

GV-780 SERIES

Ultra Performance Vertical CNC Turning Centers

www.YAMASEIKI.com



YAMA SEIKI[®]
TURNING CENTERS by **WOODWAY**[®]

YAMA SEIKI

GV-780



G.LINC 350

New Generation Intelligent Control System

Mechatronics
Integration

Customer
Needs

Introducing the brand new model with
Innovative Intelligent Technology,
Brand New Appearance,
Customer Applicative Request.

Mechanical
Aesthetic



ULTRA PERFORMANCE VERTICAL CNC TURNING CENTER

Packed with the latest machine tools technology and high precision turning capabilities, the YAMA SEIKI GV-780 series ultra performance vertical CNC turning center combines a high rigidity structure and precision roller linear guideways with a servo indexing turret and powerful spindle (max. torque up to 1,050 N-m). These series features a compact machine size with heavy duty turning capabilities. The optional live tooling turret, C-axis, dual-face turning holders and work-piece balancing analyzer allows the GV-780 series to be able to complete turning, milling, drilling, tapping, dual-face machining and work-piece balancing analyzing in one single machine.

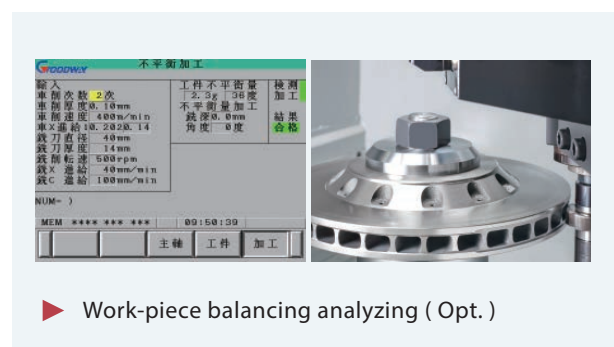
- ▶ Spacious machining range with advanced multi-tasking capabilities can meet the needs of all sorts of machining applications.
- ▶ The rear discharge type chip conveyor provides excellent chip removal efficiency while increasing floor space usage.



(GV-780M Model shown.)

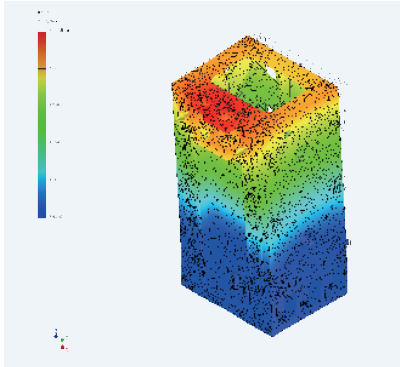


- ▶ The optional self developed G.LINC 350 intelligent control system reduces man power while increasing production efficiency.*1



- ▶ Work-piece balancing analyzing (Opt.)

*1 Please contact YAMA SEIKI sales for further information.



- ▶ By using Finite Element Methods (FEM), optimal reinforced ribbings are directly casted into the one-piece bed and column structure. Mechanical rigidity has been increased by 30% when compared to conventional designs. The GV-780 series is capable of performing heavy-duty turning and maintain long-term high-precision accuracy. More rigidity also means extended tool life.

- ▶ The servo motor of each axis feed system uses FANUC *αi* series components to ensure peak machining performance and accuracy.

- ▶ X & Z axes uses high rigidity roller linear guideways which provides rigidity for heavy cutting and fast movement low abrasion advantages. The rigidity and controllability are greatly increased.

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

- ▶ Built to withstand years and years of rigorous high production turning, the heavily ribbed, one-piece thermally balanced bed and column casting components are of " MEEHANITE " casting.



- ▶ Contact surfaces on the bed and column are precision hand scraped to provide maximum assembly accuracy, structural rigidity and load distribution.



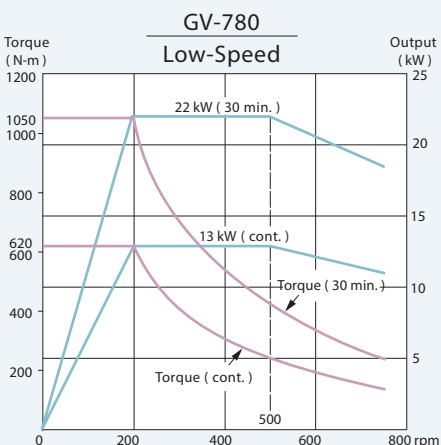
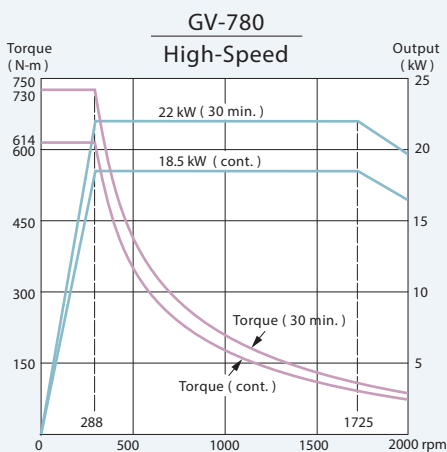
(Casting structure of GV-780 series model shown.)

