AMADA MACHINE TOOLS

AMADA MACHINE TOOLS' quality for processing of small precision parts

Lineup of lathes

www.amada.com

AMADA

A manufacturer of machine tools that supports cutting-edge manufacturing

Since starting the manufacturing of lathes in 1937, AMADA MACHINE TOOLS has constantly sought higher accuracy and quality as a pioneer in the field of gang-type lathes.

To meet the diversifying needs, the designer visits the customer to ensure that the engineering of products reflects their needs speedily and appropriately. We work with the customer to develop a process and integrate the process to the machine. We focus on processing complicated parts in one process. Since the company's establishment, Amada MACHINE TOOLS has been highly valued for it's application engineering. We aim to contribute to the customers manufacturing by reducing setup time and the work in process.

As expected with the high standards of Japanese-made products, we are constantly striving to improve our machine manufacturing in pursuit of excellence. Each machine is built with traditional "scraping". We aquired the latest "state of the art" equipment and manufacturing systems, and design our machines using three-dimensional stress analysis. Our well-established machine supply system ensures high performance for all our customers. The new plant relocation plan to increase capacity is currently ongoing.

AMADA MACHINE TOOLS' service staff is highly skilled and uses the latest equipment

A high level of proficiency that is constantly updated

Solution Center where you can find cutting-edge technology

Regal type conventional lathe 1st model (1937)

Fine early model of gang-type turret NC lathe LG-81 (1979)

“Quality for quality’s sake” – AMADA MACHINE TOOLS’ constant endeavor to satisfy customers

With customers

As typified by application engineering, our company has promoted a system for carrying out development, manufacturing, and sales / services. We aim to provide the highest technical capabilities with ease of operability.

Actual machines can be inspected at the Solution Center to confirm the functions and performance first hand. We also carry out demonstration processing in which you can implement solutions using the actual machines with the help of our engineers. We have four Solution Centers at home and abroad and we aim to carry out further global expansion.
For customers who are going to introduce our product, we have set up the NC School as a training facility. In addition to learning how to operate the machinery before introduction, you can learn all about processing technology. Our company’s field engineers are fully qualified to carry out seamless operation support after introduction. The engineers can browse the parts stock / ordering system and visualized manuals anywhere utilizing the latest mobile equipment. We have 11 bases in Japan providing rapid high quality services to support your manufacturing.

AMADA MACHINE TOOLS constantly advances the development, manufacturing, sales, services to advance the customer’s productivity and manufacturing environment.

Manufactured according to strict quality standards

“S.Robo-1” is mounted on the pioneer automation system LG-6 (1989)

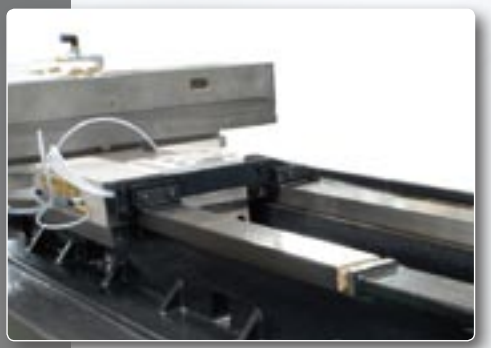
The latest simultaneous 5-axis control processing machine Mi-8

Designed with accuracy in mind –technology adopted by AMADA MACHINE TOOLS for a purpose

Thermal expansion of the structure due to the cutting and feeding operation has considerable effects on changes in the dimensions of the work to be processed.
The products of AMADA MACHINE TOOLS are configured so that the effects of heat generation are minimized.

1 Horizontal design that maintains high accuracy and stability

Compact casting with integral ways provides superior support. Scraping and fitting of all sliding surfaces creates excellent vibration dampening. Horizontal alignment lowers the center of gravity processing accuracy for the long term.

