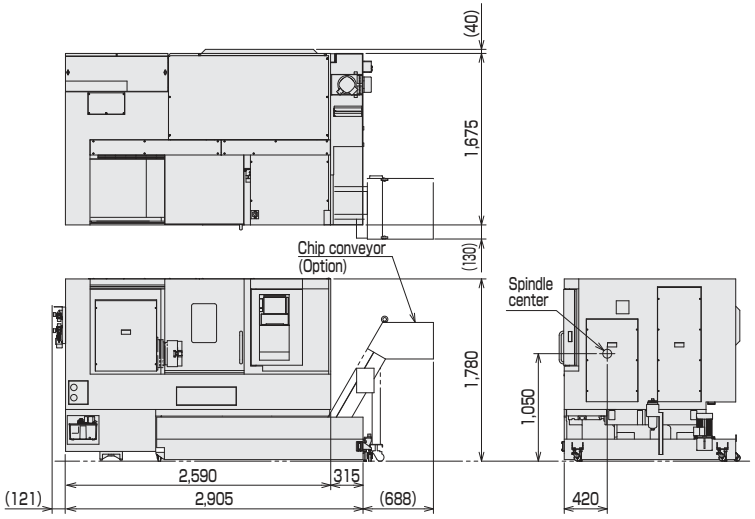
Layout

M10D



PTW TSUGAMI CORPORATION
12-20, TOMIZAWA-CHO, NIHONBASHI,
CHUO-KU, TOKYO 103-0006, JAPAN
Phone : +81-3-3808-1172
Facsimile : +81-3-3808-1175
http://www.tsugami.co.jp/

CAT.NO.E124A02.0CT.5H(H)

PRECISION TSUGAMI

TSUGAMI

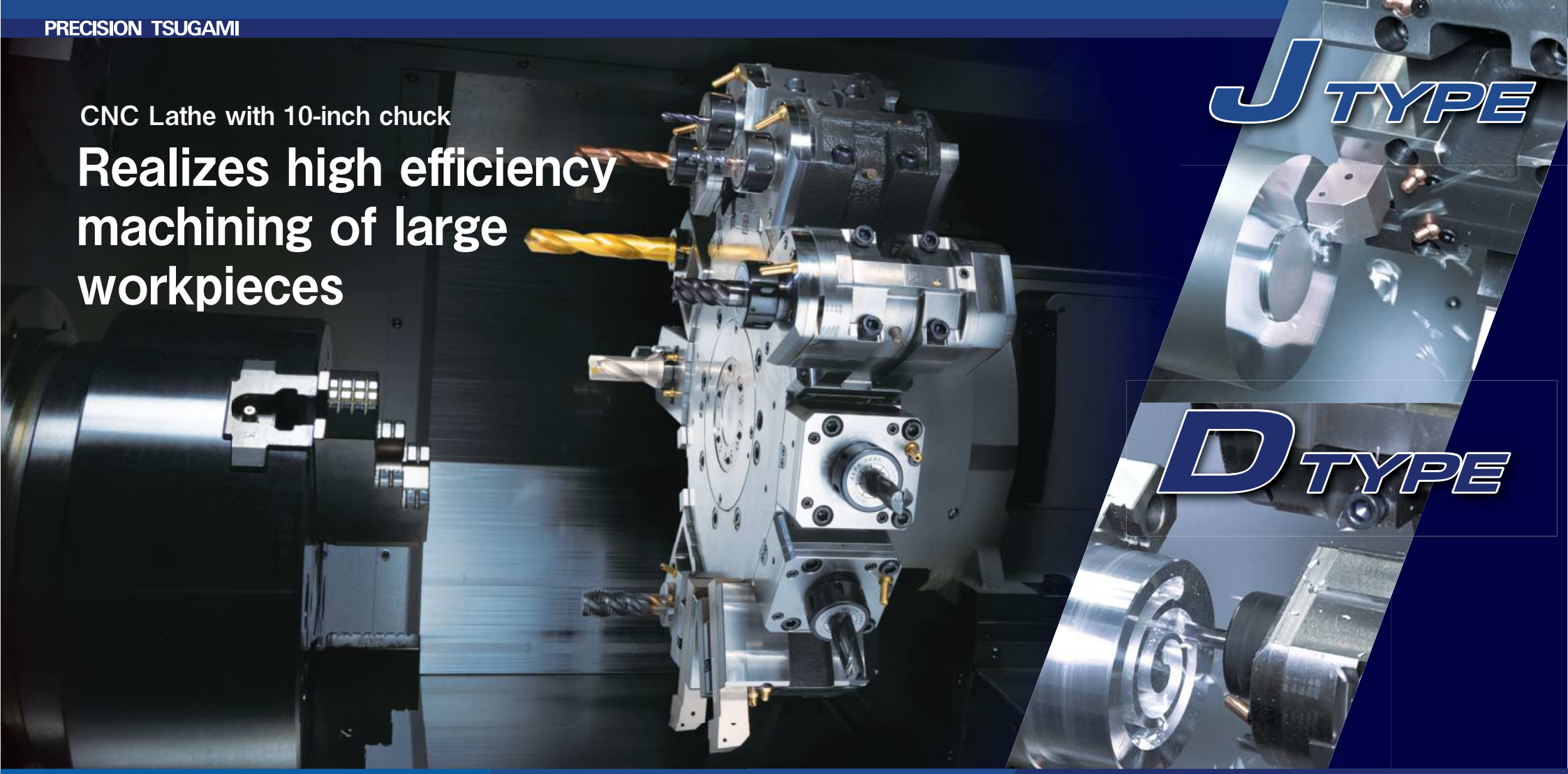
CNC Lathe

M10J/M10JL10
M10D

CNC Lathe with 10-inch chuck
Realizes high efficiency machining of large workpieces

CNC Lathe with 10-inch chuck

Realizes high efficiency machining of large workpieces

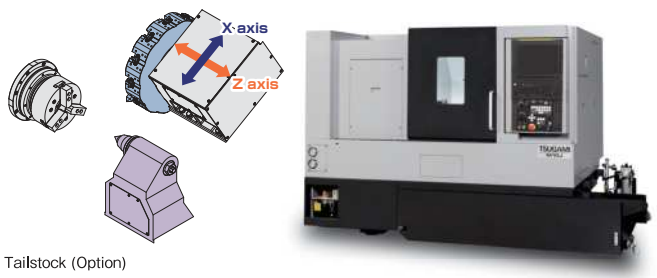


J TYPE

D TYPE

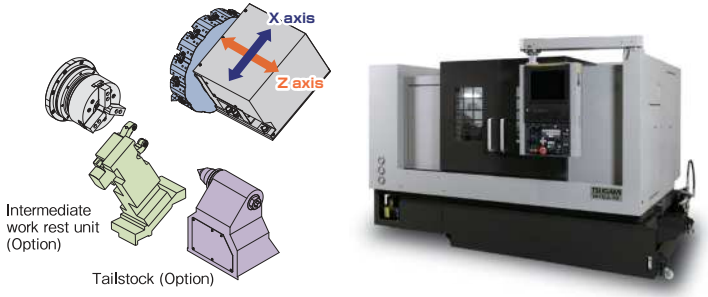
M10J

Basic type for turning, drilling, and boring



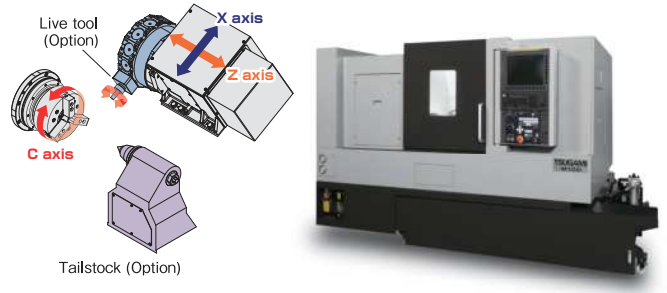
M10JL10

Long stroke type for machining long workpiece up to 1,000 mm



M10D

CNC lathe equipped with high-output, high-torque motor for live tools

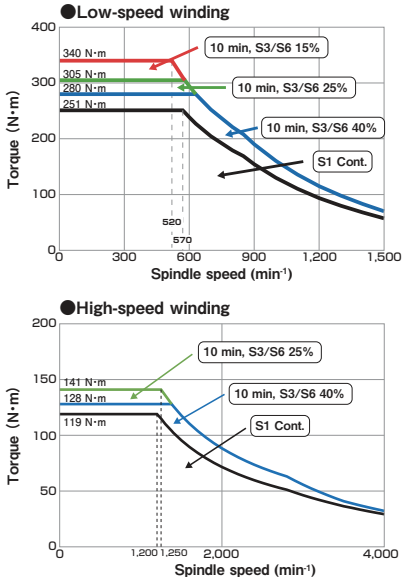


High Productivity and High Accuracy

Spindle

18.5 kW high-output built-in motor spindle realizes powerful machining.
Achieves high productivity by heavy-duty cutting of large diameter workpieces.
Built-in motor spindle eliminates belts or other joint devices which cause vibration. The stable geometrical accuracy and the surface roughness are secured.