ULTIMATE TURNING POWER

- ▶ P4 grade double row roller bearings and angular ball bearings are directly assembled for maximum level of support and precision. Bearing configuration is designed for super heavy-duty cutting with ultra-smooth performance and long term durability with a higher level of accuracy.
- ▶ The A/C, constant output, wide-range FANUC α P40 series motor can generate twice the torque output of standard motors. This double bind motor is designed to reach full output at 1/2 the RPM of standard motors, providing the ability to take heavier cuts in the lower RPM ranges.
- ▶ Maximum horse power can reach up to 22 kW (30 HP) [30 min.] which provides heavy cutting capabilities.

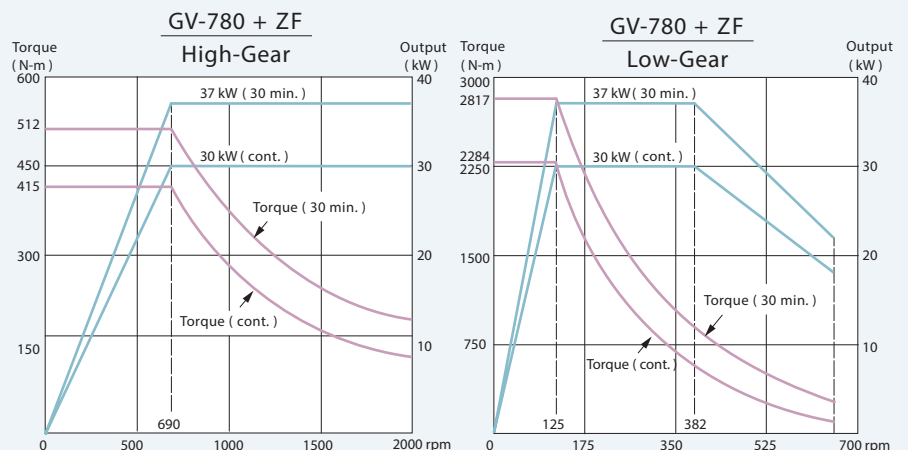
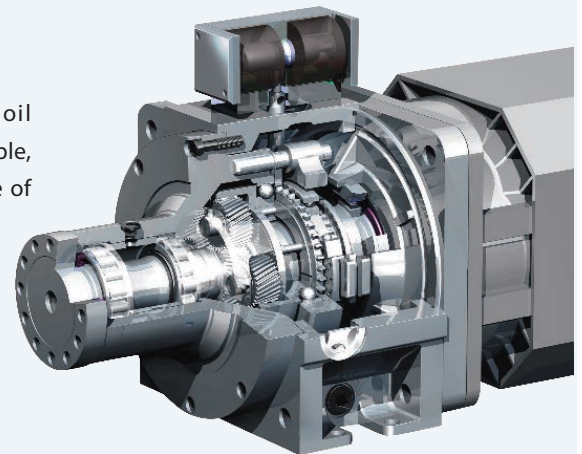


Spindle Output



Optional ZF Gear Box Output

- ▶ Optional GERMAN made oil bath gear box is also available, providing maximum torque of 2,817 N-m.



ADVANCED TURRET TECHNOLOGY

5

6

Standard 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 (7,240 lbs.) of clamping force ensures abundant turret rigidity for all cutting conditions.
- ▶ The curvic couplings features auto-centering, auto-cleaning and a large size tooth flank which are superior to traditional curvic couplings and are greatly used in our products.



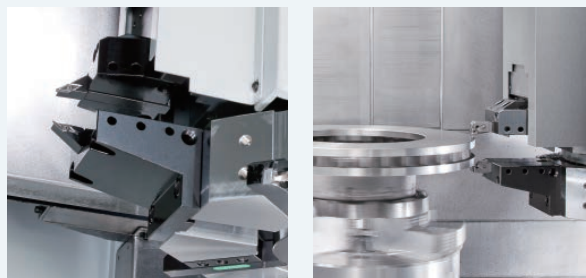
Optional Live Tooling Turret

- ▶ Live tooling turret and C-axis control capabilities on the GV-780 series allows the machine to perform multi-tasks on a work-piece, such as turning, milling, drilling and tapping. This eliminates manpower and cycle time, while reducing accuracy lost, which will occur if the part is moved from machine to machine.
- ▶ Each station of the live tooling turret can be equipped with live tooling (live tooling tools rotate in working position only) and features a non-lifting turret disk.
- ▶ YAMA SEIKI's live tooling turret utilizes advanced servo indexing technology to achieve 0.2 second indexing for adjacent stations and 0.5 second for stations at the opposite end of the disk.

Optional Dual-face Turning Holder

The YAMA SEIKI dual-face turning holder allows both sides of a work-piece to be machined at the same time while ensuring parallel precision of the surface, which is applicable for disk brakes or automotive related components.

