

OP20 ▶

Automatic discharge



Automatic feeding

The 1st spindle on GVI series equips with both X & Z axes feeding ability which can provide workpiece clamping function same as the robot arm and it also can increase the elasticity for equipping with automatic facility. Moreover, it also achieve the requirement of compact machine design.



Synchronization on twin spindle

Workpiece can be flipped faster and more reliable by catching the workpiece with synchronous speed on both 1st spindles and 2nd spindle. It can avoid the scrape during the flip procedure after workpiece finished work. And also make sure the optimize surface roughness for the workpiece.



Automatic discharge

Workpiece clamped by turret, workpiece caught by tray and parts discharged are all direct driven by servo motor and whole procedure is accomplished at one go.



Workpiece flipping device

Tapping center

Workpiece unloading system

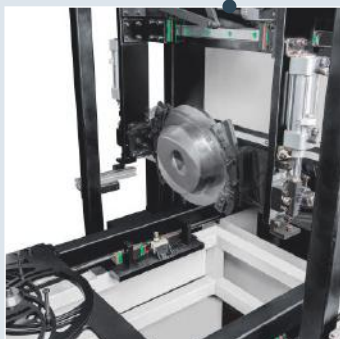
Automatic discharge ▶

Workpiece flipping ▶

Automatic feeding ▶

OP30 ▶

Automatic discharge ▶



Workpiece flipping

Workpiece clamping and flipping device are adopt with pneumatic drive design and it also include with efficient, environmental and durable.



High speed drilling and tapping

To do drilling and tapping with high speed by TRV series, it's not only shorten cycle cutting for OP10 but decrease the waiting time of un-cutting for OP10~30 significantly. Moreover, it can make sure the high efficiency of production.



Control panel

To simplify the operation and increase work safety, the main control panel provides the convenient function-one touch button and each module equip with the manual control panel.

INTELLIGENT PRODUCTION SYSTEM

In response to manufacturing mode of revolutionary **Industry 4.0**, GVI automatic production system can integrate with lots of advance technology such as GOODWAY Remote Monitoring "G.NET system", "FANUC 3D Area Sensor", "Articulated Type Robot Arm" and etc. It not only can achieve the target of unmanned factory but also intelligent manufacture on small-volume / multiple-type.

(All kits for intelligent production system are optional accessories.)



G.NET Remote Monitoring system

By GOODWAY Remote Monitoring system "G.NET" can integrate the equipments with communication capability such as machine equipment, warehouse system, robot arm and sensor kit in specific area. It can achieve the system monitoring, schedule planning, instruction executing and other advanced manufacture modes in central control platform.

FANUC 3D Area Sensor

To create area detecting visual system by using 1 set of light projector and 2 set of high resolution camera. By project the straight light and 3D bin-picking technology which can identify the mess workpiece in the bin and it also can assist robot arm to evaluate and decide which part can be pick and the best positioning position.





Robot Arm

High performance FANUC robot arm can magnetize the workpiece by electromagnetic force on the front side of robot arm. No matter how the workpiece be placed, robot arm can magneize it successfully.

(The specification of robot arm will be different according to different machining requiremet.)

Max. load : 35 kg

Radius of gyration : 1,813 mm

Repeatability : ± 0.08 mm



Accuracy Detection

The high precision digital eddy current sensors developed by GOODWAY can measure relative position without contact. By using RS232 interface to communicate directly with controller and show / save the data. It is more reliable and can save more manpower.



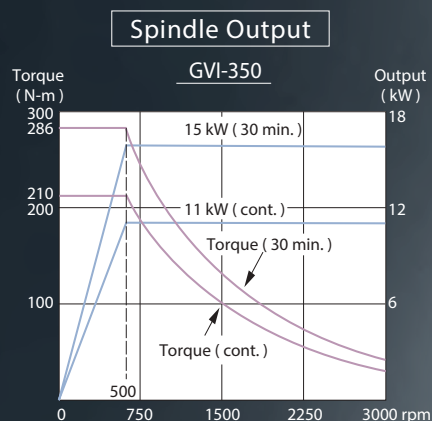
Digital eddy current sensors



0.4 μ m
Resolution

OPTIMAL SPINDLE SYSTEM

- ▶ 3,000 rpm high torque spindle with high power 15 kW spindle motor which can offer max. torque output 286 N-m at 500 rpm is suitable for heavy cutting.
- ▶ P4 grade super-high precision spindle bearings are directly assembled for maximum level of support and precision. Bearing configuration is designed for heavy-duty cutting with ultra-smooth performance and long term durability with a high level of accuracy.
- ▶ Standard 3-Jaw chuck with hydraulic clamping force 14,200 kgf to keep spindle rigidity in any cutting condition.