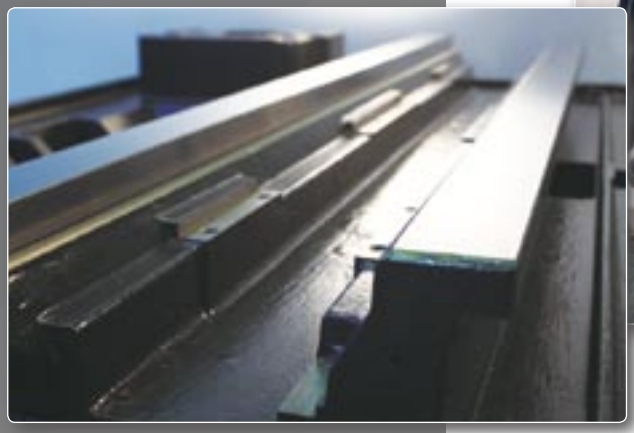


2 The distance from the cutting tools to the spindle can be minimized

The longer the distance from the spindle to the cutting tools, the greater the increase in thermal displacement. AMADA MACHINE TOOLS minimizes the distance from the tooling to the spindle and limits the effects of thermal growth.

3 The pre-tension structure cancels the heat generation

The bearing housing of the ball screw is positioned the shortest distance from the spindle to reduce thermal growth. The highly reliable pre-tensioned structure is utilized to counteract the heat generation of the ball screw.



4 Securely guarded by stainless covers

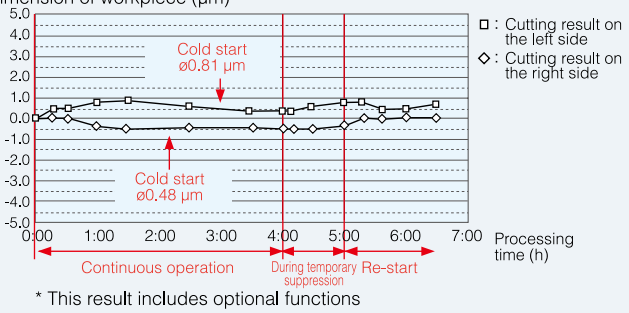
A space is created between the casting and the way cover. The stainless steel cover has low thermal conductivity. The design limits the transfer of heat from the cutting fluid and the machining chips, maintaining superior dimensional accuracy and stability.

A lesser amount of compensations is required as the thermal displacement is reduced. Automatic operation or the operation of multiple machines improves productivity, while reducing labor costs due to superior machine stability. The change of a dimension when production is stopped for a short time is small, so conforming parts can be produced upon re-start.

■ Thermal displacement

1. Processing condition (model: GS-04T)
   Rotary speed of the primary spindle: 6,000 min-1
   Cutting feed: 0.01 mm/rev
   Finishing margin: 0.02mm (diameter)
   Type of cutting agent: VariocutD734D
   Loading method: handover
2. Used tools
   Chip material: diamond compax
   Nose radius: 0.1 mm
3. Workpiece
   Material: brass
   Point to be measured:
   ø4 mm (inside diameter)

Dimension of workpiece (µm)

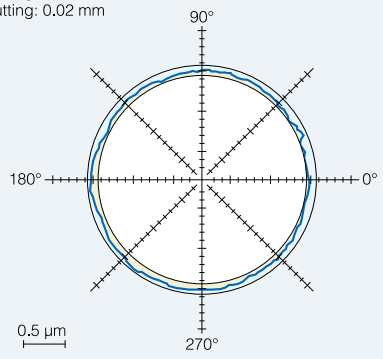


* This result includes optional functions

■ Roundness 0.09 µm

Processing conditions (model: GS-04T)

Rotation frequency of primary spindle: 8000 min-1
Cutting feed: 0.05 mm/rev
Cutting: 0.02 mm
Tool: mined diamond (R2 mm)
Material: aluminum test piece



●The data above is based on a case example. The described data may not be obtained depending on the cutting conditions etc

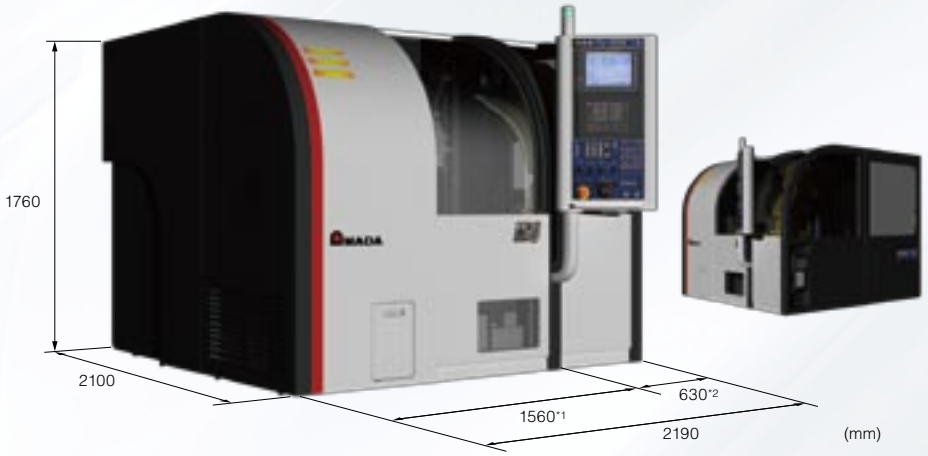
Simultaneous 5-axis control multi-function Mi8