- ▶ The cutting time is 50 % shorter than when using regular tools.
- ▶ The servo motor driven dual face tool holder provides more flexibility to various working conditions, overcoming hydraulic driven disadvantages, thus, saving tool adjustment time and increasing production efficiency.



WORK-PIECE BALANCING ANALYZER (WBA)

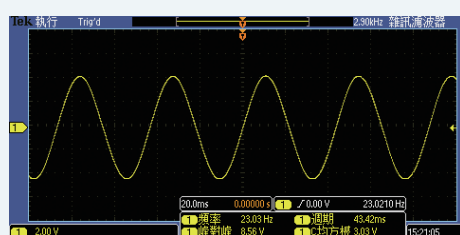
High efficiency, High precision, Suitable for short / thin workpieces



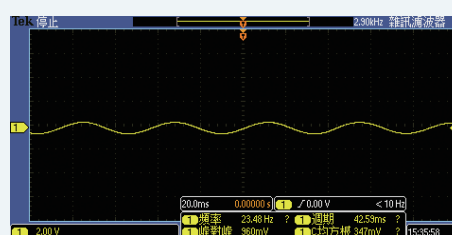
Increasing productive efficiency and streamlining operations have always been YAMA SEIKI's research and development concept. The YAMA SEIKI Work-piece Balancing Analyzer (WBA) is based on the developing foundation of our multi-tasking turning centers and University - Industry Cooperation. And now we combine them together to accomplish for a higher level of efficiency and streamlining.

The WBA is mainly applied to "Dissymmetrical parts" and "work-pieces that needed to be balanced after machining". The sensor installed inside the machine can pick up the vibration signal caused by the centrifugal force under high speed rotation from the work-piece. For dissymmetrical parts, the machine is able to detect the unbalanced position and weight and provide information for the user to design the appropriate tooling. For work-pieces that needed to be balanced after machining, by using our multi-tasking turning centers (more than 3 axes machines), the unbalanced position and weight can be detected online and be eliminated by the live tooling turret during the machining.

Before / After correction comparison chart



▶ Before WBA correction



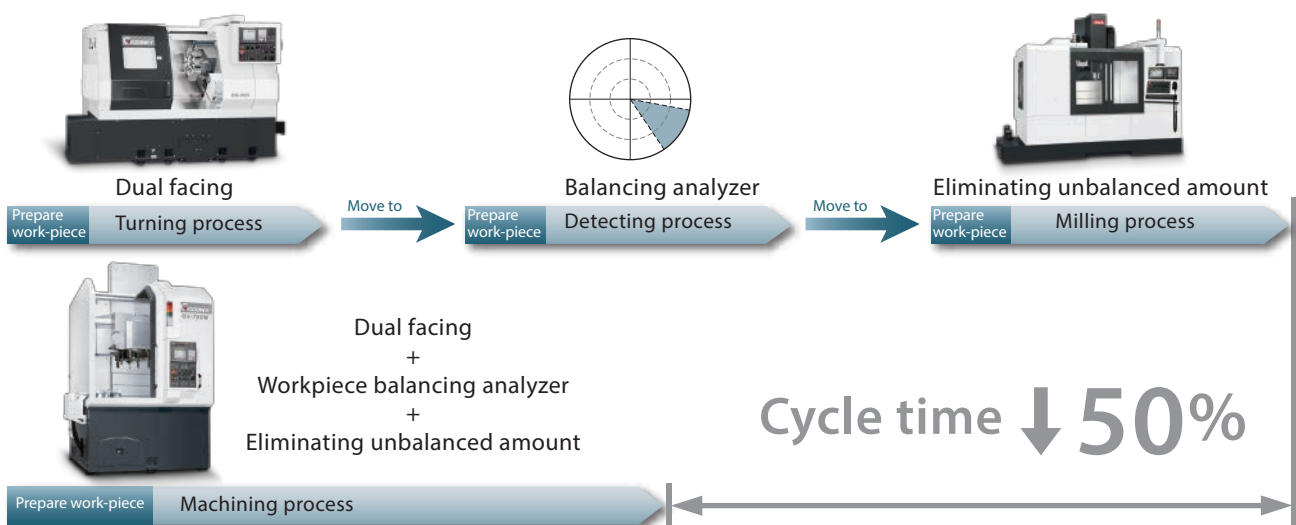
▶ After WBA correction

Vibration
↓ 88%

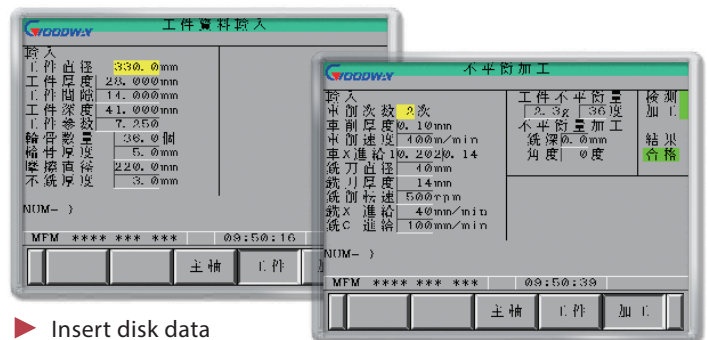
Applications

Take disk brake as an example, most companies use offline balancing analyzer method, which the machine needs to be stopped after the disk is finished, then move to the balancing analyzer for detection. When the detection is done, then move the disk to a machining center to eliminate the unbalance amount. It costs unwanted time by just loading and unloading the disk from one place to another, it can also cause accuracy error.