ADVANCED TURRET TECHNOLOGY



Servo Turret

- ▶ The super heavy-duty servo indexing turret features the latest non-lifting turret disk technology, achieving 0.2 second indexing for adjacent stations and 0.5 second for stations at the opposite end of the disk.
- ▶ The JAPANESE super high precision curvic couplings accurately position the turret disk and 3,620 Kg of clamping force ensures abundant turret rigidity for all cutting conditions.
- ▶ The curvic couplings features auto-centering, auto-cleaning and a large size tooth ank which are superior to traditional curvic couplings and are greatly used in our products.



Dual-face Turning Holder (Opt.)

The GOODWAY dual-face holder allows both sides of a workpiece to be machined at the same time while ensuring parallel precision of the surface and save 50% processing time. It is applicable for disk brakes or automotive related components.

- ▶ The servo motor driven tool holder provides more flexibility to various working conditions which saving tool adjustment time and increasing production efficiency.

Dual-face Turning Holder	
O.D. tool shank size	□ 20 mm
Allowance diameter of work piece	Ø 420 mm
Allowance height of work piece	7~100 mm
Allowance depth of work piece	100 mm



COMBINATION OF PROCESSING CAPACITY



Live Tooling Turret (Opt.)

- ▶ Live tooling turret is driven by spindle motor with transmission mechanism which provides abundant 4.5 kW output can easily complete any task of milling, drilling and tapping.
- ▶ The 12-station GOODWAY live tooling turret offers 12 stations available for live tooling (live tooling tools rotate in working position only) and features a non-lifting turret disk.

Live tooling shank size ▶ ER32

Live tooling RPM range ▶ 40 ~ 4,000 rpm

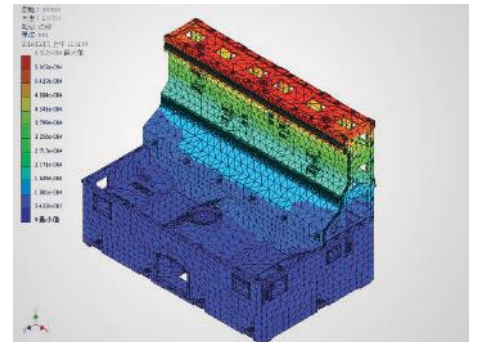


C-axis (Opt.)