In high-accuracy small article processing, flexible production and higher efficiency are required. The new-generation, simultaneous 5-axis control multi-function machine Mi-8 combines AMADA MACHINE TOOLS' lathe technologies to meet these needs.

Characteristic 1

An original form combining beauty and utility

Designed for operability based on the ergonomics, the machine is compact and has a low center of gravity. It can be installed in a space of just 4 m^2 while realizing high rigidity, beauty and utility. As the total height is approximately 1.7 m, it is also superior in visibility in the factory. It can be automated by attaching the rotary stocker, which the robot is built-in to retain compactness.

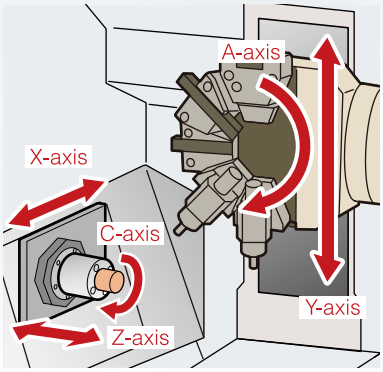


*1 Dimensions of this machine
*2 Dimensions of stocker

Characteristic 2

Simultaneous 5-axis control

The rotation point (A-axis) is attached to the primary spindle, and simultaneous 5-axis control is realized. This enables processing of an oblique hole, which is not possible with other turning centers. As processing by one chucking is achieved, misalignment is eliminated.



Characteristic 3

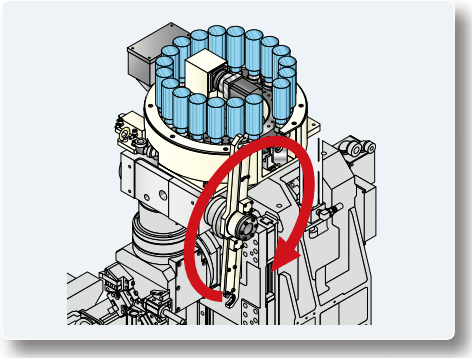
High-rigidity turret

The milling spindle is located in the rear of the turret. A high accuracy coupling controls the turret position. The lathe spindle has superior roundness and is capable of 8000 rpm.

Characteristic 4

ATC & high-speed spindle

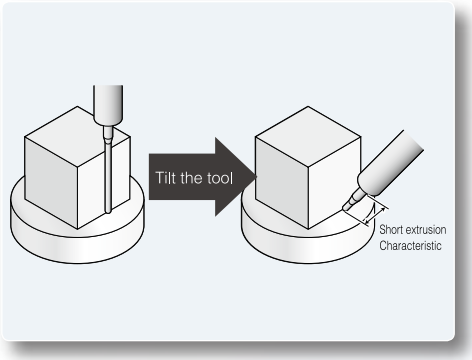
Twenty station “HSK style” tool changer is standard equipment. Tool change time is less than 6 seconds, so the optimum tool can be used with out interferences. The milling spindle is 20,000 rpm and machining with small diameter tools is manageable with a higher degree of accuracy.



Characteristic 5

Improvement of accuracy and part processing

By utilizing the “A” axis, the tool can be positioned to maximize the machining conditions. Parts with curved or complex surfaces can be easily machined. Improved part accuracy and reduction in cycle times due to the flexibility of the five-axis configuration.