■Spindle torque characteristics



■Machining capability (Work material : JIS S45C)

●Turning (Cutting area)

1.8 mm²

Machining dia.: ϕ120 mm Cutting speed: 200 m/min

Cutting depth: 6.0 mm Feed: 0.3 mm/rev

●Drilling

ϕ40 mm

Cutting speed: 150 m/min

Feed: 0.2 mm/rev

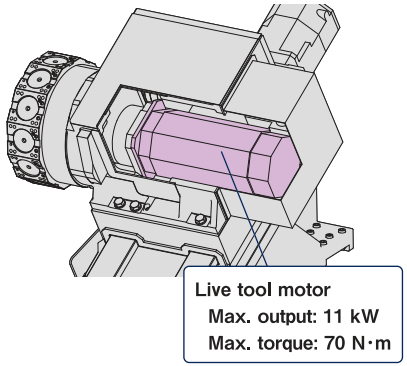
Sliding guideway for X axis

Enables heavy-duty cutting of large diameter workpieces with high-rigidity box slide for X axis.

Milling Operation (M10D)

Live tool

Live tools driven by high-output, high-torque motor can be mounted on all positions.
Efficient milling is realized by rigid live tools.



Live tool motor
Max. output: 11 kW
Max. torque: 70 N·m

■Machining capability (Work material: JIS S45C)

●Drilling

ϕ20 mm

(Front, Cross)

Cutting speed: 135 m/min Feed: 0.3 mm/rev

●Milling

ϕ20 mm

(Front)

Cutting speed: 35 m/min Feed: 150 mm/min

Cutting depth: 7 mm

(Cross)

Cutting speed: 38 m/min Feed: 110 mm/min

Cutting depth: 10 mm

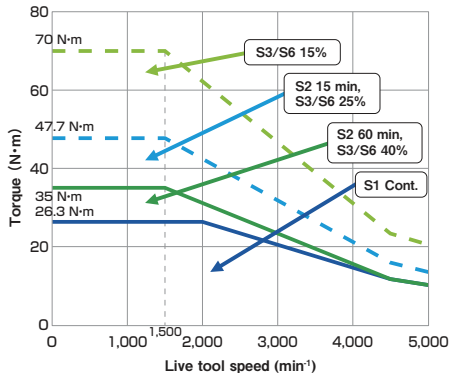
●Tapping

M20 × 2.5

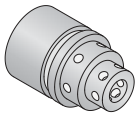
(Front, Cross)

Cutting speed: 12 m/min

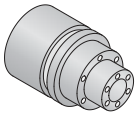
■Live tool torque characteristics



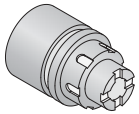
■Machining patterns



Cross drilling
(Cross live tool)



End face drilling
(Front live tool)

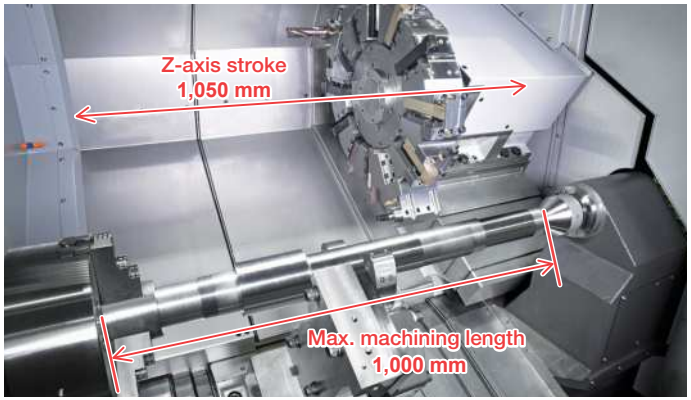


Milling
(Cross live tool + Front live tool)

Long Workpiece Machining (M10JL10)

Long stroke

High-output spindle motor and high-rigid slide can machine workpieces up to 1,000 mm with powerful cutting capability.



■Small floor space

The machine size is minimized to save floor space, even with long stroke type.

Floor space

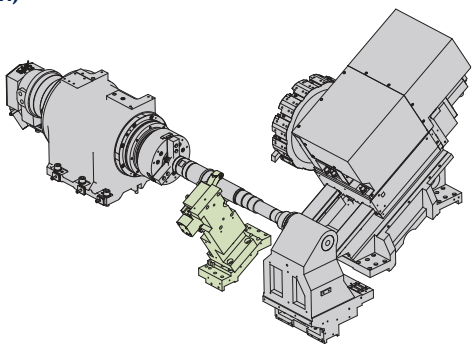
M10JL10	M10J	Competitor
5.2 m²	4.8 m²	5.8 m²

■Intermediate work rest unit (Option)

Achieves stable machining by supporting the long workpieces.

Specifications

Max. gripping dia.	6.8 kN / 3.5 MPa
Chucking dia.	ϕ12 mm to ϕ125 mm
Moving method	Moves in conjunction with Z slide
Command method	M code



Operability

1 NC tailstock (Option)

NC tailstock driven by servo motor is available as an option.
The supporting position and the supporting force can be numerically controlled on the dedicated setting screen, and it minimizes setup time.

2 Collection of waste lubricating oil

The telescopic guard is equipped on the X-axis slide.
By separating the slide from the tooling zone, it reduces the contamination by the waste lubricating oil in the coolant and inhibits deterioration of water-miscible coolant.

3 Interactive programming function (*i*CAP T)

Automatically creates NC programs by the conversational format.
・15" LCD with touch panel

4 Improved operability

Equipping individual mechanical switches of TURRET SELECT, SPINDLE OVERRIDE, RAPID OVERRIDE, and FEEDRATE.

5 Frontal withdrawal of coolant tank

The coolant tank can be pulled out to the machine front without taking out the chip conveyor.
Cleaning is easy, and the maintenance space for coolant tank is not necessary on the machine back side.

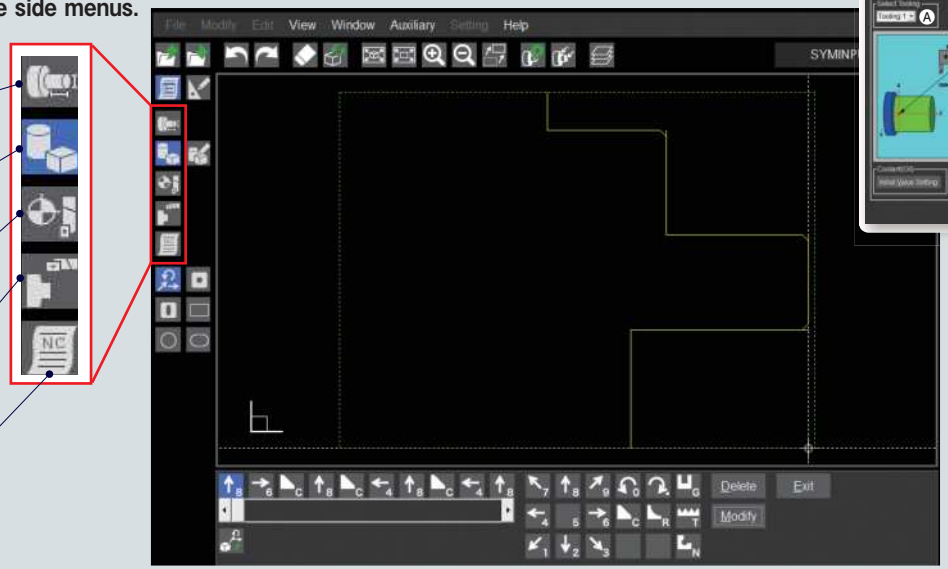
Interactive Programming Function (*i*CAP T)

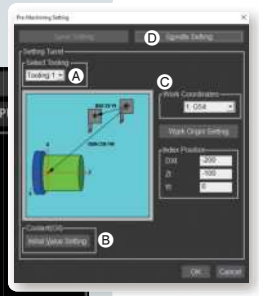
Creates NC programs automatically by inputting workpiece figures and machining conditions in an interactive format.
NC programs can be created even without knowledge of ISO programming using G codes.
Note: The PC version is also available. (Option)

Process of program creation

Create NC programs by following the side menus.