Therefore, we created the concept of installing the WBA into the vertical multi-tasking turning center. When the disk brake is finished, it can be evaluated online, then use C-axis to eliminate the unbalanced amount. This can save lots of loading and unloading time and also prevent accuracy error from the process. With the combination of the WBA and multi-tasking turning procedure, we can bring multi-tasking advantages into the next level.



The interface of the WBA can be customized based on customer's needs, which is easy to use. Take disk as an example, the standard work-piece only takes 2 minutes to setup. First insert the disk data, then insert machining parameters. After the setup is done, it only needs one button to begin the entire procedure (turning, detecting, milling) which the cycle time is only 3 ~ 4 minutes.



▶ Insert disk data

▶ Insert machining parameters

Work-piece balancing analyzing specifications

Capacity	WBA
Disk diameter	Ø 286 ~ 355 mm
Disk thickness	28 ~ 32 mm
Disk friction surface	60 mm
Correction method	Single side correction
Unbalance amount	1,650 ~ 14,850 g-mm
Sensitivity	0.001g
Balancing grades	ISO 1940, G2.5



▶ WBA displayed in G.LINC 350 (opt.)

Specifications are subject to change without notice.

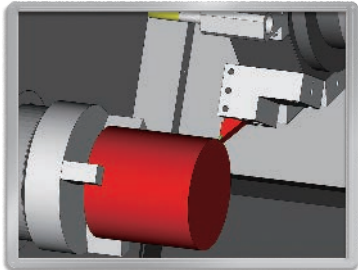
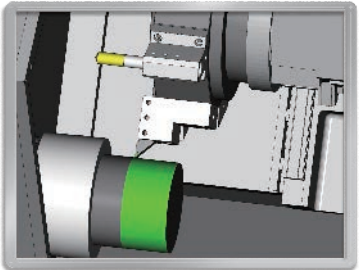
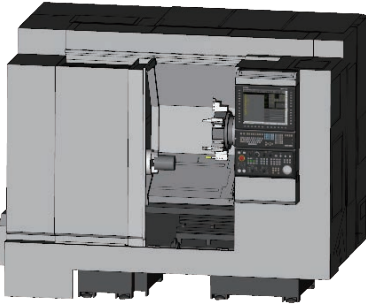


G.LINC 350

Advanced hardware combined with intelligent software, makes your machine smarter

SVI Inspection

Brand New Inspection Strategy for Safer and More Efficient Working Experience (Optional)