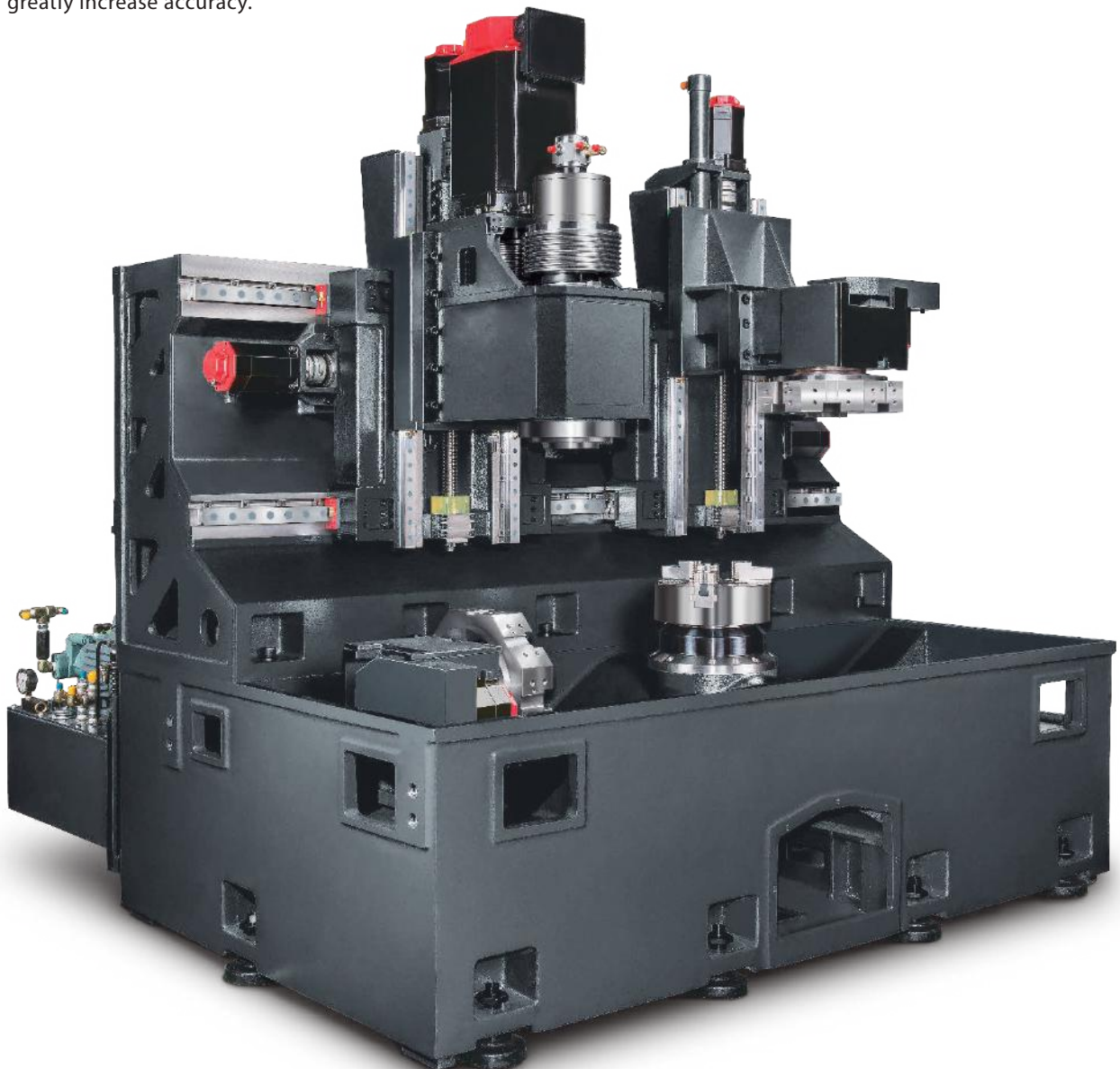
- ▶ The GVI series with option C-axis and driven tool turret provide milling and turning capacity which turning, milling, drilling and tapping can be done in one machine. It can avoid the error while moving from machine to machine and save cycle time and manpower.
- ▶ High torque built-in type Cs-axis combine high precision magnetic ring design which is easy to operate and quicker to positioning compare with Cf-axis.

SUPER RIGID CONSTRUCTION

- ▶ By using Finite Element Methods (FEM), optimal reinforced ribbings are directly casted into the one-piece bed and column structure. The GVI series is capable of performing heavy-duty turning and maintain long-term high-precision accuracy.
- ▶ Built to endure years and years of rigorous high production turning, the heavily ribbed, thermally balanced, super rigidity bed and column are MEEHANITE casting. It is capable of withstanding much greater stress without deforming and provides maximum vibration dampening, which result in a machine that will outlast and outperform the competition.
- ▶ The high precision linear guideways on X/Z axes provide maximum precision rapid movement and low-wear advantage.
- ▶ After heat treatment and precision grinding, the C3 class ball screws with pre-load design on each axes can reduce addendum modification and greatly increase accuracy.



▶ Finite Element Methods (FEM)