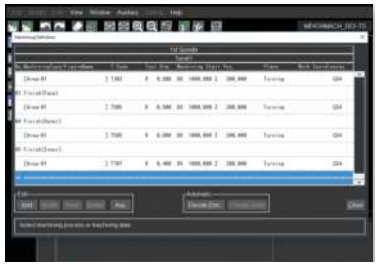
❶Blank Figure Creation
↓
❷Part Figure Creation
↓
❸Pre-Machining Setting
↓
❹Machining Definition
↓
❺NC Program Creation





❸Pre-Machining Setting

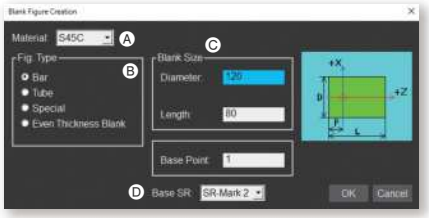
Item	Setting details
A: Select Tooling	Select tooling data to use.
B: Coolant (Oil)	Select coolant discharge position.
C: Work Coordinates	Select work coordinate system to use.
D: Spindle Setting	Set spindle max. speed.



❹Machining Definition

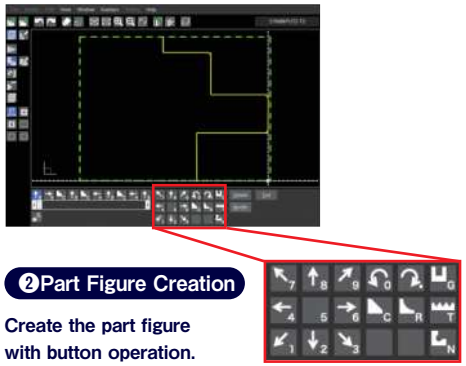
Significantly reduces programming time by automatic process determination

- Machining process, cutting area, and cutting conditions are automatically determined.
- Tool is automatically selected from library, or new tools can be registered.



❶Blank Figure Creation

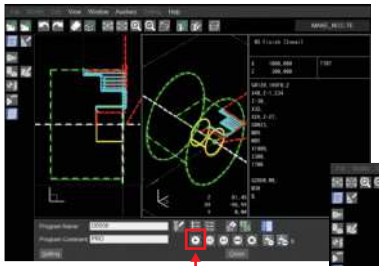
Item	Setting details
A: Material	Select material.
B: Fig. Type	Select figure type.
C: Blank Size	Input blank size (Diameter and Length).
D: Base SR	Select reference surface roughness.



❷Part Figure Creation

Create the part figure with button operation.

- Creates part figures with a single stroke by using symbolic buttons on the screen.
- No intersection calculations are required since only drawing dimensions are input.
- It is also possible to input the part figures from CAD data (DXF, IGES, STEP).

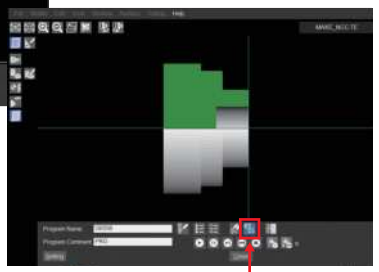


Tool path display

When pressing the NC program creation button, the program is automatically created and the tool path is displayed at the same time.

❺NC Program Creation

Easy program check with tool path display and machining simulation



Machining simulation

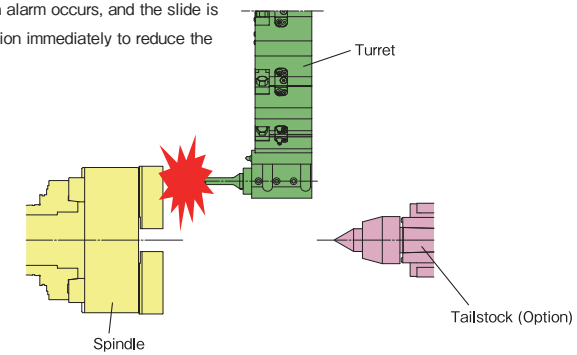
When pressing the display switch button, 2-dimensional animation is displayed to simulate machining program.

Note: Simulation of inclined surface machining is not available. It is not possible to change the viewing angle while simulating.

Enhanced Control Functions

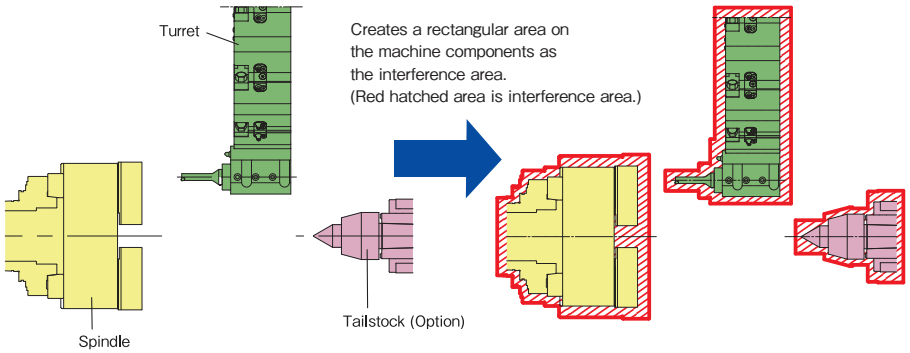
Abnormal load detection

When load level exceeds the preset level due to the collision, cutting tool breakage, etc., an alarm occurs, and the slide is moved to the retracting direction immediately to reduce the damage to the machine.

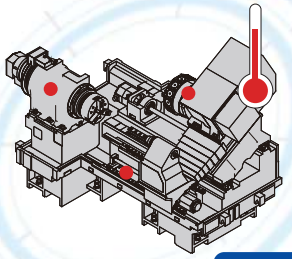


Interference prevention function

When the linear axis enters the interference area at debug mode, the axis stops moving and the alarm occurs.

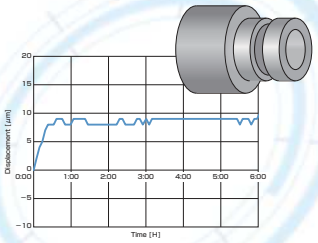


AI Thermal Displacement Compensation



Temperature

Data collection



Thermal displacement

Displacement data under various temperature conditions are collected and learned at TSUGAMI.

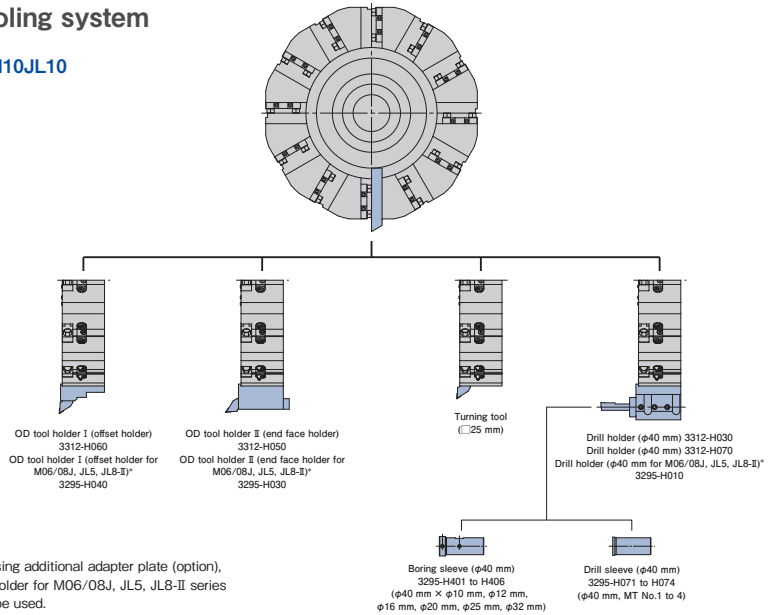
Prediction

Compensation

Based on the learning results, AI predicts and compensates the thermal displacement.