Create Simulation

Simulation Inspection

Interference Inspection

General Production Process



Using 3D Simulation Inspection



Utilization Rate **30 %**

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

NEW GENERATION INTELLIGENT CONTROL SYSTEM

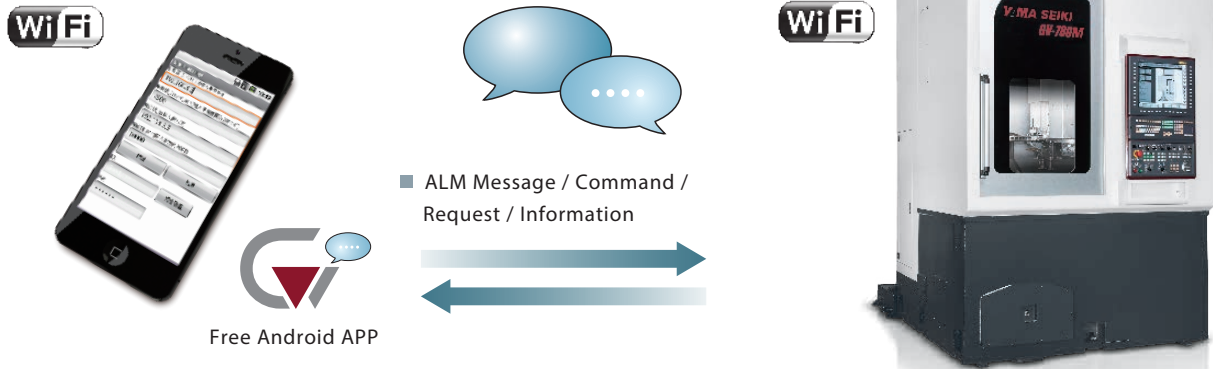
Features

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



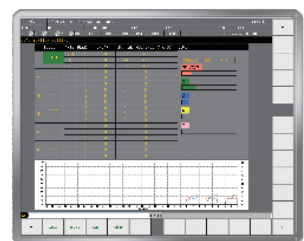
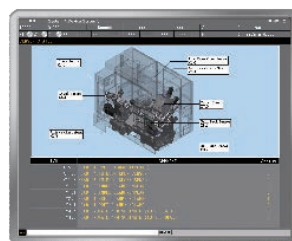
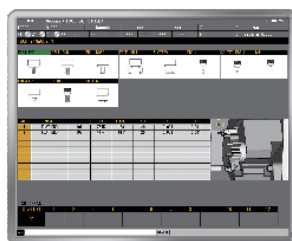
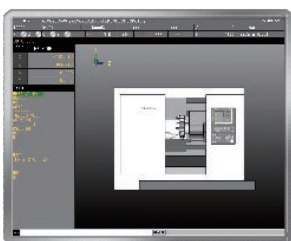
MT-Line Messages

Monitoring machine condition in real time



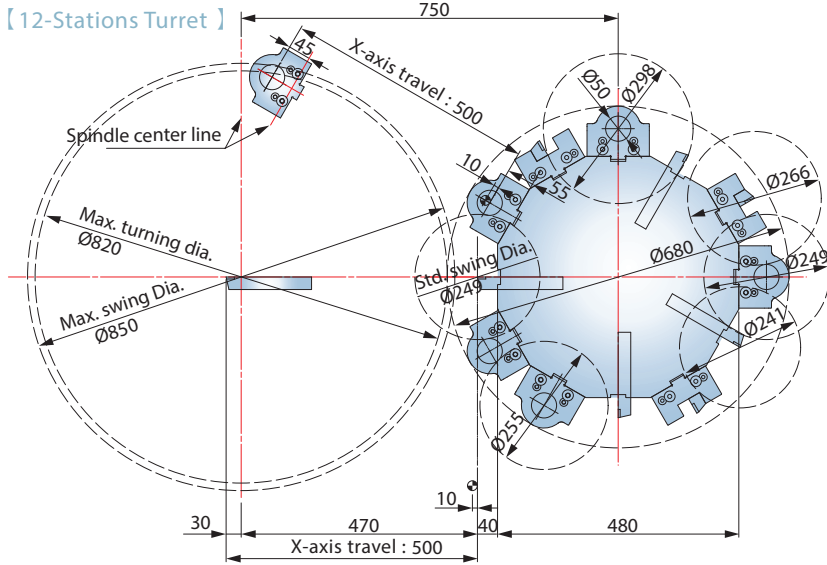
High Intelligent Machine Control

- 3D Check
- Tool Management
- Sensor Status
- Load Monitor
- Tool Build
- Alarm Detail
- Productive Management
- Position Screen