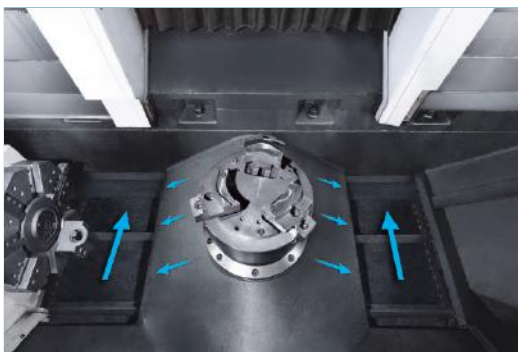
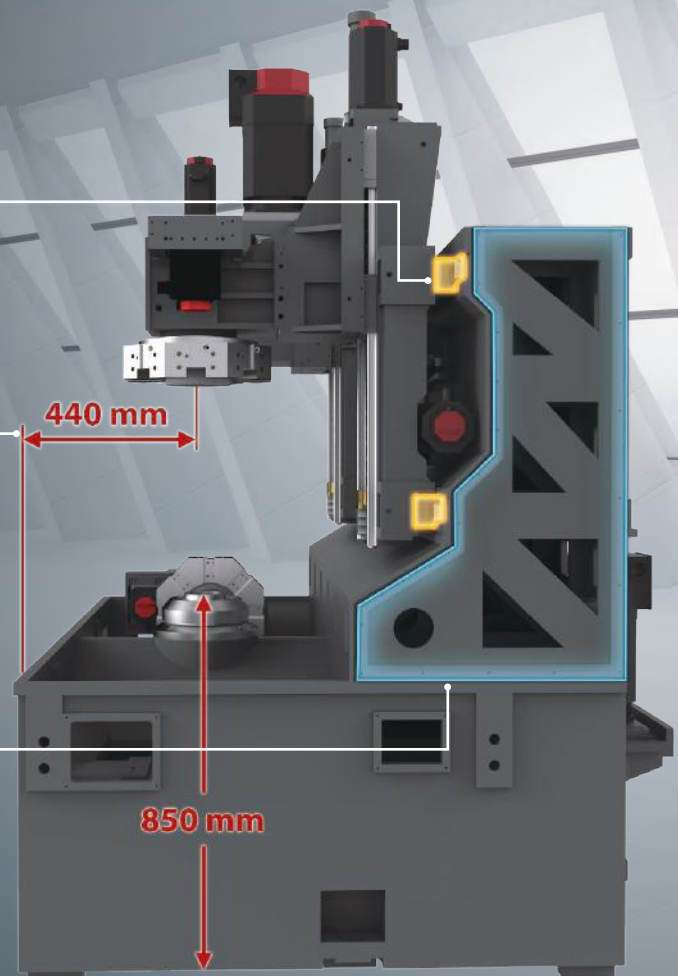


X-axis rail is using high-low rail design to efficiency shorten first axis / gravity of upper turret and the distance of column to ensure the outstanding cutting rigidity.

Humanized operation environment which tools installation, workpiece setting or trouble shooting can be easily done.

MEEHANITE grade casting, L type design rib enlarge the contact surface area of column and bed which provide excellent stability, and ensure rigidity of support on all axes.

Contact surfaces of column, bed and ball screws bearing housings are precision hand scraped to provide maximum assembly accuracy, structural rigidity and load distribution.



- ▶ Extra wide slant surface chip disposal design allows easy chip removal, preventing the heat from influencing machining accuracy.