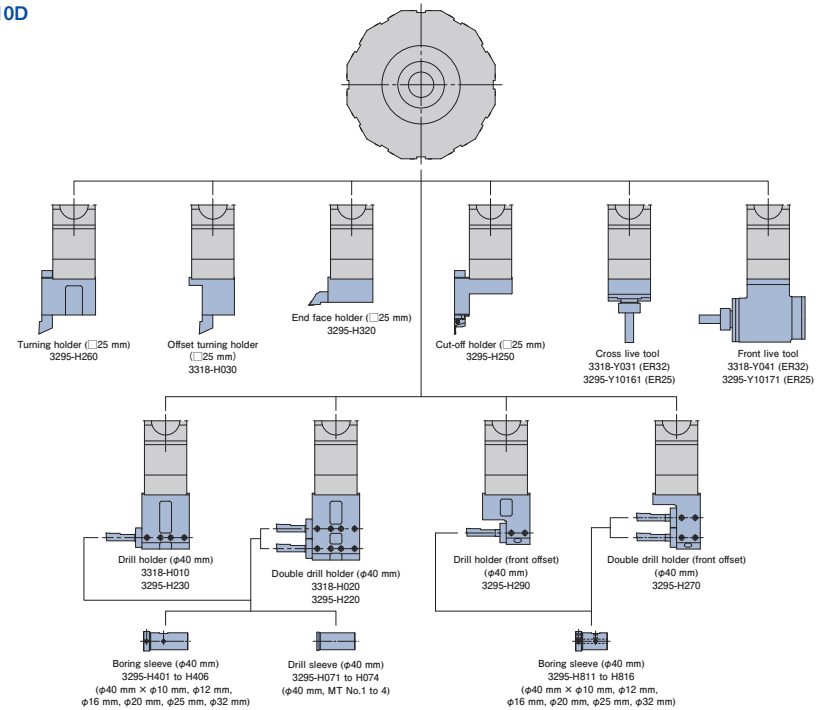
Tooling system

M10J/M10JL10



Note: By using additional adapter plate (option), the holder for M06/08J, JL5, JL8-II series can be used.

M10D



Options

NC tailstock

Supports one end of a workpiece when machining a long workpiece or a workpiece with less chucking length. (Taper size: MT No.5)

Work catcher *1

The workpiece is carried to the outside of the machine. By combining with work conveyor, it realizes automation.

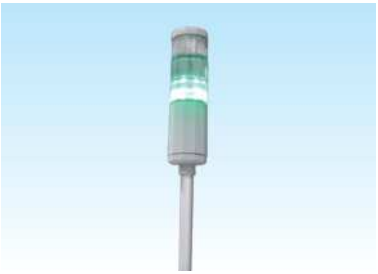
Tool setter (swiveling type) *1

Tool offset is set automatically by pressing the tool to the sensor located at the top of the arm.

Chip conveyor

Chips are carried to the outside of the machine (right side).

Signal indicator



Three color lamp indicates the status of the machine.

Intermediate work rest unit *2

Achieves stable machining of long workpieces. Enables ID processing of long workpieces.

*1 Work catcher and tool setter (swiveling type) cannot be installed together. In case of using them together, select the detachable type tool setter.
*2 Intermediate work rest unit and hydraulic tailstock cannot be installed together. In case of using together, select NC tailstock.

Machine specifications

Item	M10J	M10JL10	M10D
Max. machining dia.		ϕ400 mm	
Max. machining length	500 mm	1,000 mm	500 mm
Swing over bed		ϕ660 mm	
Spindle chuck size		10 inch	
Stroke	260 mm (X) 560 mm (Z)	260 mm (X) 1,050 mm (Z)	260 mm (X) 560 mm (Z)
Spindle speed		Max. 4,000 min^{-1} (Rated speed: 3,500 min^{-1})*1	
Spindle end face configuration		JIS A2-8	
Spindle bore		ϕ90 mm	
Spindle draw tube ID		ϕ81 mm	
Spindle bearing ID		ϕ130 mm	
Number of turret stations		12	
OD tool size		□25 mm	
Drill holder hole dia.		ϕ40 mm	
Live tool speed	—		Max.5,000 min^{-1} (Rated speed: 4,000 min^{-1})*1
Rapid traverse rate		30 m/min (X) 33 m/min (Z)	
Taper size for tailstock*2		MT No.5	
Spindle motor		15/18.5 kW	
Live tool motor	—		5.5/11 kW
Tailstock motor*2		1.8 kW	
Coolant pump motor		0.55/0.75 kW (50 Hz/60 Hz)	
X-/Z-axis motor		3.0 kW	
Turret motor		1.2 kW	
Power source requirement		30 kVA	
Compressed air requirement		0.5 MPa or more	
Air discharge rate*3		100 NL/min	
Coolant tank capacity	220 L	240 L	260 L
Width × Depth × Height	2,880 mm×1,675 mm×1,780 mm	2,921 mm×1,970 mm×1,908 mm	2,905 mm×1,675 mm×1,780 mm
Weight	4,700 kg	5,500 kg	5,000 kg

*1 When the rotation of the spindle exceeds the rated speed, keep the exceeding speed range within 30% of one cycle of the machining process.
*2 Option *3 It may change depending on the mounted options.

Safety Instructions for Coolant Selection

Use a water-miscible coolant only. Do not use any oil-based coolant.
In case of using an oil-based coolant:
- There is a risk of fire which hot chips or cutting-heat may ignite coolant mist.
- Since the temperature of oil-based coolant rises more than that of water-miscible coolant, it has a great influence on the thermal displacement of the machine.
- In case of unavoidable use of oil-based coolant, an appropriate device for safety such as automatic fire extinguisher is required.

Before using an oil-based coolant, please contact TSUGAMI at the time of consideration of installation.

NC specifications

Item	M10J	M10JL10	M10D
Controlled axes		X, Z	X, Z, C
Least input increment		0.001 mm (X-axis in diameter)	
Max. programmable value		± 8 digits	
Interpolation method		Linear, Circular	
Feedrate		1 to 6,000 mm/min	
Feedrate override		0 to 150% in 10% increments	
Dwell		G04, 0 to 99999.999	
Absolute/incremental command		X, Z: Absolute U, W: Incremental	X, Z, C: Absolute U, W, H: Incremental
Number of tool offset		64	
LCD/MDI		15" color LCD	
Display language		English	
Part program storage size		2 Mbyte	
Number of registerable programs		1,000	
Miscellaneous functions		M4-digits	
Spindle functions		S4-digits	
Tool functions		T4-digits	

Machine standard accessories

Item	Item	Item
Internal light	Plate, Leveling bolt	Rapid override
Door interlock	Transit clamps	Light switch
Through-turret coolant	Spindle air purge	Edit lock key
Hydraulic cylinder	Thermal displacement compensation	Interactive programming function (*i*CAP T)
C-axis control for spindle (with brake) (M10D)	Over-spindle coolant nozzle	Shut-off valve for air purge
Standard tools	Spindle override	

NC standard accessories

Item	Item	Item
Chasing function	Programmable data input	Abnormal load detection
Continuous threading	Chamfering & corner R	Variable lead threading
Manual pulse generator	Tool nose radius compensation	Threading retract
Memory card I/O interface	Multiple repetitive cycle	Interference prevention function
Background editing	Extended program editing	Power consumption monitor
Run time & parts number display	Direct drawing dimension programming	Energy saving mode
Custom macro	Inch/metric conversion	ECO operation mode
Constant surface speed control	Canned drilling cycle	
Tool geometry/wear offset	Rigid tap (spindle, live tool)*	

*Only spindle for M10J/M10JL10.

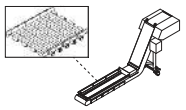
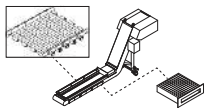
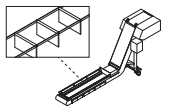
Options

Item	
Coolant	Coolant pump (0.75 kW/ 1.1 kW)
	Coolant gun
Work discharge	Work catcher*1
	Work conveyor*2
	2-axis NC loader
	Work stocker (flange)
	Work stocker (shaft)
Chip disposal	Chip conveyor (right side discharge)
	Chip carrier
Operation support functions	Automatic door
	Foot switch
	Interactive programming function (PC version)
Machine maintenance and Monitoring functions	Tool load monitor (spindle)
	Tool load monitor (linear axis)

Item	
Machine maintenance and Monitoring functions	Tool counter
	Tool setter (swiveling type)*1
	Signal indicator
	MT-LINK i
	AI servo monitor*3
Tooling	Hydraulic chuck
	NC tailstock
	Hydraulic tailstock
	Live center (MT No.5)
	Tool holder
	Live tool (cross, front) (M10D)
	Intermediate work rest unit*4 (M10JL10)
NC functions	Manual handle retrace
Other	RS232C interface

*1 Work catcher and tool setter (swiveling type) cannot be installed together. In case of using them together, select the detachable type tool setter.
*2 Work conveyor installation: Machine outside (M10J/M10D), Machine inside (M10JL10) *3 MT-LINK i (option) is additionally required.
*4 Intermediate work rest unit and hydraulic tailstock cannot be installed together. In case of using together, select NC tailstock.

