

# SC-100

**NAKAMURA-TOME**  
PRECISION INDUSTRY CO.,LTD.

Simple but beyond  
expectations

Innovation  
Technology

~ Creation of new values ~

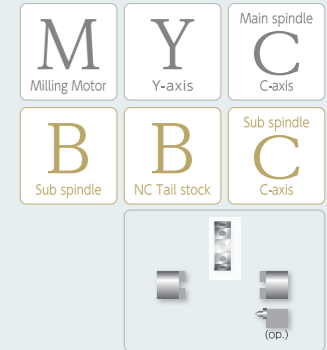
# SC-100

A high-performance compact 6-Inch Turning Center with one turret, to complete the SC-Series product line.

Our benchmarks are "High Rigidity", "High Precision" and "User-Friendliness".

Through its well-designed mechanical structure and flexible packages, a wide range of parts can be machined, fulfilling various market needs.

- Milling and Y-axis are standard
- Y-axis travel is 80mm (±40mm)
- 7.1/2.2kW Milling motor / Spindle Max. speed 6,000min<sup>-1</sup>
- 7.5/5.5kW Sub Spindle(option)
- Parts Catcher A with integrated parts conveyor for Sub Spindle specifications.
- High rigidity design
- Z-axis travel 400mm
- Floor space 2,268mm×1,700mm (Standard Specification)
- 100% recovery of lubrication oil (\*Standard spec. / Theoretical value)
- Environment-Friendly Inverter-type hydraulic unit



Compact machine with high machining capabilities



SC-100 is a first-class machine, featuring high-performance machining in a small foot-print, which is one of the merits of Nakamura-Tome machines.

In addition to Milling and Y-axis, which are standard equipment, several packages are available to respond to the needs of various industries.

The robust bed casting design, which is the base of the machine, contributes to improved stiffness.

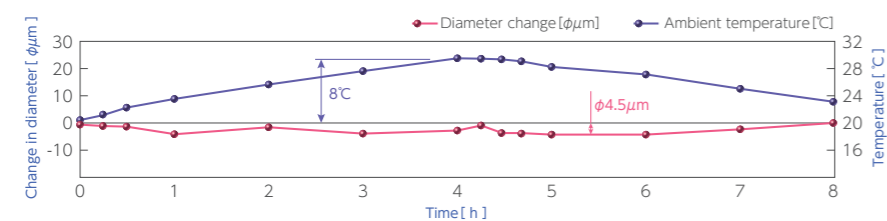
By introducing "NT Thermo Navigator", thermal growth is drastically reduced, ensuring thermal-stability and high-accuracy machining.

Nakamura-Tome design does not focus only on machining capabilities, but also on high rigidity and high accuracy.

NT Thermo Navigator

Amount of Thermal displacement amount **4.5 $\mu$ m**

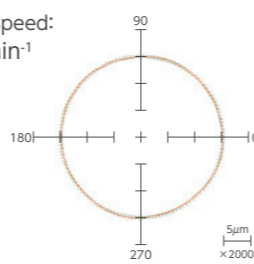
※8 hours continuous operation from cold start



Roundness **0.5 $\mu$ m**

Spindle speed: 2,000min<sup>-1</sup>

Material: BsBM



Turning



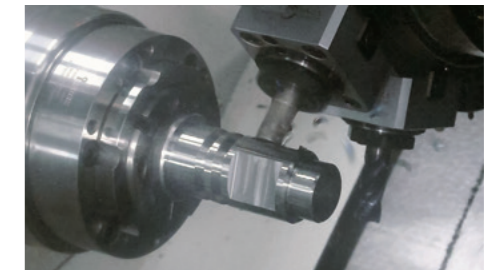
Main Spindle

- Spindle motor **11/7.5kW**
- Cutting cross section **2.8mm<sup>2</sup>/rev**
- Depth of cut **4mm (MAX.)**
- Feed **0.7mm/rev**
- O.D. groove end milling capability  
Groove width **6mm**

Sub Spindle(op.)