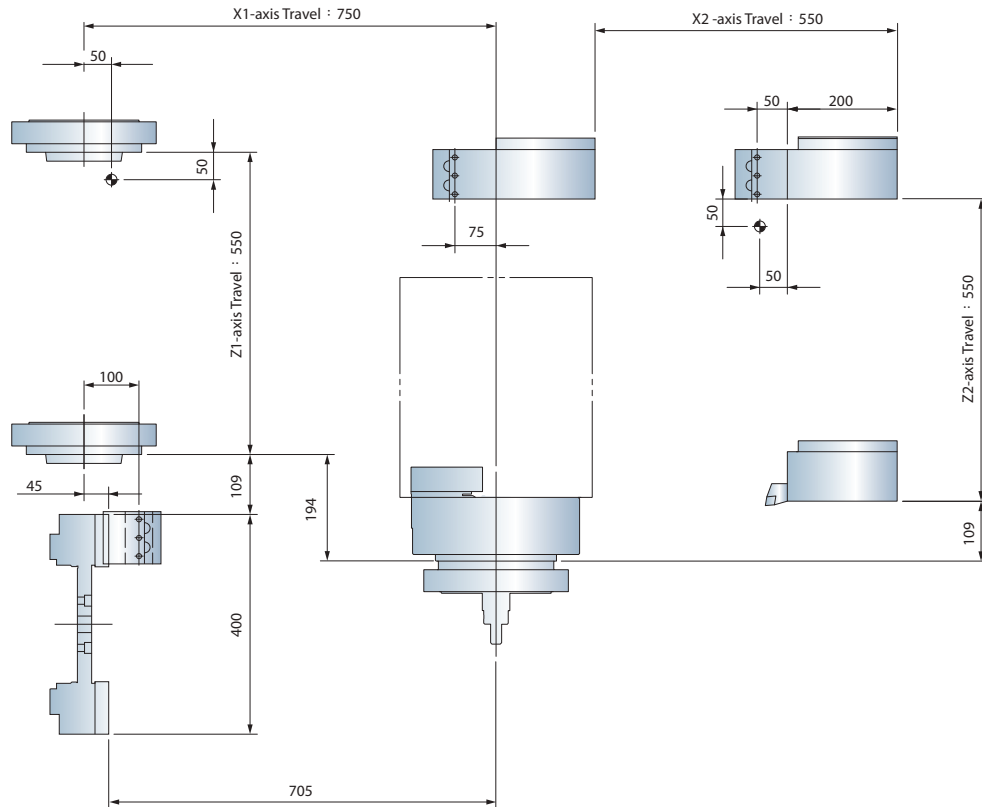


- ▶ Rear side of chip conveyor designed with compacted machine structure can reduce floor space and beneficial to arrange production line.

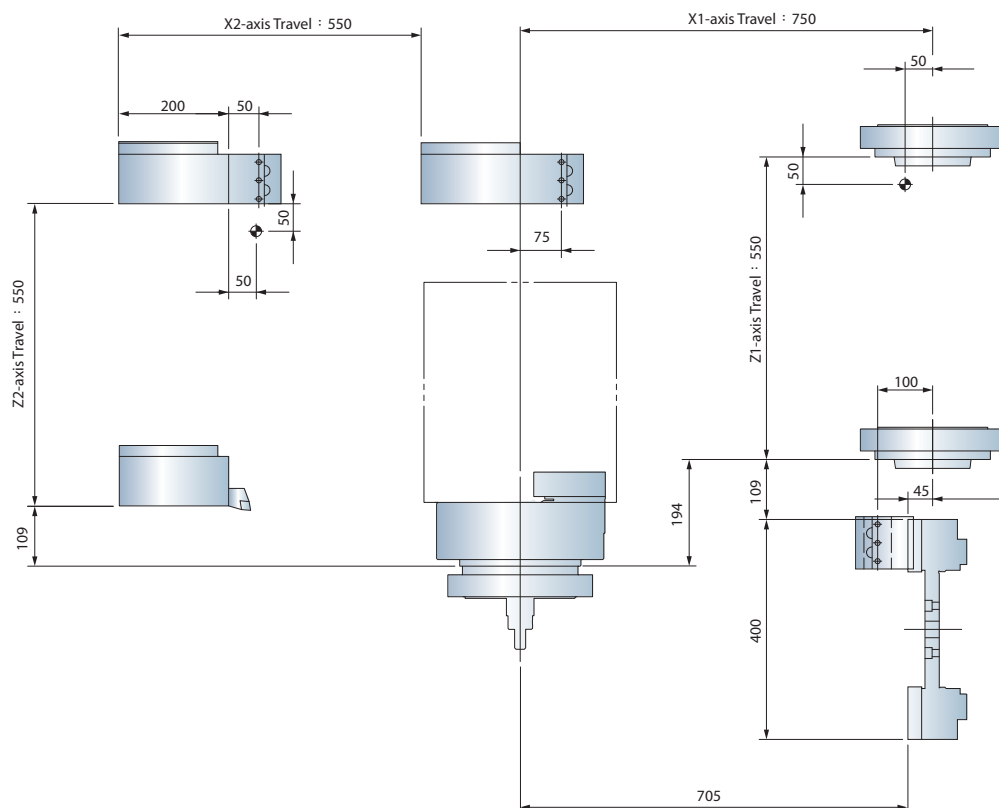
GENERAL DIMENSION

Work Range

[Left side in and right side out]



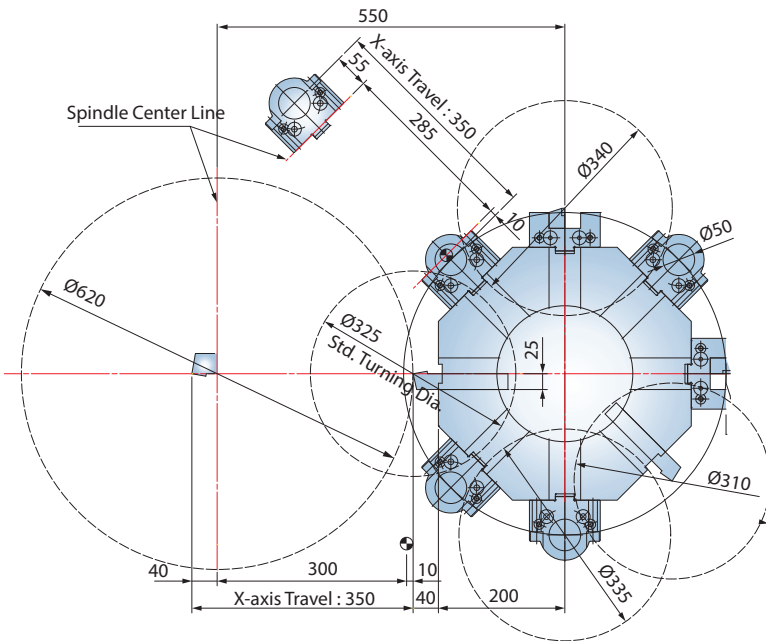
[Right side out and left side in]