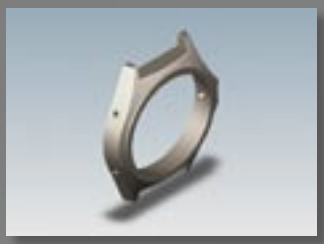


Characteristic 6

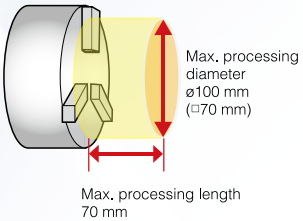
Programming by the latest CAM

Processing of complex shapes can be programmed quickly and simply using the latest CAM technology. This reduces the time required for processing and confirmation.

Sample work

Maximum processing size of Mi-8



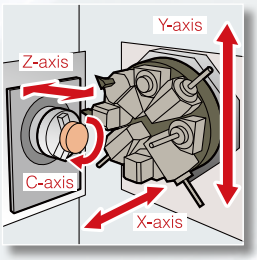
Series of lathes for high-accuracy and precision parts processing evolved through customer demand and AMADA MACHINE TOOLS' advanced technologies

AMADA MACHINE TOOLS has a comprehensive machine lineup according to the work size, the variation of processing and the number of tools to be attached to meet a wide range of customers' needs. We support customization according to the description of the work by the application engineering system.

A SERIES

Turret type combined processing machine with Y-axis function, which is good at processing complex shapes

Space-saving design for utilizing limited space in the factory. Even though it is compact, it has the longest Y-axis stroke in that class and high-speed milling processing is available. The largest number of tools in every series and high-accuracy and high-productivity type machining and lathe turning enable the processing of complex shapes easily. This is an environment-responsive machine with a good cutting powder brush.



Structure diagram of A series

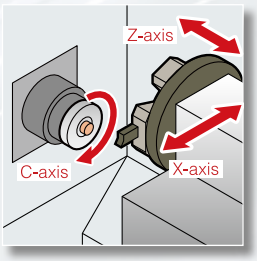

Sample work

Example of application:
medical equipment parts
optical equipment parts

J SERIES

Initial setup-saving, heavy-duty and compact-space turret type blade table

This turret type lathe is highly valued in the precision parts industry for automobiles. It is manufactured with high accuracy specification for which optional tailstock can be selected. Even though it is a high performance machine that balances space saving and heavy duty operation, it is available at a reasonable price.



Structure diagram of J series

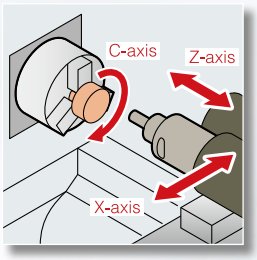

Sample work

Example of application:
auto parts
pneumatic and hydraulic equipment parts

G SERIES

Ultra-high accuracy gang-type lathe with a symmetrical, low gravity center bed

This is ultra-high accuracy gang-type lathe enables hard turning. Customization supports high-mix middle and low-volume production and high value-added production in addition to mass production. Shortening of the cycle time by "index time zero" and flexible tool layout by longest-in-class stroke are available.



Structure diagram of G series


Sample work

Example of application:
IT equipment parts
auto parts

■ M specification

Target model: JJ-3M/G-07M

This high-value added type has a milling function, which supports efficient processing. It can be installed in X or Z directions according to demand.

■ 2-spindle specification

Target model: AA-1 / JJ-1 / JJ-3 / JJ-3M / GG-5 / GS-04T

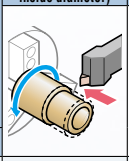
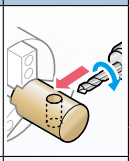
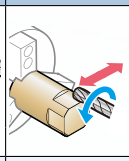
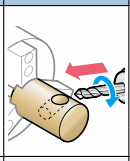
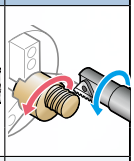
This process integration type implements the A/A process and A/B process in one. It contributes to shortening cycle time and realizes space saving in the factory.

Work size comparison table

Blade method	Series		Maximum workpiece diameter					
	Model	Specification	ø30	ø50	ø80	ø100	ø120	ø150
Turret type	Mi-8			●	●	●		
	A			●	●	●	●	
				●	●	●		
	J	M specification						
							●	
		Without M specification			●	●	●	●
					●	●	●	
Gang type	G	M specification				●		
		Without M specification		●	●	●	●	
			●	●				

●1-spindle model ●2-spindle model

Processing shape comparison table

Series		Lathe turning (outside diameter / inside diameter)	Drill (tap)	End mill		Polar coordinate	Skew hole	Helical interpolation
				Z-direction	Y-direction			
Model	Specification							
Mi-8		●	●	●	●	●	●	●
A		●	●	●	●	●	▲	▲
J	M specification	●	●	●				
	Without M specification	●						
G	M specification	●	●	●				
	Without M specification	●						

▲ : Option needs to be attached.