- Spindle motor **7.5/5.5kW**
- Cutting cross section **1.98mm<sup>2</sup>/rev**
- Depth of cut **3mm (MAX.)**
- Feed **0.66mm/rev**
- O.D. groove end milling capability  
Groove width **6mm**

Milling



Milling

- Driven-tool spindle motor **7.1/2.2kW**
- Driven-Tool spindle rotating speed **6,000min<sup>-1</sup>**
- Y-axis travel **±40mm**
- Feed **0.7mm/rev**
- Chip disposal amount **31.84cc/min**
- Tool diameter **φ16mm**  
(Slow away end mill 2 blades)
- Depth of cut **5mm (MAX.)**
- Feed **0.2mm/rev**

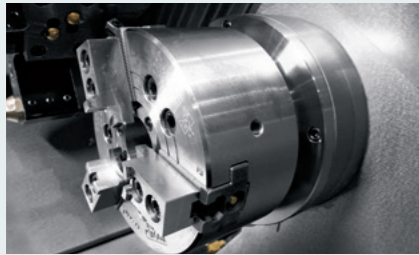
## High Performance and Reliability

■ Bar Capacity  $\phi 51\text{mm}$

Main Spindle **11/7.5kW**  
**5,000min<sup>-1</sup>**

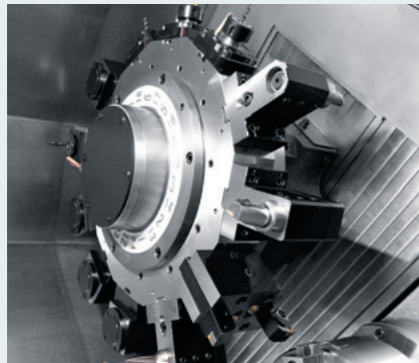
■ Bar Capacity  $\phi 42\text{mm}$

Sub Spindle **7.5/5.5kW**  
**6,000min<sup>-1</sup>**



Milling and Y-Axis are standard equipment

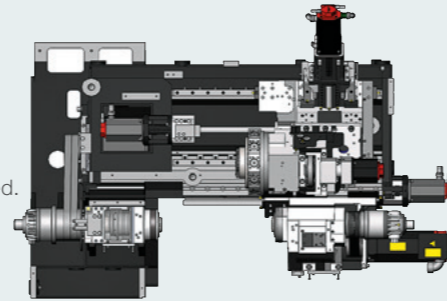
■ Y axis Travel 80mm( $\pm 40\text{mm}$ )



Milling Motor **7.1/2.2kW**  
**6,000min<sup>-1</sup>**

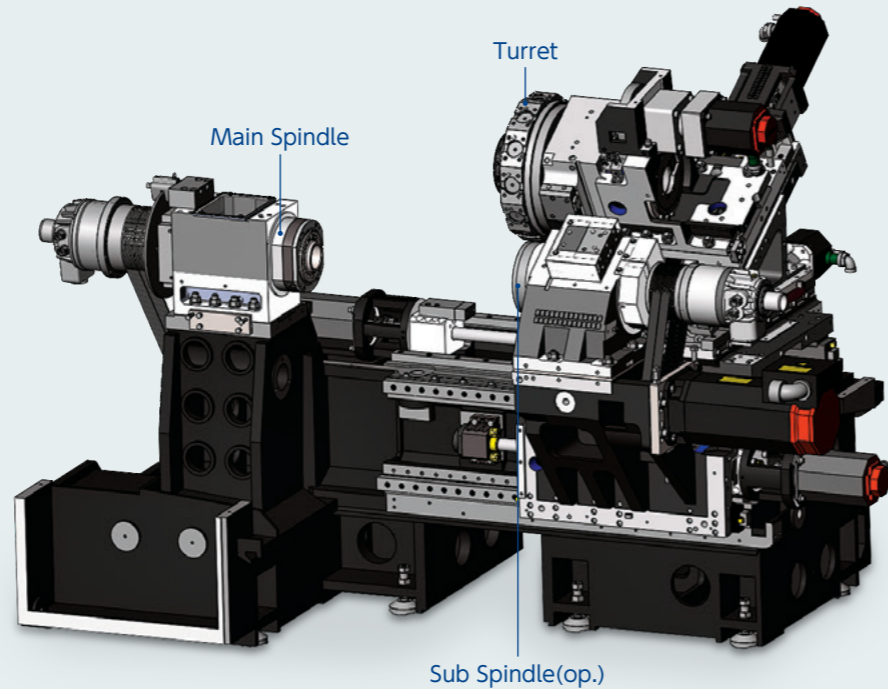
### New Machine Bed Design

Chip disposal is improved.  
Better accessibility during set-up.