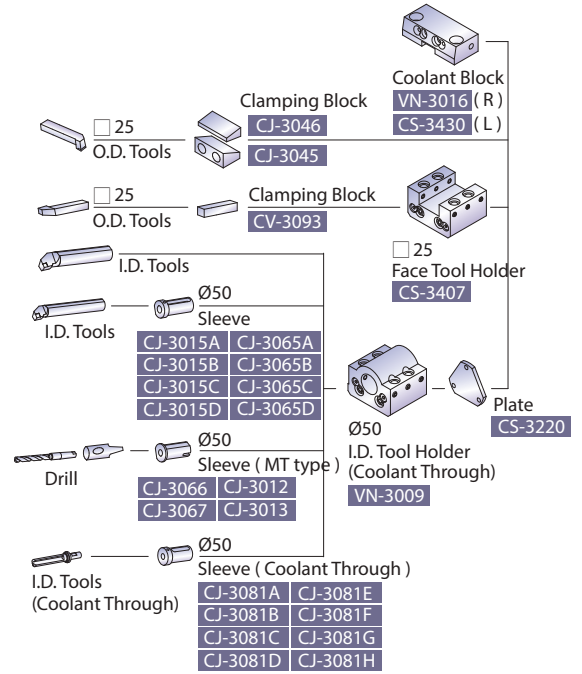
Unit : mm

Interference Diagram

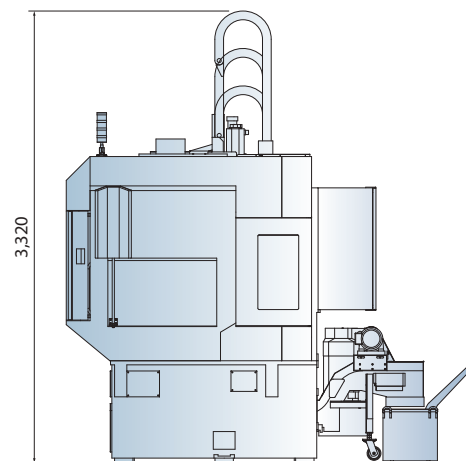
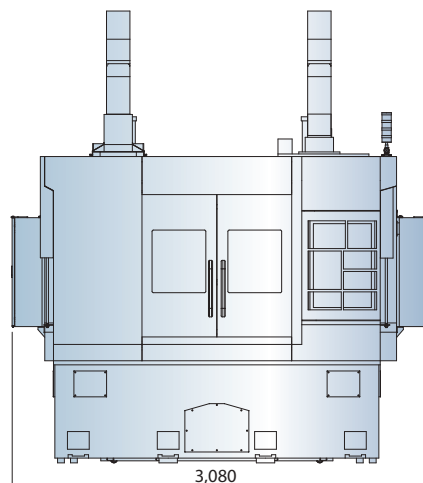
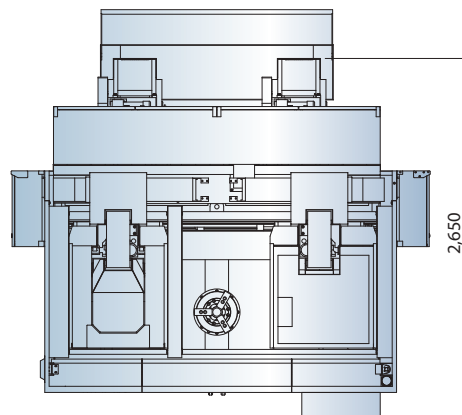
【 Standard 8-Station Turret 】



Tooling System



Machine Layout



Specifications are subject to change without notice .