Chip conveyor (Option)

Type		Hinge	Hinge + Filter	Scraper
Shape				
Feature		·General type ·For long to short chips ·Not suitable for fine chips or sludge	·Equipped with mesh filter ·Reduces fine chips from leaking into tank	·Suitable for fine chips or sludge ·Not suitable for long chips
Applicable chips	Material	Steel, cast-iron, nonferrous material	Steel, cast-iron, nonferrous material	Cast-iron, nonferrous material
	Shape	Long, short	Long, short, fine	Fine, sludge

Note: This is a general guideline. Changes may be required depending on machining conditions or machine specifications.

Packaged options M10J

Packaged options			Chucker spec.			Chucker spec. (Automation)		
			A	B	C	D	E	F
Workpiece shape			Flange	Shaft	Shaft	Flange	Shaft	Shaft
Options	Tailstock	NC tailstock	—	○	—	—	○	—
		Hydraulic tailstock	—	—	○	—	—	○
	Automation	2-axis NC loader	—	—	—	○	○	○
		Work stocker (flange)	—	—	—	○	—	—
		Work stocker (shaft)	—	—	—	—	○	○
	Spindle chuck	3-jaw hollow 10 inch	○	○	○	○	○	○
	Tooling kit		○	○	○	○	○	○
		OD tool holder Ⅰ (offset holder)	2	2	2	2	2	2
		OD tool holder Ⅱ (end face holder)	2	2	2	2	2	2
		Drill holder (ϕ40 mm)	4	4	4	4	4	4
		Drill sleeve (MT No.2)	1	1	1	1	1	1
		Boring sleeve (ϕ40 mm × ϕ16 mm)	2	2	2	2	2	2
		Boring sleeve (ϕ40 mm × ϕ20 mm)	2	2	2	2	2	2
		Live center (MT No.5)	—	○	○	—	○	○
	Chip conveyor	Hinge type	○	○	○	○	○	○
	Tool setter	Manual swiveling type	—	—	—	—	—	—
	Foot switch		○	○	○	—	—	—
	Signal indicator		○	○	○	○	○	○

Packaged options M10D

Packaged options			Chucker spec.			Chucker spec. (Automation)		
			A	B	C	D	E	F
Workpiece shape			Flange	Shaft	Shaft	Flange	Shaft	Shaft
Options	Tailstock	NC tailstock	—	○	—	—	○	—
		Hydraulic tailstock	—	—	○	—	—	○
	Automation	2-axis NC loader	—	—	—	○	○	○
		Work stocker (flange)	—	—	—	○	—	—
		Work stocker (shaft)	—	—	—	—	○	○
	Spindle chuck	3-jaw hollow 10 inch	○	○	○	○	○	○
	Tooling kit		○	○	○	○	○	○
		Turning holder	4	4	4	4	4	4
		Double drill holder	4	4	4	4	4	4
		Boring sleeve (ϕ40 mm × ϕ16 mm)	2	2	2	2	2	2
		Boring sleeve (ϕ40 mm × ϕ20 mm)	2	2	2	2	2	2
		Cross live tool	2	2	2	2	2	2
		Front live tool	2	2	2	2	2	2
		Live center (MT No.5)	—	○	○	—	○	○
	Chip conveyor	Hinge type	○	○	○	○	○	○
	Tool setter	Manual swiveling type	—	—	—	—	—	—
	Foot switch		○	○	○	—	—	—
	Signal indicator		○	○	○	○	○	○

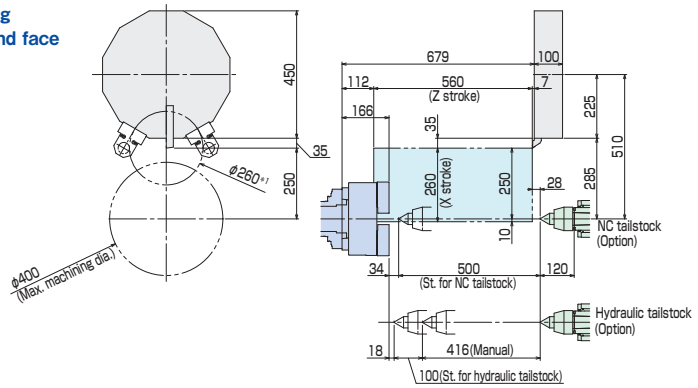
Packaged options M10JL10

Packaged options			Chucker spec.				Chucker spec. (Automation)			
			A	B	C	D	E	F	G	H
Workpiece shape			Flange	Shaft	Shaft	Shaft	Flange	Shaft	Shaft	Shaft
Options	Tailstock	NC tailstock	—	○	○	—	—	○	○	—
		Hydraulic tailstock*	—	—	—	○	—	—	—	○
	Intermediate work rest unit*		—	—	○	—	—	—	○	—
	Automation	2-axis NC loader	—	—	—	—	○	○	○	○
		Work stocker (flange)	—	—	—	—	○	—	—	—
		Work stocker (shaft)	—	—	—	—	—	○	○	○
	Spindle chuck	3-jaw hollow 10 inch	○	○	○	○	○	○	○	○
	Tooling kit		○	○	○	○	○	○	○	○
		OD tool holder Ⅰ (offset holder)	2	2	2	2	2	2	2	2
		OD tool holder Ⅱ (end face holder)	2	2	2	2	2	2	2	2
		Drill holder (ϕ40 mm)	4	4	4	4	4	4	4	4
		Drill sleeve (MT No.2)	1	1	1	1	1	1	1	1
		Boring sleeve (ϕ40 mm × ϕ16 mm)	2	2	2	2	2	2	2	2
		Boring sleeve (ϕ40 mm × ϕ20 mm)	2	2	2	2	2	2	2	2
		Live center (MT No.5)	—	○	○	○	—	○	○	○
	Chip conveyor	Hinge type	○	○	○	○	○	○	○	○
	Tool setter	Manual swiveling type	—	—	—	—	—	—	—	—
	Foot switch		○	○	○	○	—	—	—	—
	Signal indicator		○	○	○	○	○	○	○	○

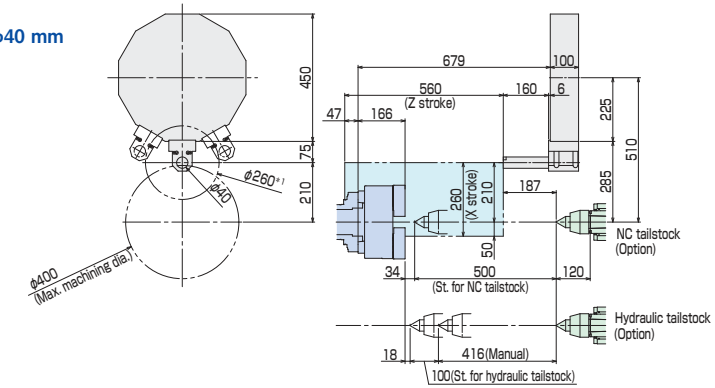
*Intermediate work rest unit and hydraulic tailstock cannot be installed together. In case of using together, select NC tailstock.