Tool quantity table

Series			Maximum number of tools *1	
Model	Specification	Process	Lathe turning tool	Rotating tool
Mi-8		1 spindle	5 pieces	20 pieces (ATC)
A		1 spindle	18 pieces *2	
		2 spindles	8 pieces x2 *2	
J	M specification	1 spindle		
		2 spindles	12 pieces x2 *2	
	Without M specification	1 spindle	12 pieces	
		2 spindles	8 pieces (12 pieces) x2	
G	M specification	1 spindle	8 pieces *3	4 pieces
		2 spindles		
	Without M specification	1 spindle	8 pieces *3	
		2 spindles	5 pieces *3	

*1: Option needs to be attached depending on the model.
*2: Total quantity of lathe turning tools and rotating tools
*3: Varies depending on the processing shape and tool layout

Comparison of accuracy

Series	Mi-8/A/G	J
Roundness (minimum value in the series)	0.3μm	0.4μm

* The data above are reference values. The described results may not be obtained depending on the cutting conditions etc.

Introduction of the functions of each lathe series

Multi-function part processing

A SERIES

Highly functional series specialized for combined operations
"One chucking 5-surface machining" is realized by Y-axis and milling function

Ai-8/A-12/A-18S

This is the standard model of the A series. The optimum model can be selected according to the number of tools. Ai-8 has two types; the line-compliant front face operation type and the cell-compliant side operation type. With A-18S, the number of tools is the largest in the series; however, it can be installed in the same floor space as the A-12.

●Ai-8

AD-12/AD-18S

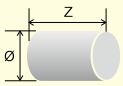
The sub-spindle is part of the main turret for efficient part processing. The sub-spindle tooling has two options. There is a gang type or turret option, the turret option has rotary tool capability.

●AD-18S

AA-1

This top-end model provides the performance of the A series with 2-spindle specification. It has octagonal turret type tooling on both sides on which a milling unit can be attached. Even though it is highly functional, it also realizes high accuracy, with a roundness of 0.2μm (A specification).

Standard work size



	Ai-8	A-12	A-18S	AD-12	AD-18S	AA-1
Diameter (ø)	30~50	50	50	50	50	50
Length (Z)	30~50	80	80	80	80	50

* The work size is restricted by chucking or loader etc.

Turret type lathe

J SERIES

Family series provides high-accuracy processing and heavy-duty machining selected according to the application

J-1/J-3/J-5

These are basic models of single spindle 2 axis turning centers. The J1 has superior positioning accuracy with roundness 0.5 micron at a low cost. The automated cell pack further reduces labor requirements as an operator can manage multiple machines. The number of tools is 8 or 12 station depending on the model. The J3 / J5 come equipped standard with a heavy-duty 7.5 kw motor. The J5 has an optional high power 11 kw motor.

●J-1

●JJ-1

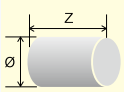
JJ-1/JJ-3

The 2-spindle specification adds process integration, which enhances the capability of the "J" series with A/B and A/A processing capability. The design takes into consideration the ease of operation and setup; make for an operator friendly environment. The layout and the new improvements make set-up and serviceability simple. The JJ-1 is the mid-sized 2 spindle, in which high-accuracy, speed and functionality are focused; the JJ-3 is larger capacity with heavy duty machining capability and superior accuracy.

JJ-3M

This high-value added model adds milling function with "C" axis control to the JJ-3. The 12 station turrets are standard equipment. The increased number of tools supports the multi-function capability of the machine.

Standard work size



	J-1	J-3	J-5	JJ-1	JJ-3	JJ-3M
Diameter (ø)	80	100	100	50	150	150
Length (Z)	50~180	100~310	100~480	50	100	100

* The work size is restricted by chucking or loader, etc.