NC INTELLIGENCE

Advanced hardware combined with intelligent software, makes your machine smarter



G.LINC 350

- Advanced Hardware
- Outstanding Operability
- Streamlined Programming
- High Security and Shortened Machining Setting
- Reliable Continuous Operation
- Shortened Troubleshooting Time
- Improved Utilization Rate

Significant Production Efficiency

General Production Process



Using 3D Simulation Inspection



The 3D simulation inspection can greatly reduce test-run time and improve overall utilization rate

Comprehensive Functions

Programming	Setting	Test-Run	Actual Production	Daily Used
■ Program management ■ Friendly programming environment ■ Programming auxiliary ■ Manual Guide <i>i</i> ■ Embedded E-manual	■ 3D advance tool path and cutting simulation	■ Tool load monitor ■ Program check ■ Smart balance detection ■ 3D Real-time cutting simulation and interference check	■ Tool load monitor ■ 3D Real-time cutting simulation and interference check	■ Safety signal viewer ■ Fast alarm check productivity ■ Productivity management ■ Twin operation system switch ■ Maintenance management



STANDARD & OPTIONAL FEATURES

S : Standard O : Option
 – : Not available C : Contact GOODWAY

		GV-350
SPINDLE		
Main spindle configuration	Two-speed	S
ZF gear box		O
Rigid tapping		S
Cs-axis & disk brake for main spindle		O
WORK HOLDING		
Solid 3-jaws chuck & hydraulic solid cylinder for chuck	12"	S
Manual chuck	15"	O
Hard jaws	1 set	O
Soft jaws	1 set	S
Special work holding chuck		C
Foot switch for chuck operation	Single	S
	Double	O
TURRET		
8-station turret		S
12-station turret		O
12-station live tooling turret		O
Tool holder & sleeve package		S
Dual-Face Turning Holder		O
Live tooling tool holders		O
MEASUREMENT		
Tool presetter		O
COOLANT		
Coolant pump	5 Kg/cm ²	S
High-pressure coolant system	20 Kg/cm ²	O
Roll-out coolant tank		S
Oil skimmer		O
Coolant level switch		O
Coolant intercooler system		O
CHIP DISPOSAL		
Chip conveyor with auto timer		S
Chip cart with coolant drain	Rear discharge	O
Coolant gun		O
Oil mist collector		O
AUTOMATIC OPERATION SUPPORT		
Auto door		O
Automatic load & unloading system		O
Parts flipping device		O
SAFETY		
Fully enclosed guarding		S
Door interlock (incl. Mechanical lock)		S
Impact resistant viewing window		S
Chuck cylinder check valve		S
Low hydraulic pressure detection switch		O
Over travel (soft limit)		S
Load monitoring function		S
OTHERS		
Tri-color machine status light tower		S
Work light		S
Electrical cabinet	Heat exchanger	S
	A/C cooling system	O
Complete hydraulic system		S
Advanced auto lubrication system		S
Emergency maintenance electrical part package		S
Operation & maintenance manuals		S

		Oi-TF	31i
FANUC CONTROL FUNCTIONS			
Display	8.4" color LCD	S	O
	10.4" color LCD	O	S
Graphic function	Standard	S	S
	Dynamic* ¹	O	O
Part program storage size	512K bytes	S	–
	1M bytes	O	S
	2M bytes	O	O
	4M bytes	–	O
Oi-TF : each path	8M bytes	–	O
	400	S	–
31i : total	1,000	O	S
	4,000	–	O
Registerable programs	99	–	S
	128	S	–
	200	O	O
	400	–	O
	499	–	O
	999	–	O
Tool offset pairs	2000	–	O
	Servo HRV control	HRV 3	S
	Automatic data backup	–	S
	Synchronous / Composite control	O	O
	Inch / metric conversion	S	S
Polar coordinate interpolation		S	S
Cylindrical interpolation		S	S
Multiple repetitive cycle		S	S
Rigid tapping		S	S
Unexpected disturbance torque detection function		S	S
Spindle orientation		S	S
Spindle speed fluctuation detection		S	S
Embedded macro		O	O
Spindle synchronous control		S	S
Tool radius / Tool nose radius compensation		S	S
Multi-language display		S	S
Polygon turning		S	S
Helical interpolation		O	O
Direct drawing dimension programming		S	S
Thread cutting retract		S	S
Variable lead threading		S	S
Multiple repetitive cycle II		S	S
Canned cycles for drilling		S	S
Tool nose radius compensation		S	S
Chamfering / Corner R		S	S
AI contour control I		O	S
Multi part program editing* ²		S	S
Manual handle retrace		O	O
Manual intervention and return		S	O
External data input		S	S
Addition of custom macro		S	S
Increment system C		S	S
Run hour & parts counter		S	S
Auto power-off function		S	S
RS-232 port		S	S
Memory card input / output (CF + USB)		S	S
Ethernet		S	S

*1 Cannot coexist with MANUAL GUIDE i

*2 10.4" LCD option needed

Specifications are subject to change without notice .