### Compound Y Axis Structure

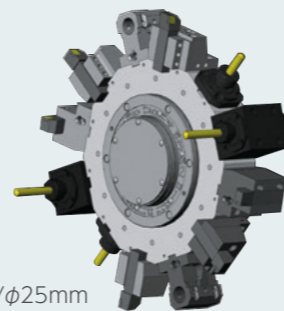
Compound Y-Axis and low center of gravity, make the machine more robust.



## 24 stations

### 12/24 Station Turret

- ▶ Number of tool stations : 12 station turret
- ▶ Max Number of tool : 24
- ▶ Number of index positions : 24
- ▶ Number of driven tool stations : 12
- ▶ Driven tool speed : 6,000min<sup>-1</sup>
- ▶ Tool size (square shank/ round shank) : □20/ $\phi 25\text{mm}$
- ▶ Milling tool size :  $\phi 1 \sim 14\text{mm}$



### Floor space (Machine only)

\*not including Motor area.

Standard specifications

**L2,268mm × W1,700mm × H1,780mm**

Sub Spindle Specifications(op.) L2,270mm × W1,700mm × H1,780mm



15 inch Color LCD

### Built in Parts Conveyor

Parts catcher A (PCA) and built-in parts conveyor are standard equipment of the Sub Spindle specifications (op). Best package for Bar work.

※Built-in parts conveyor is not included without R-spindle specifications.

### Eco Friendly

Inverter type hydraulic unit with reduced power consumption. Furthermore, Lubricant oil recovery rate is improved.



### Inverter type hydraulic unit

Power consumption reduction **21%<sup>※1</sup>**

※1) This value may change depending on actual machining conditions.

Lubrication oil collection rate **100%<sup>※2</sup>**

※2) Collection rate is 75% in case of sub spindle specifications

## Various Options to Meet Customers Needs. Total Provider for Peripheral Equipment.

Whether it is machine set up, cutting chip management, higher efficiency or improved productivity, Nakamura-Tome offers top class peripheral equipment, which boosts the performance of our Multitasking Machines. As a total solution provider with numerous achievements, Nakamura-Tome offers complete solutions, including Multitasking Machines complemented with a variety of peripheral equipment.



Mata-Bei (Sub Spindle)



Tailstock

and many others ...  
For not Listed Items, please contact your Nakamura-Tome representative.



Parts Catcher A+Built-in conveyor. \*Standard for Sub Spindle Specs.



Tool setter



Han-Bei (In-process measuring system)



Chip conveyor



Oil skimmer



Signal tower



Coolant pump



Digital chuck interlock

## Full Operator Support : User-Friendly and Highly Reliable.

Jig less !  
Set-up less !  
Skill less !

This essential function for  
multitasking machines  
is standard.



### Main Features

#### Standard

NT Work Navigator

Airbag (Overload detection)

Advanced NT NURSE

NT Smart Sign

#### Option

NT Manual Guide i  
(LUCK-BEI II)

### Airbag (Overload detection)

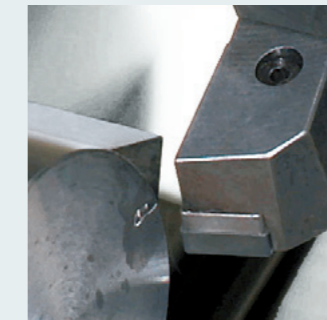
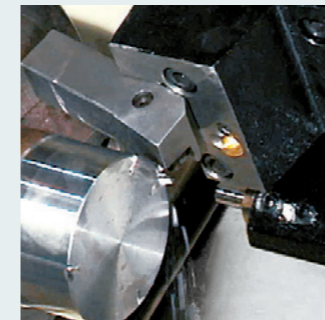
Compared to other machines, Nakamura-Tome machine will not break after the slightest collision. The "Airbag Function" minimizes the damage that may occur during a collision.