Gang-type lathe

G SERIES

AMADA MACHINE TOOLS' traditional gang-type lathe series
It has high performance in addition to extreme accuracy and responds to various machining conditions

●G-05

G-05/G-06/G-07/G-07F

They cover a wide range of machining conditions, in addition to the speed and high-accuracy of the gang tooling. The G05 balances high-accuracy and low cost with a complete automated package. The G06 is the mid-range model, while the G07 offers the longest stroke and tooling capability. The G07F has a heavy duty 5.5 kw spindle option.

G-07M

This value added model includes "C" axis milling and drilling function. The 150 W electric milling unit is a standard option. The primary spindle is a built-in type with higher accuracy capability.

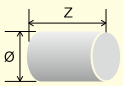
GG-5

This gang type lathe integrates A/B and A/A operations. Although it is configured with 2 spindles and 2 gang slides, it is a space-saving design that meets the needs of manufacturing. The block type tooling reduces set-up time remarkably and improves productivity.

GS-04T

This 2-spindle gang type lathe is configured for complete processing of A/B operations. The opposed spindle configuration is highly accurate, with short cycle time capability due to the direct spindle parts transfer. The automated cell package is standard equipment and allows for quick delivery and ease of start-up.

Standard work size



	G-05	G-06	G-07	G-07M	G-07F	GG-5	GS-04T
Diameter (ø)	50	60	100	100	120	50	30
Length (Z)	40	60	100	100	120	40	20

* The work size is restricted by chucking or loader, etc.

Customized lathe

Multi player selected for usability

●C-3

C-3/C-5

These multi machines play 4 roles; "general-purpose lathe", "interactive type lathe", "playback lathe" and "CNC lathe".
* The playback lathe is set for D specification only.

Normal lathe

Superior performance, simple and convenient operability

●ILEO-80A

LEO-80A/LEO-125A/LE-19K/LR-55A

This best-seller group of normal lathes has a 50-year track record. More than 80,000 units of these all-Japanese machines have been delivered (as of end of September 2008). These machines are used at approximately 85 percent of industrial high schools in Japan.

● The photos include optional parts.

Automation system

AMADA MACHINE TOOLS does not compromise on the accuracy of peripheral equipment.

We prepare various items of peripheral equipment that improve the productivity and enable quick delivery. The system can be configured to meet the customers' needs.

Carrier device

Loader
It automates the delivery of work with a compact size.
There is a lineup according to the size and weight of work and other peripheral equipment.

Hand loading
You can select hand loading according to the shape, size and weight of work.

Material feeding device

Bar feeder equipment
It supplies the bar material from the rear part of the primary spindle. It improves the operating efficiency. It is compatible with competitors' product too.

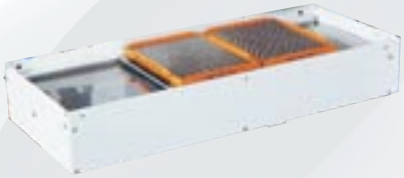
Material feeding / product ejection device

In-conveyor
The material is supplied from the conveyor. The device can operate automatically without the need for an operator

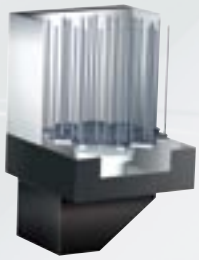
Out-conveyor
The processed product is ejected from the conveyor. This equipment promotes automation.

Material feeding / Finish product ejection device

1-axis pallet stocker
It implements the supply of material and finish of product by palette.
There are two palettes so it is suitable for comparatively small work.



2-axis pallet stocker
It implements the supply of material and ejection of product by palette.
9 to 10 multi-step loading palettes can be mounted, so it is suitable for small work to large work.

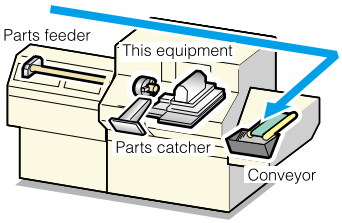


Rotary stocker
It can load the works on the palette with the guide in a column pattern. The material can be put in and the product can be pulled out during the automatic operation. The setup can be changed easily when the size is changed.

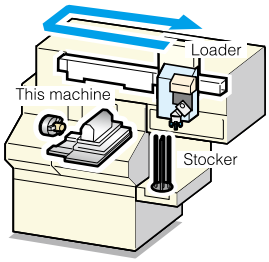
Parts feeder
This stocker aligns works automatically using vibration and supplies them to the next process, and is used mainly for small work.