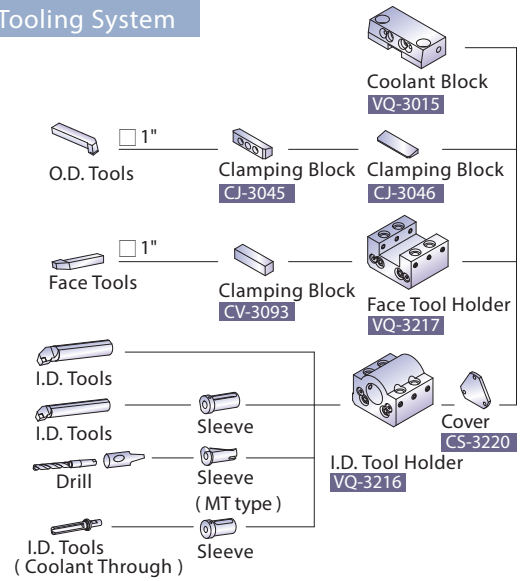


GENERAL DIMENSION

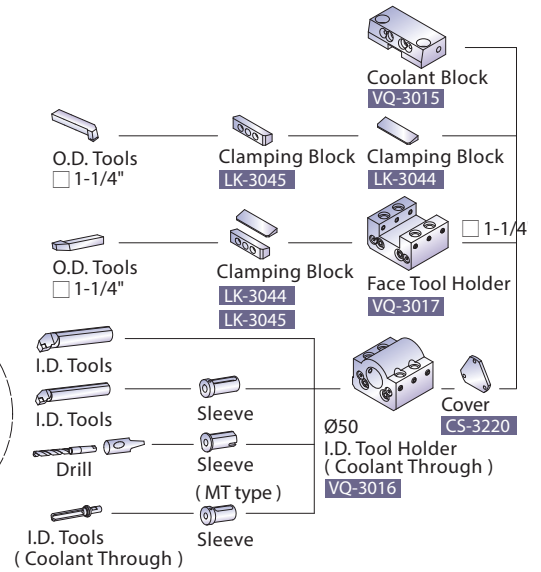
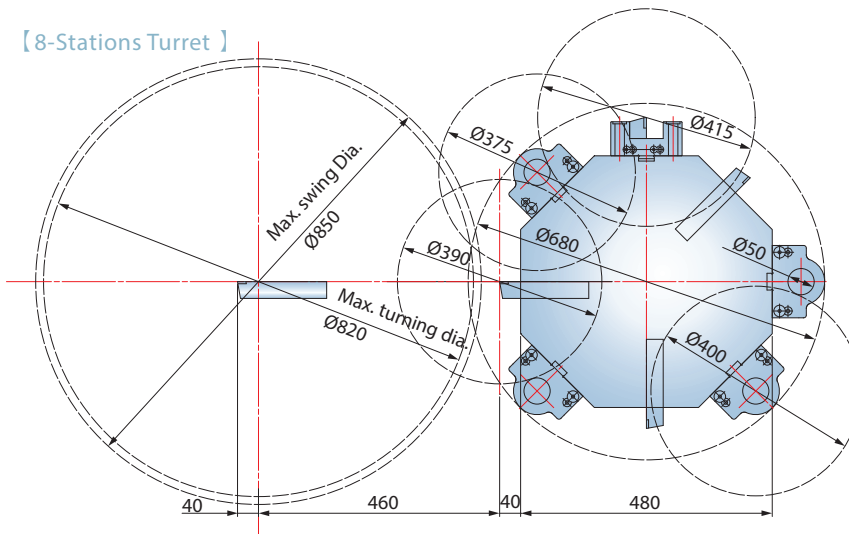
Interference Diagram



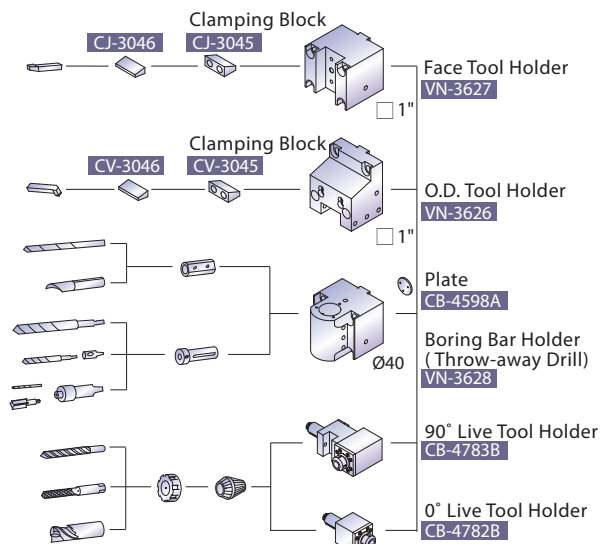
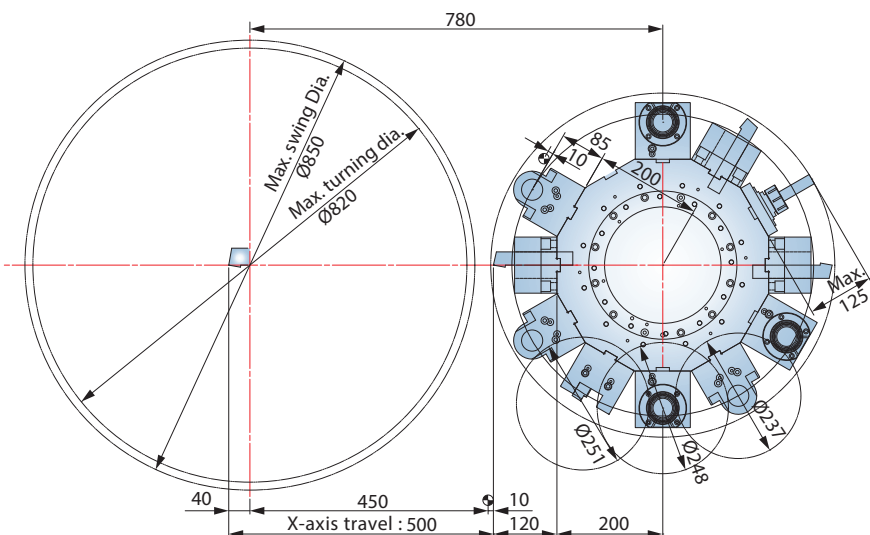
Tooling System



[8-Stations Turret]



[Live Tooling Turret]