If a machine collision occurs,  
there is good reason to be assured: Airbag !

Barrier?  
Even with barrier  
function, machine  
collisions may  
occur

When the machine collision, there is no reason to panic.  
Nakamura-Tome is...

The Airbag (Overload detection) of the machine tool greatly reduces the impact of a collision, and protects the machine.



### Without Airbag

Machine will not be  
stop immediately.  
The slide continues to  
move even after collision.

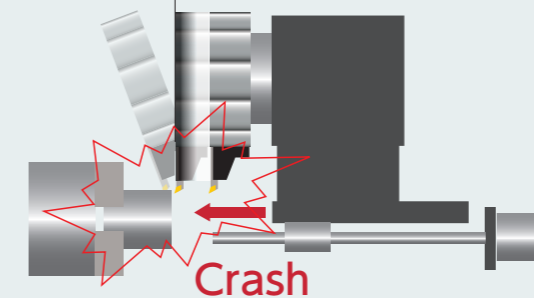
### With Airbag

Retraction within 0.001 sec

Crash !  
Within 1 milliseconds after the crash,  
servo motor-feeding direction is reversed and  
the machine stops in EMG mode.



▲Video



\* This feature does not mean zero impact

### NT Work Navigator

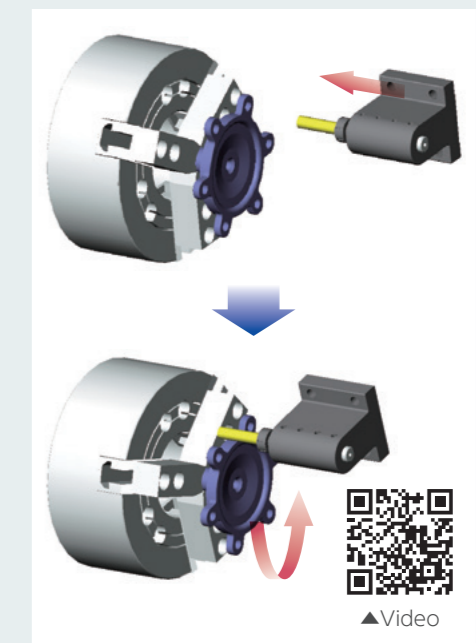


Advanced  
NT Work  
Navigator !

A new upgrade makes it  
possible to navigate with the  
X and Y-axes. Many parts with  
irregular outer surfaces, requiring  
coordinate recognition with X or Y-Axis, become  
within the range of NT Work Navigator.

No fixtures  
required

Machining parts with  
non-round shapes, such as  
forgings or castings requires  
that the raw part coordinates be  
recognized by the CNC control.  
In order to achieve this without requiring extra cost  
or additional options, the NT Navigator is used.  
It works just by touching the part with a simple  
inexpensive probe (mostly round bar mounted on a  
tool holder) and using the torque control feature of  
the servo-motor, which is to record required  
coordinates in the CNC. The NT Navigator is a cost  
cutting feature in multitasking machines, eliminat-  
ing the need for positioning fixtures and special  
clamping devices.



▲Video

## Featuring Functions to Make Efficient-Programs Faster.

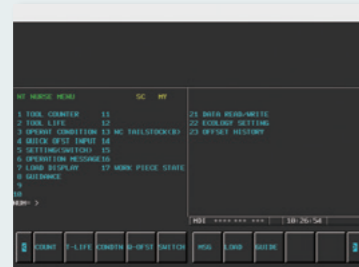
### Advanced NT NURSE

All-in-one software!

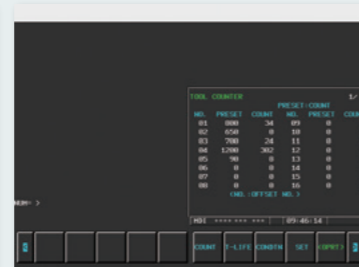
NT Nurse is software that provides the operator with user-friendly support for operation, programming and production on the machine. Among vital features are phase recognition (a must for multitasking), direct chucking to prevent positioning error during transfer, and perfect synchronization of the

left and right hand spindles. Among other features, are the load monitor for detecting tool wear and tool breakage, tool life management, operation condition monitoring, in addition to many other features to simplify programming, set up, operation and production, all offered in one single package.