MACHINE SPECIFICATIONS



CAPACITY		GVI-350
Max. swing diameter		Ø 550 mm
Max. turning diameter		Ø 350 mm
Max. turning height		400 mm
Max. workpiece weight		20 kg
Chuck size		12"
1 st & 2 nd SPINDLE		
ID of main spindle bearing (front)		Ø 120 mm
ID of main spindle bearing (rear)		Ø 110 mm
Spindle nose		A2-8
Motor output (cont. / 30 min.)		11 / 15 kW
Spindle drive system		Belt
Spindle speed range		20 ~ 3,000 rpm
Max. spindle torque (30 min.)		286 N-m
X & Z AXES		
1 st spindle	Max. X1-axis travel	750 mm
	Max. Z1-axis travel	550 mm
Upper turret	Max. X2-axis travel	550 mm
	Max. Z2-axis travel	550 mm
X / Z axes rapids		24 m/min.
X / Z axes feed rates		1 ~ 5,000 mm/min.
Slide way type		Linear guide way
UPPER TURRET & LOWER TURRET		
Stations		8
OD of turret disk		400 mm
O.D. tool shank size		□ 25 mm
I.D. tool shank size		Ø 50 mm
Indexing speed		0.2 sec. (Adjacent)
GENERAL		
Positioning accuracy		± 0.01 mm
Repeatability		± 0.005 mm
Control		FANUC Oi-TF (DUAL SYSTEM)
Voltage / Power requirement		AC200 / 220 + 10% to-15% 3 phase / 35 KVA
Hydraulic capacity		50 L
Machine weight		10,000 kg
Dimensions (L × W × H)		3,080 x 2,650 x 3,320 mm

Specifications are subject to change without notice .



CAPACITY		TRV-350
Max. workpiece diameter		Ø 350 mm
Max. table load		20 kg
SPINDLE		
ID of main spindle bearing (front)		Ø 50 mm
ID of main spindle bearing (rear)		Ø 45 mm
Spindle taper		BT30
Motor output (cont. / 30 min.)		7.5 / 11 kW
Spindle drive system		Direct-drive
Spindle speed range		2 ~ 8,000 rpm
Max. spindle torque (30 min.)		36 N-m
Y & Z AXES		
Max. Y-axis travel		185 mm
Max. Z-axis travel		300 mm
Y / Z axes rapids		24 m/min.
ATC		
Stations		14
Max. tool size		Ø 80 mm
Max. tool length		120 mm
Max. tool weight		3 kg
Max. magazine load		25 kg
C-AXIS		
Chuck size		12"
C-axis torque output		500 N-m
GENERAL		
Positioning accuracy		± 0.01 mm
Repeatability		± 0.005 mm
Control		FANUC Oi-MF Mate
Voltage / Power requirement		AC200 / 220 + 10% to-15% 3 phase / 15 KVA
Hydraulic capacity		35 L
Machine weight		2,500 kg
Dimensions (L × W × H)		1,775 x 1,920 x 2,575 mm

Specifications are subject to change without notice .



GOODWAYCNC.com

GOODWAY MACHINE CORP.

HEADQUARTERS

No.13, 5th Road,
Taichung Industrial Park,
Taichung City, 407, Taiwan
E-mail : goodway@goodwaycnc.com

CENTRAL TAIWAN SCIENCE PARK BRANCH

No. 38, Keyuan Road,
Central Taiwan Science Park.Taichung,
Taichung City, 407, Taiwan
TEL : + 886-4-2463-6000
FAX : + 886-4-2463-9600

GOODWAY MACHINE (WUJIANG) CO.,LTD

No. 4888, East Lake Taihu Avenue, Wujiang
Economic and Technological Development Zone,
Jiangsu, China
Sales Hotline : + 86-512-8286-8068
Service Hotline : + 86-512-8286-8066
FAX : + 86-512-8286-8620
E-mail : goodway@goodwaycnc.cn