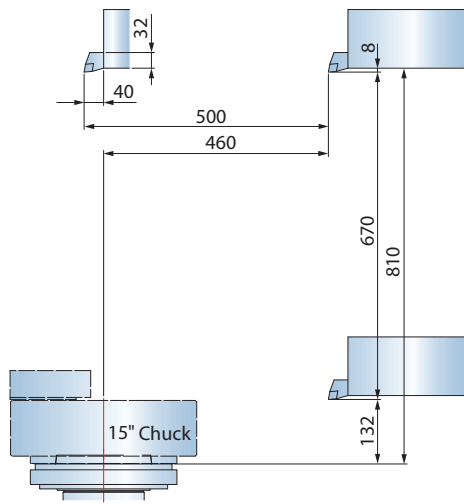


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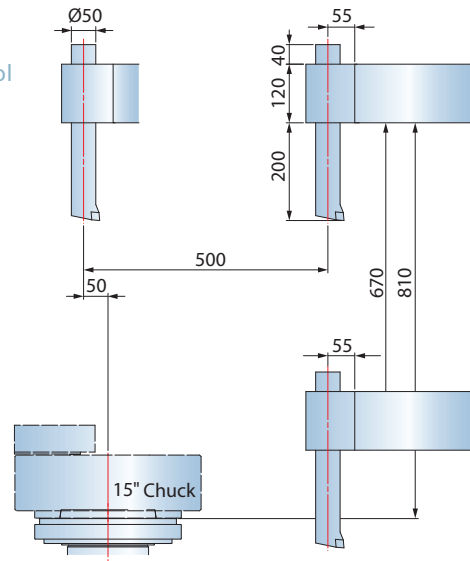
Work Range

[12-Stations Turret / 8-Stations Turret]

O.D. Tool

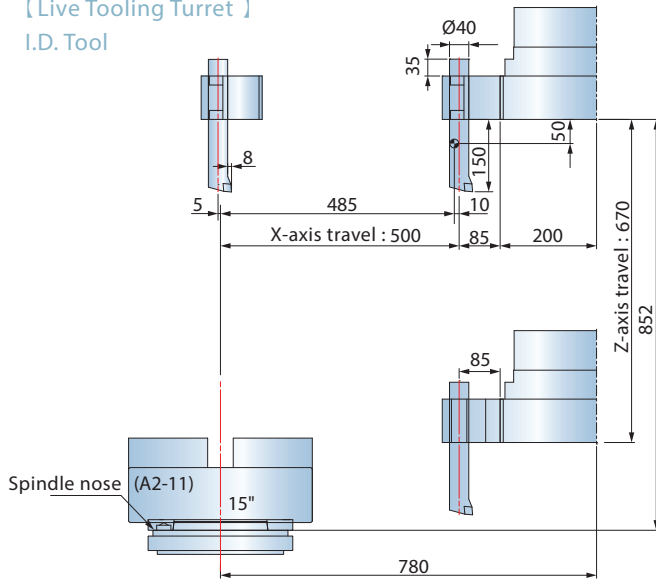


I.D. Tool

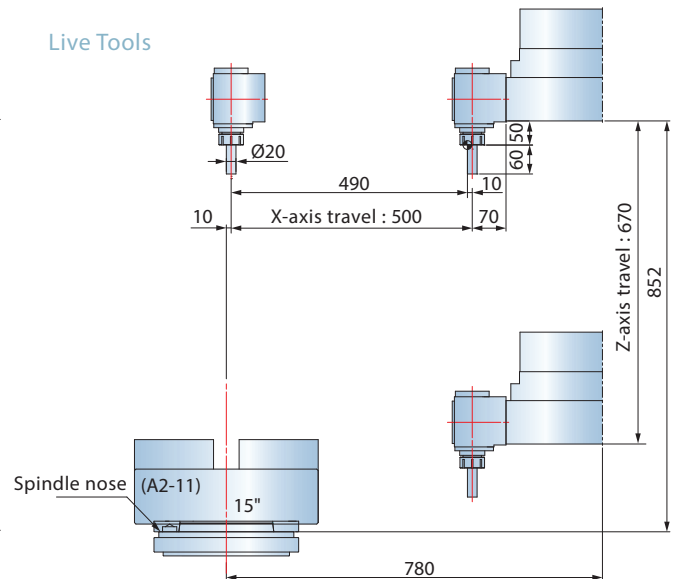


[Live Tooling Turret]

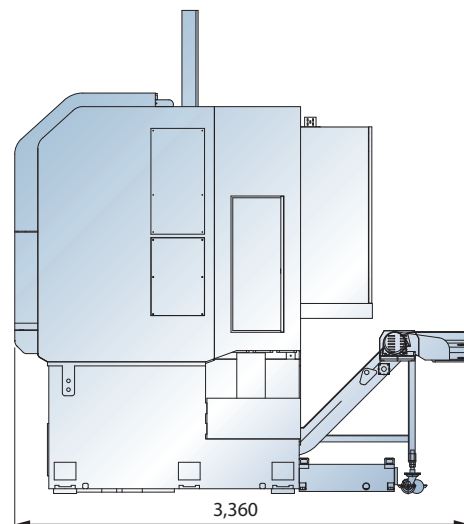
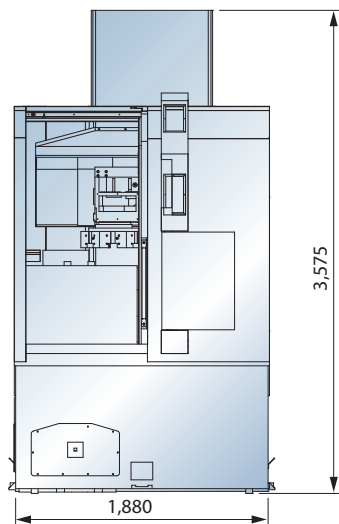
I.D. Tool



Live Tools



Machine Layout



Unit : mm

Specifications are subject to change without notice.