Tooling zone/M10J

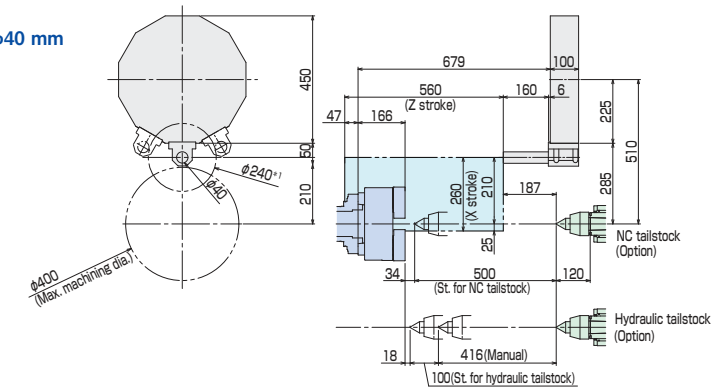
Direct mounting on the turret end face



3312-H030 Drill holder φ40 mm

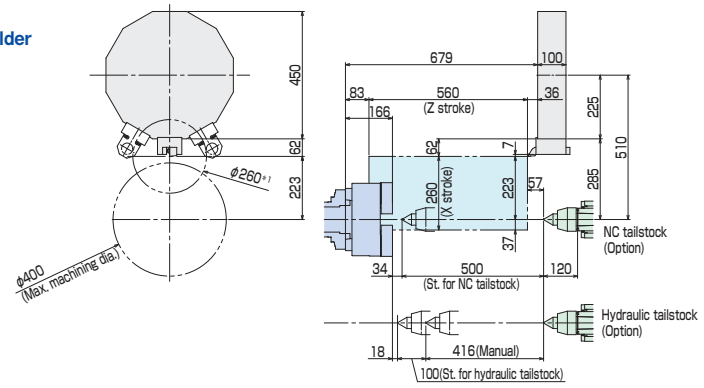


3312-H070 Drill holder φ40 mm

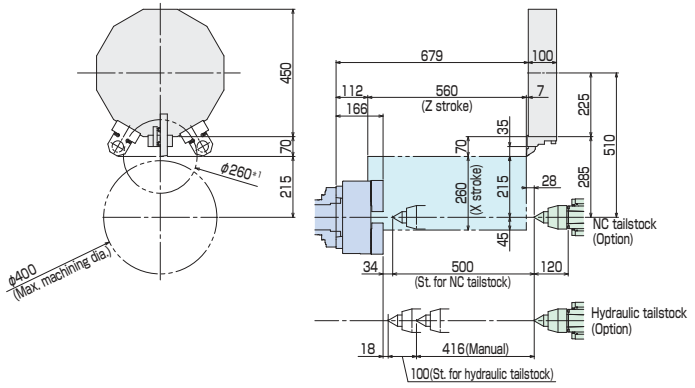


*1 Max. workpiece dia. restricted by the adjacent tool holders.
*2 Chuck type (CHANDOX): OPB-210 (10 inch)

3312-H050 End face holder



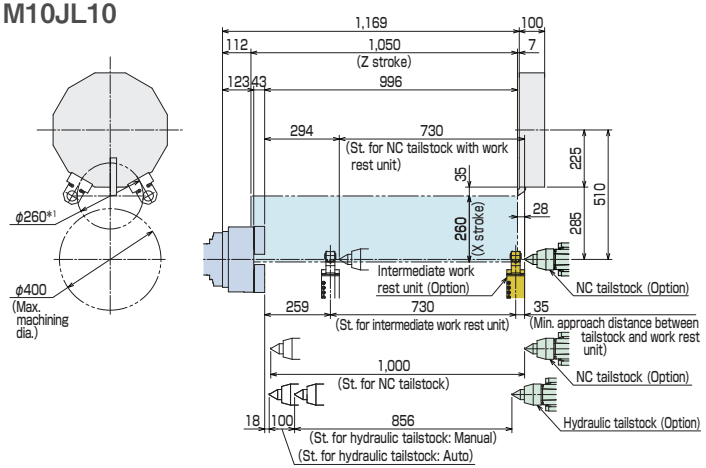
3312-H060 Offset holder



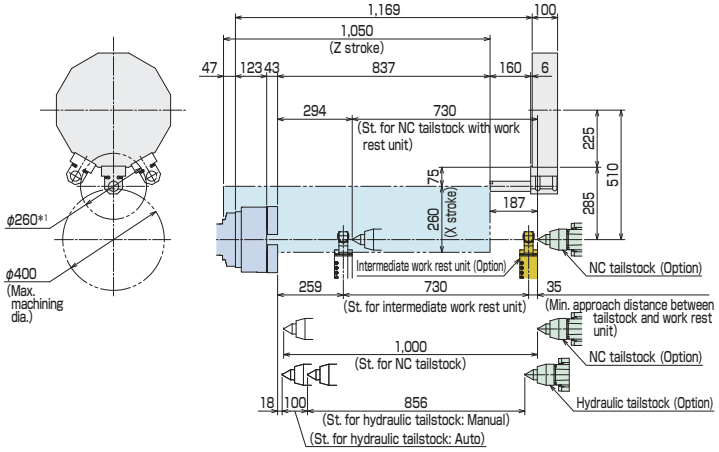
*1 Max. workpiece dia. restricted by the adjacent tool holders.
*2 Chuck type (CHANDOX): OPB-210 (10 inch)

Tooling zone / M10JL10

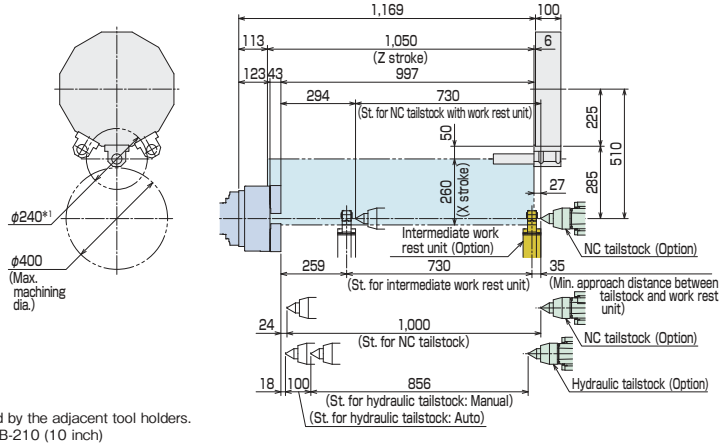
Direct mounting on the turret end face



3312-H030 Drill holder Ø40 mm

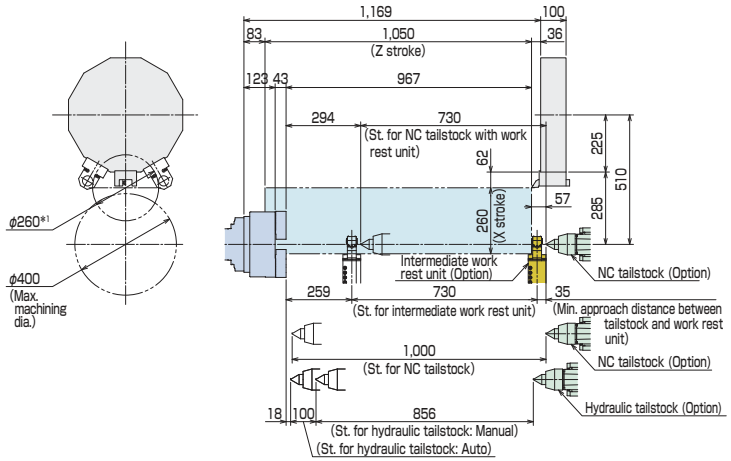


3312-H070 Drill holder Ø40 mm

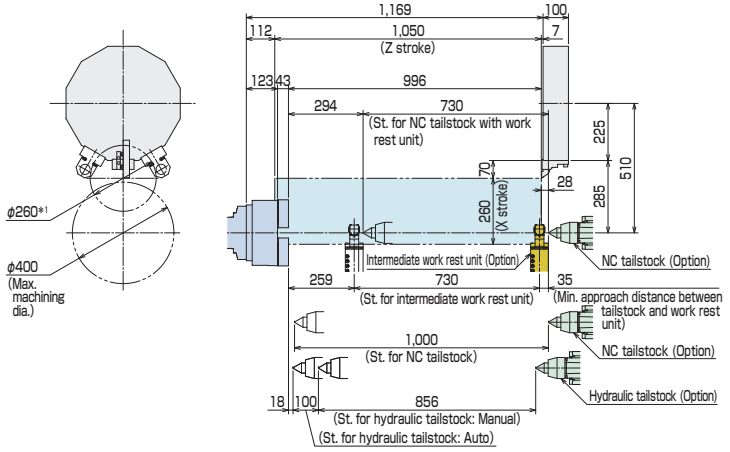


*1 Max. workpiece dia. restricted by the adjacent tool holders.
*2 Chuck type (CHANDOX): OPB-210 (10 inch)