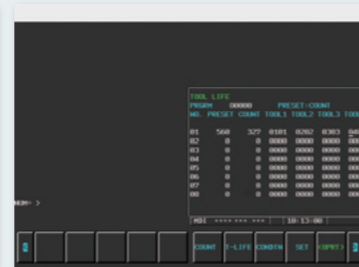
### Useful functions



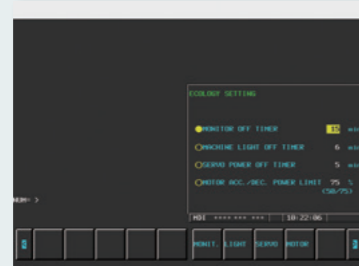
Menu screen



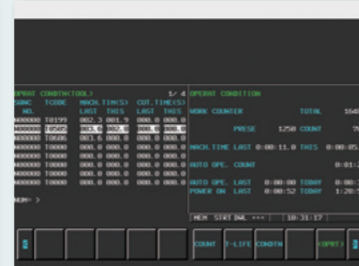
Tool counter



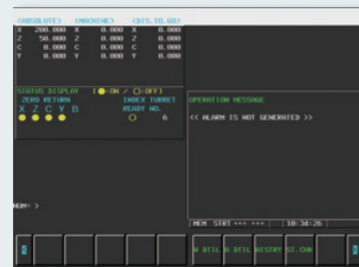
Tool Life



Energy Saving



Operation condition of each tool



Operation message



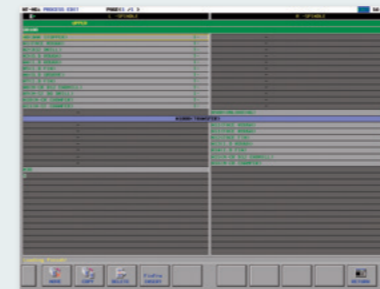
Quick offset



NT NURSE call button

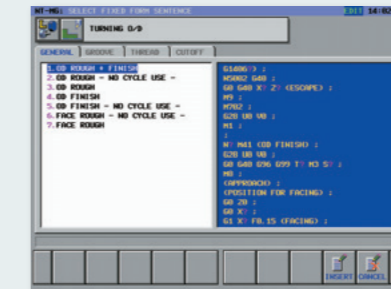
### NT Manual Guide i (LUCK-BEI II) — Option

A programming guidance system with the ability to generate NC programs (ISO/EIA G-code programs) easily. Processes created in conversational mode can be cut, copied or moved ensuring flexibility. Additionally, several cycles such as part-transfer cycle, requiring waiting M-codes, are readily made with the "NC program editing support function". The "NC program simulation function" can be used to check created-programs by tool-path simulation or solid-model animation.



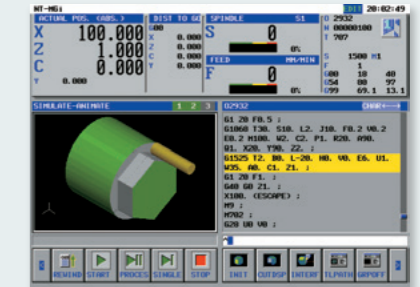
#### ▲ Process Editing Function

NT Manual Guide i automatically recognizes each process and lists all processes. Operator can easily change and optimize the program by moving processes, copying processes or adding waiting-functions.



#### ▲ Fixed-form sentence function

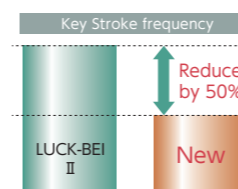
NT Manual Guide i contains more than 300 types of fixed form sentences. Operator can select these fixed form sentences for the program from a menu screen.