Material / work carry-in / carry-out flow

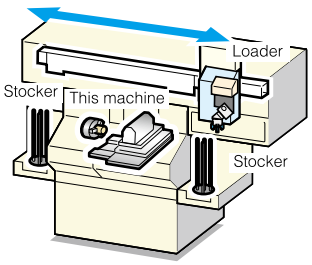
① Parts feeder → conveyor
(delivered by parts catcher)



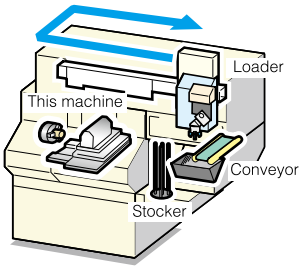
② Stocker or pallet stocker
→ stocker or pallet stocker



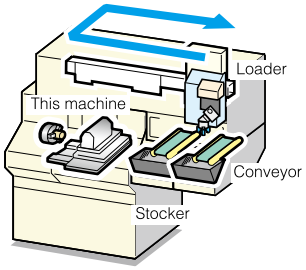
③ Traverse specification
Stocker, pallet stocker, conveyor or parts feeder
↔ stocker, pallet stocker or conveyor



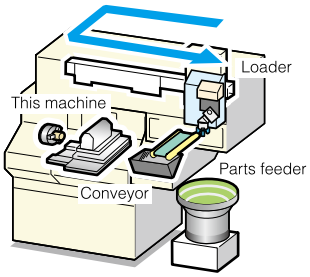
④ Stocker or pallet stocker → conveyor



⑤ Conveyor → conveyor



⑥ Parts feeder → conveyor



● The illustration shows an example

Peripheral equipment

AMADA MACHINE TOOLS offers a rich lineup of peripheral equipment and accessories so that customers can carry out operations safely and efficiently.

Operation support

This equipment is for improving the operability of workers and reducing the quantity of work.

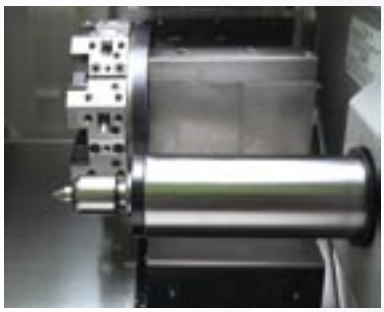
Outside measuring device
The product size after the processing is automatically measured.

Outside cleaning unit
The product after the processing is washed.

Parts catcher
The product after the processing is received and discharged outside the equipment.

Processing support

This equipment performs an auxiliary role for implementing the processing.



Tailstock
It keeps a grip on long work and controls contact when the primary spindle is rotated.

Broken tool detector
Whether the drill is broken by processing is checked.

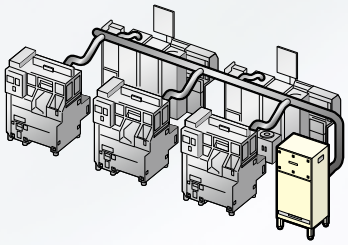
High-pressure coolant tank
The cutting powder removal ratio is increased by using a coolant with higher pressure than that of standard equipment.

Environment / hazard prevention measures

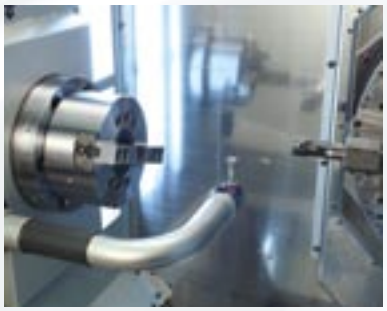
This equipment is useful for environment / hazard prevention such as removal of cutting powder and mist.

Chip conveyor
The cutting powder generated by processing is discharged out of the equipment.

Mist collector
The misty coolant generated during the processing is aspirated to make the operation environment clean.



Mist cleaning system
The maintenance property is improved by integrated duct piping.



Tool setter
The coordinate system is set by applying the tip of tool to the touch sensor.

Orientation equipment
The orientation of a typical work is automatically located.

Handy operation panel
The operation can be implemented from the control panel.