3312-H050 End face holder



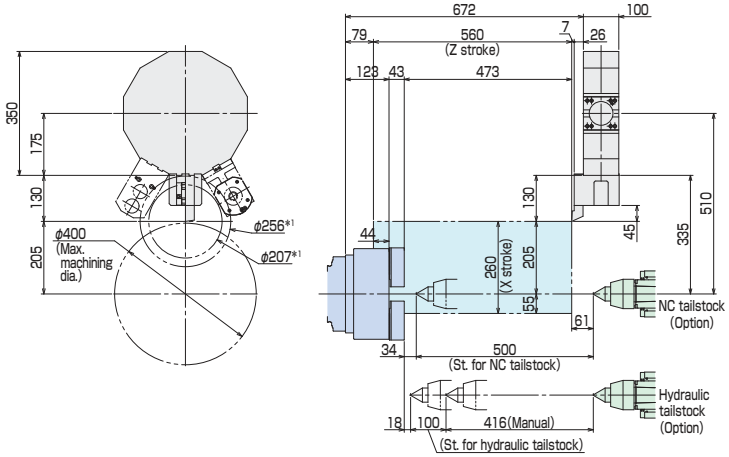
3312-H060 Offset holder



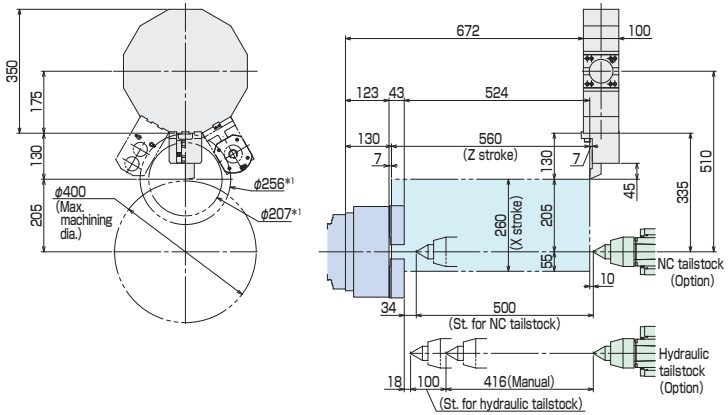
*1 Max. workpiece dia. restricted by the adjacent tool holders.
*2 Chuck type (CHANDOX): OPB-210 (10 inch)

Tooling zone / M10D

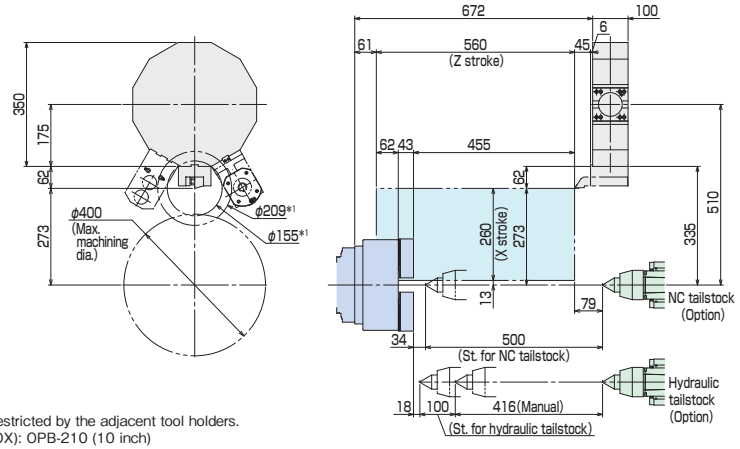
3295-H260 Turning holder



3318-H030 Offset turning holder

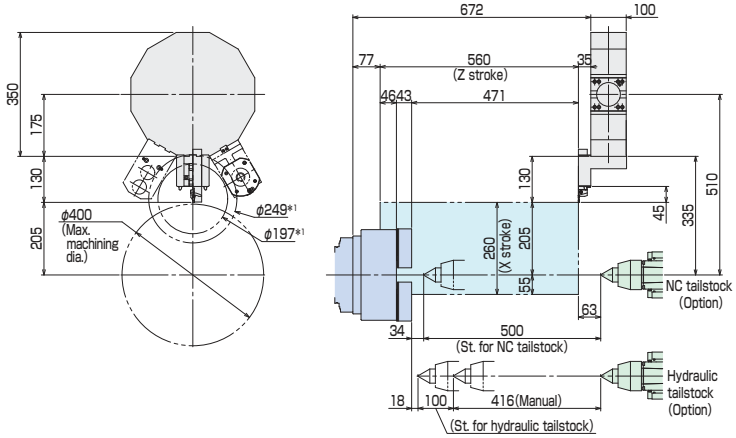


3295-H320 End face holder

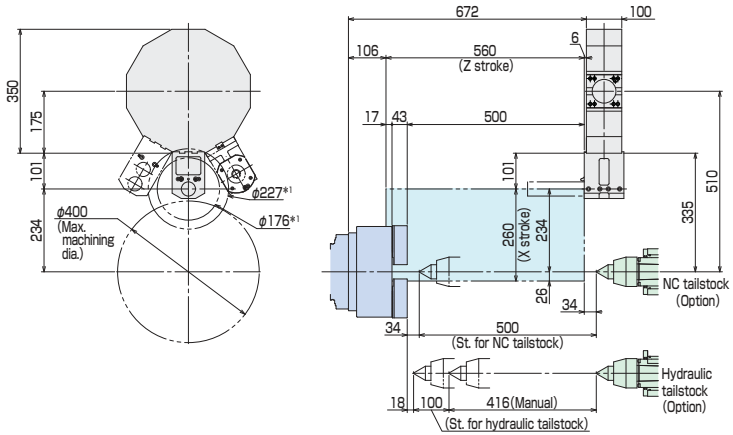


*1 Max. workpiece dia. restricted by the adjacent tool holders.
*2 Chuck type (CHANDOX): OPB-210 (10 inch)

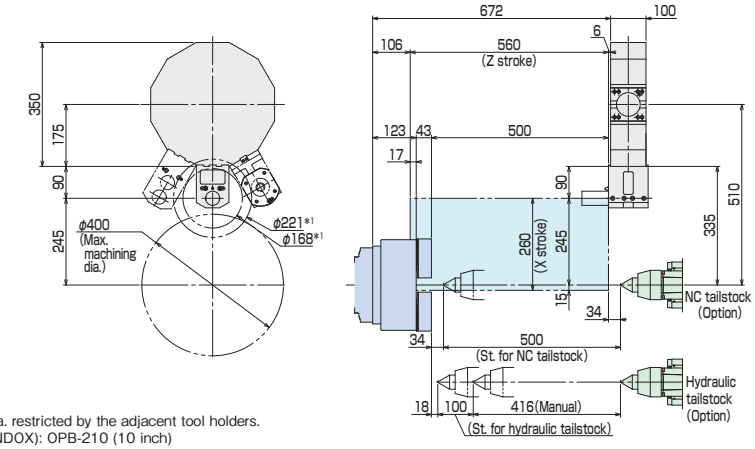
3295-H250 Cut-off holder



3318-H010 Drill holder



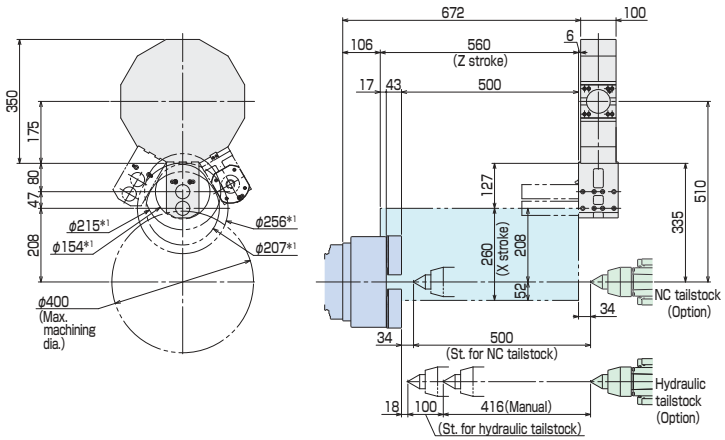
3295-H230 Drill holder



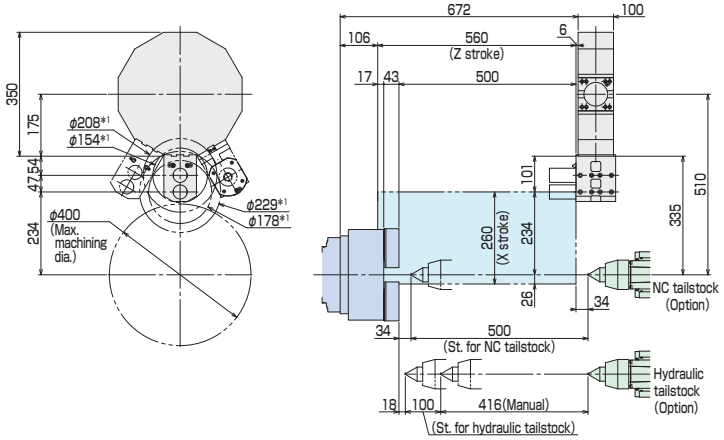
*1 Max. workpiece dia. restricted by the adjacent tool holders.
*2 Chuck type (CHANDOX): OPB-210 (10 inch)