STANDARD & OPTIONAL FEATURES

S : Standard O : Option
 - : Not available C : Contact YAMA SEIKI

SPINDLE		GV-780
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	15"	S
	18"	O
Manual chuck		O
Hard jaws	1 set	O
Soft jaws	1 set	O
Special work holding chuck		C
Foot switch for chuck operation	Single	S
	Double	O
TURRET		
8-station turret		O
12-station turret		S
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		O
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		—
Parts flipping device		—
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		GV-780
Tri-color operation status signal light tower		S
Florescent 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

FANUC CONTROL FUNCTIONS		Oi-TD	31i
PMC system	Oi-TD PMC : 25n sec/step	S	—
	31i PMC : 25n sec/step	—	S
Display	8.4" color LCD	S	—
	10.4" color LCD	O	S
Graphic function	Standard	S	S
	Dynamic	O	O
Full keypad	Small - 44 keys	S	—
	Large - 56 keys	O	S
Part program storage length	512 K byte	S	—
	1M byte	—	S
	2M byte	—	O
	4M byte	—	O
Registerable programs	8M byte	—	O
	400	S	—
	1,000	—	S
Tool offset pairs	4,000	—	O
	64	S	—
	99	O	S
	400	—	O
Servo control	499	—	O
	999	—	O
	2000	—	O
Servo control	HRV2 (3)	S	S
Conversational programming	Manual Guide Oi	S	—
	Manual Guide i	O	S
Servo motors	α i	S	S
Spindle motors	α i	S	S
Run hour & parts counter		S	S
Auto power off function		S	S
Custom macro B		S	S
RS-232 port		S	S
Memory card input/output		S	S
Ethernet		S	S
Fast ethernet		O	O

Specifications are subject to change without notice.

MACHINE SPECIFICATIONS

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CAPACITY		GV-780
Max. swing diameter		Ø 850 mm (Ø 33.46")
Swing over saddle		Ø 660 mm (Ø 25.98")
Max. turning diameter		Ø 820 mm (Ø 32.28")
Std. turning diameter		Ø 390 mm (Ø 15.35")
Max. turning height		660 mm (25.98")
Hydraulic chuck size		15" (Opt.18")
SPINDLE		
Spindle bearing diameter		Ø 160 mm (Ø 6.30")
Spindle nose		A2-11
Motor output (cont. / 30 min.)	18.5 / 22 kW (25 / 30 HP) [30 / 37 kW (40 / 50 HP), Optional ZF Gear box]	
Motor full output speed		575 rpm
Spindle drive system		Belt-drive
Spindle speed range		2,000 rpm
Spindle full output speed		288 rpm
Max. spindle torque	1,050 N-m (774 ft-lb) [2,817 N-m (2,077 ft-lb), Optional ZF Gear box]	
X / Z AXES		
Slide way type		Roller linear guideways
Max. X-axis travel	500 (-50 ~ +450) mm [19.6" (-1.96"~ 17.7")]	
Max. Z-axis travel		670 mm (26.3")
X / Z axes rapids		20 / 20 m/min. (788 / 788 IPM)
X / Z axes servo motor		3 / 4 kW (4 / 5 HP)
TURRET		
Stations		12 (8 Opt.)
Index speed		0.2 sec. (Adjacent)
O.D. tool shank size		<input type="checkbox"/> 1-1/4"
I.D. tool shank size		Ø 2"
LIVE TOOLING TURRET (OPT.)		
Stations		12
Live tooling drive motor		4.5 kW (Opt. : 7 kW) [6 HP (Opt. 9HP)]
Index speed		0.2 sec. Adjacent / 0.5 sec. 180 degree (Single step)
O.D. tool shank size		<input type="checkbox"/> 1" (Opt. : <input type="checkbox"/> 1-1/4")
I.D. tool shank size		Ø 1-1/2" (Opt. : 2")
Live tooling shank size		ER 32 (Opt. : ER 40)
Live tooling RPM range		40 ~ 4,000 rpm (Opt. : 30 ~ 3,000 rpm)
DUAL-FACE TURNING HOLDER (OPT.)		
O.D. tool shank size		<input type="checkbox"/> 3/4"
Distance between tool holders		7 ~ 100 mm (0.27" ~ 3.93")
B-axis drive motor		0.75 kW (1HP)
Disk turning length		100 mm (3.93")
GENERAL		
Control		FANUC Oi-TD
Dimensions (L x W x H)		1,880 x 3,360 x 3,575 mm (74" x 132" x 141")
Machine weight		9,000 Kg (19,800 lb)

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