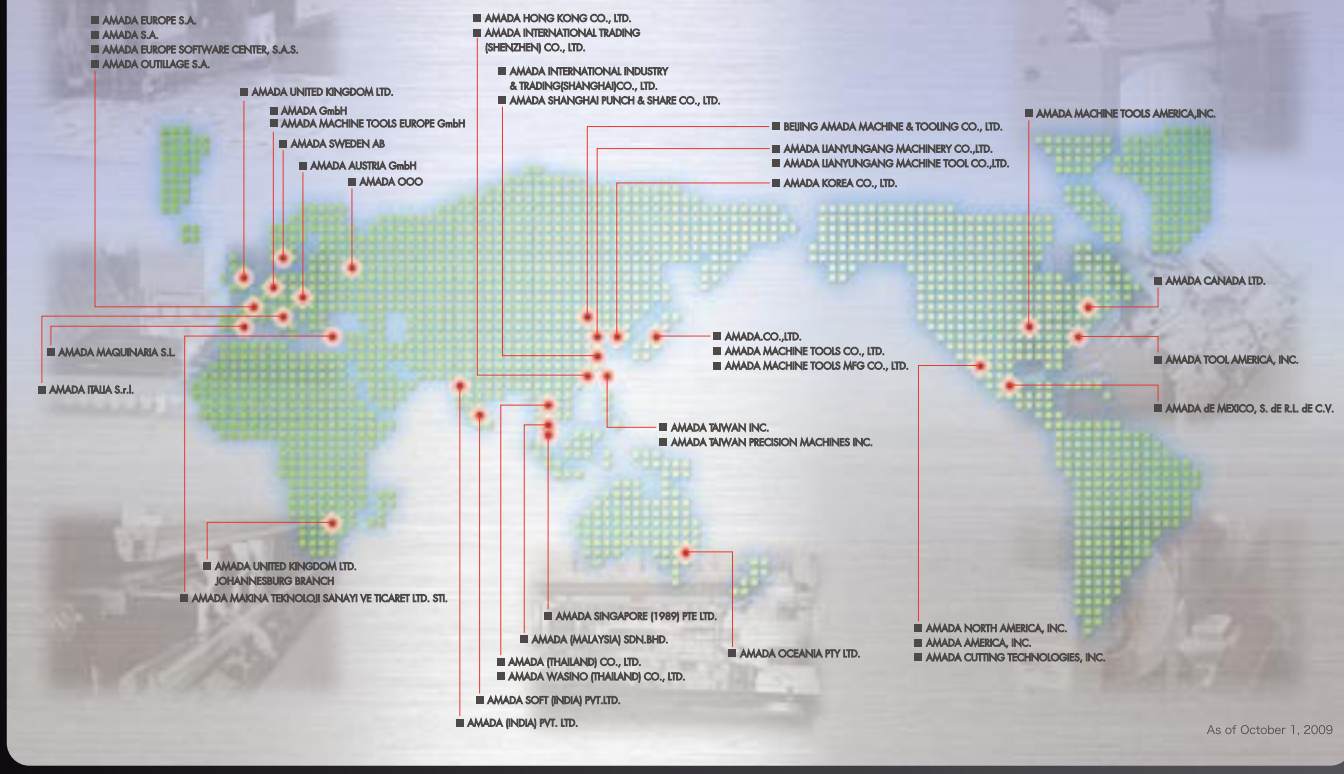
Coolant constant-temperature unit with a sub tank
The change in size caused by thermal displacement is prevented by keeping the temperature of the coolant liquid constant.

Semi-dry processing equipment
It requires less coolant and thus contributes to cost saving and lessening the environmental burden.

Automatic fire extinguishing appliance
If a fire is generated in the equipment, it is automatically extinguished.

Swarf automatic compressor
The collected swarf is compressed and solidified to reduce the transportation cost of cutting powder processing.

AMADA GROUP GLOBAL NETWORKS



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- The products in the catalog may be subject to the provisions of foreign exchange and the Foreign Trade Law. When exporting cargo subject to such controls, permission pursuant to regulation is required. Please contact our business representative in advance when exporting products overseas.
- When using our products, safety equipment is required depending on the operational task.
- For safe and correct operation, ensure thorough reference to the Instruction Manual prior to operation.
- The cutting performance data in this catalog for example is affected by temperature, the cutting materials, tool materials and cutting conditions etc. Please note that such data are not guaranteed.

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