Tooling zone / M10D

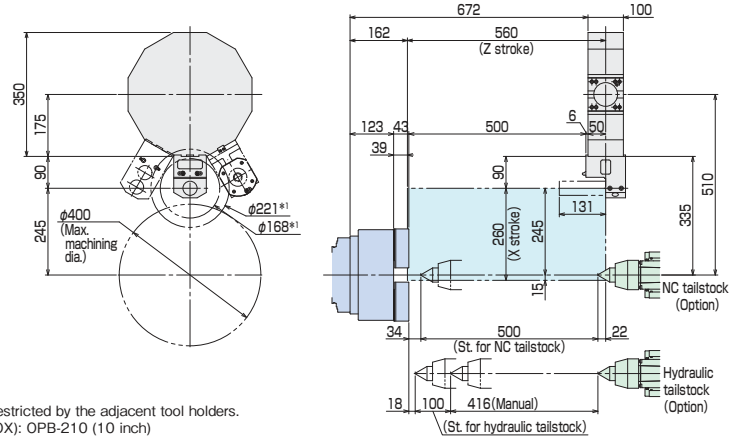
3318-H020
Double drill holder



3295-H220
Double drill holder

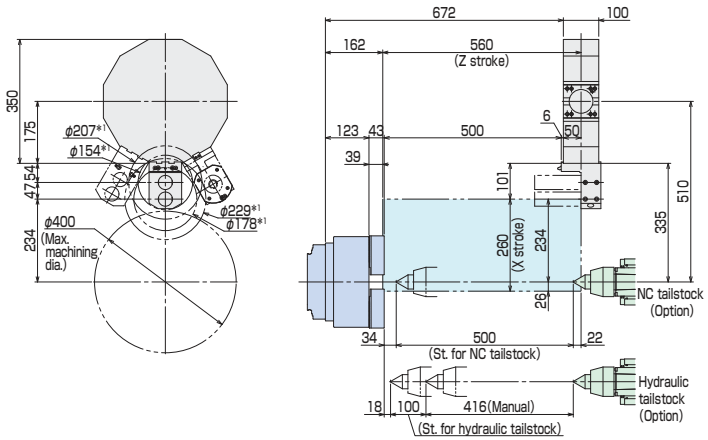


3295-H290
Drill holder (offset)

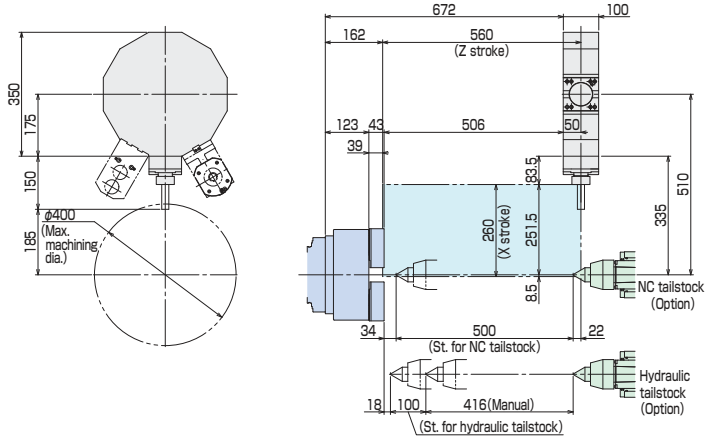


*1 Max. workpiece dia. restricted by the adjacent tool holders.
*2 Chuck type (CHANDOX): OPB-210 (10 inch)

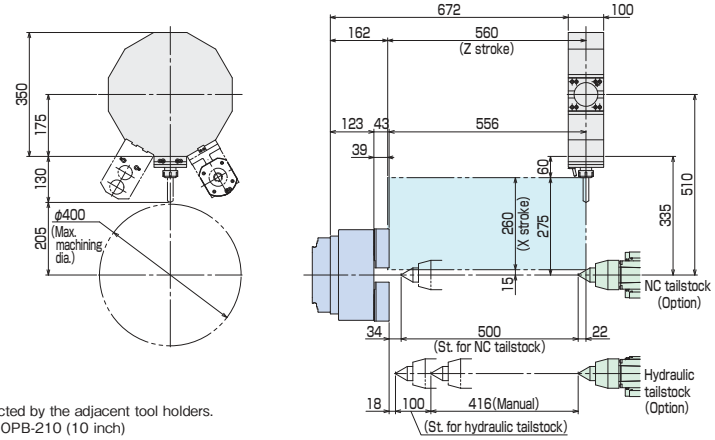
3295-H270
Double drill holder (offset)



3318-Y031
Cross live tool



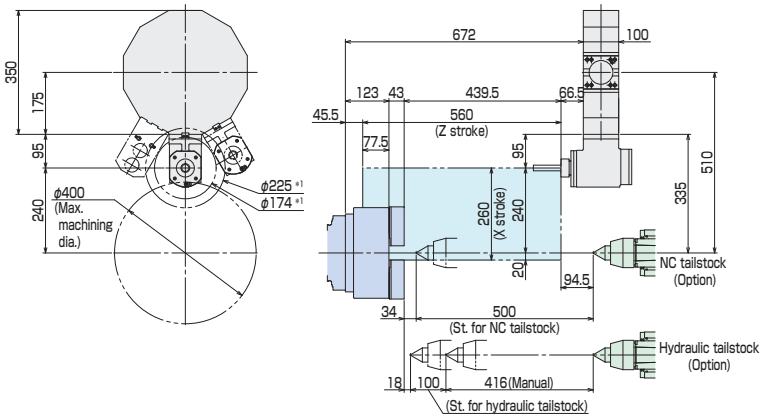
3295-Y10161
Cross live tool



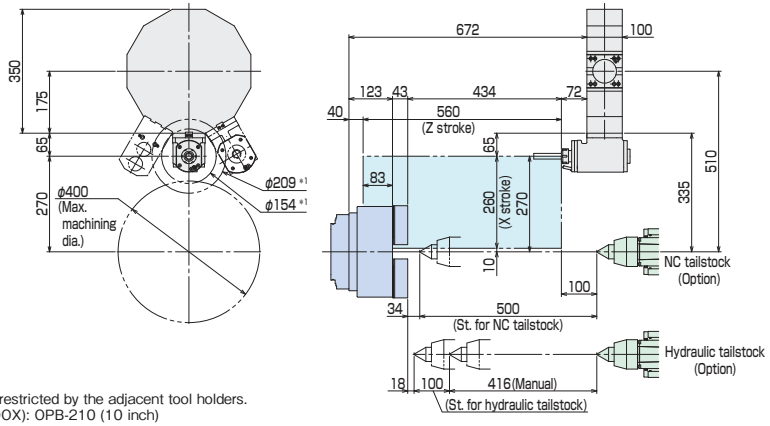
*1 Max. workpiece dia. restricted by the adjacent tool holders.
*2 Chuck type (CHANDOX): OPB-210 (10 inch)

Tooling zone / M10D

3318-Y041
Front live tool



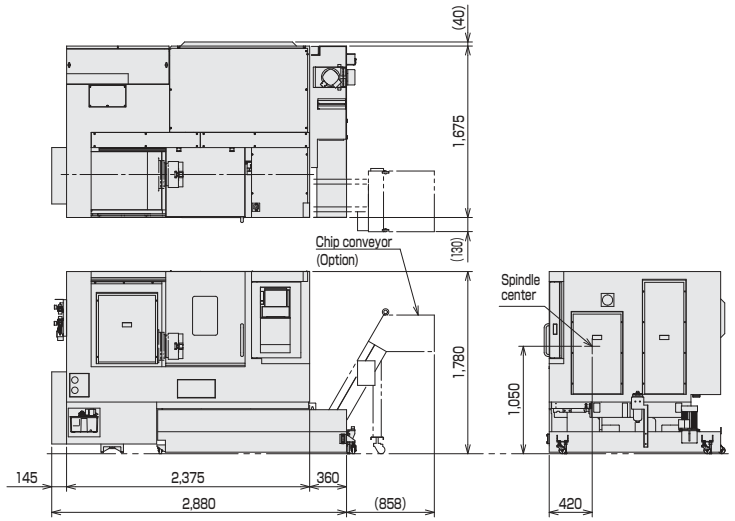
3295-Y10171
Front live tool



*1 Max. workpiece dia. restricted by the adjacent tool holders.
*2 Chuck type (CHANDOX): OPB-210 (10 inch)

Layout

M10J



M10JL10