#### ▲ Simulation

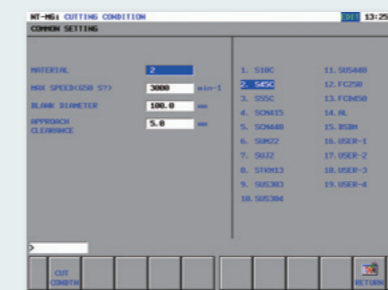
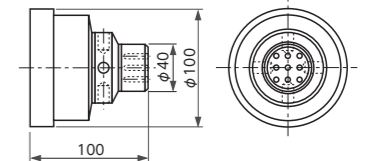
Accurate simulation of turning and milling operations using a 3D solid model.

By introducing the "automatic cutting condition setting function", the number of key strokes required to make a program were reduced by 50% reduced, compared with the previous NT-Manual guide version.



### Automatic Cutting-Condition Setting Function

By setting the material type and required surface roughness, cutting conditions are automatically generated. These can be also changed depending on customer's experience.



By selecting the material, cutting conditions B are automatically input.



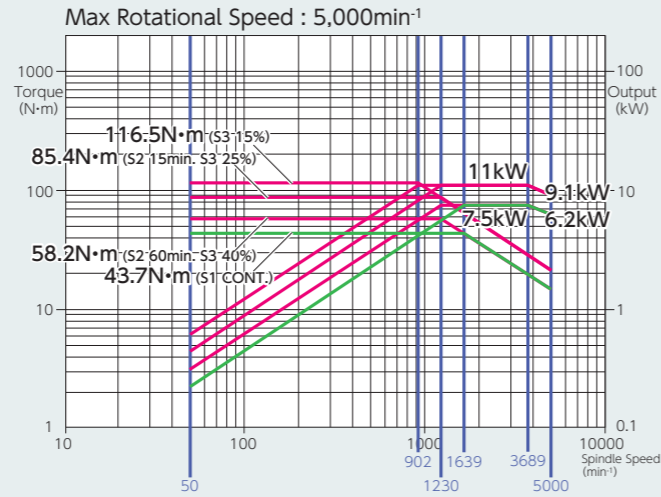
By setting the surface roughness, machining conditions are automatically input



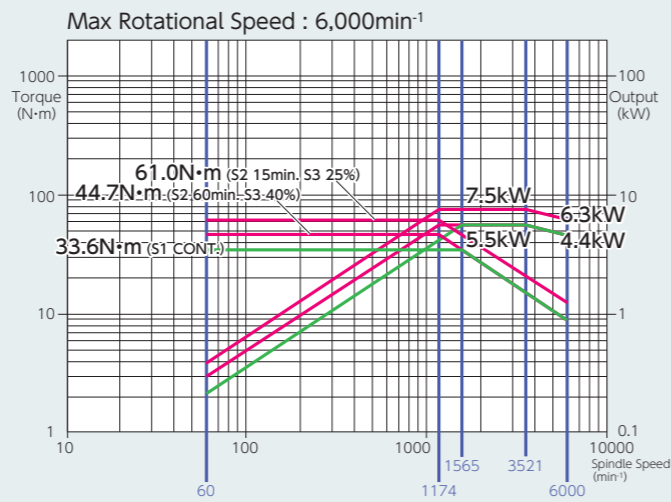
Cutting conditions. End mill

Torque/Output Chart

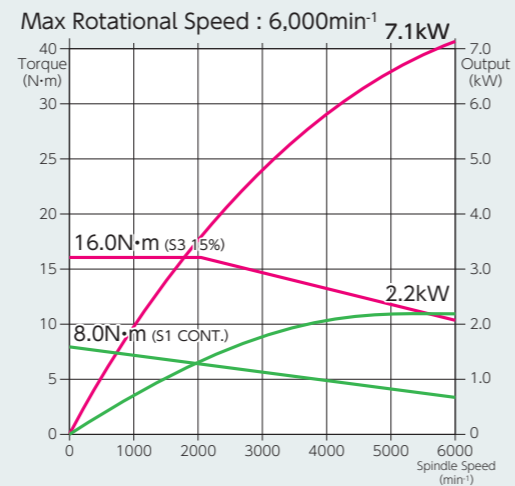
Main Spindle motor  
Standard  
Bar capacity  $\phi 51\text{mm}$



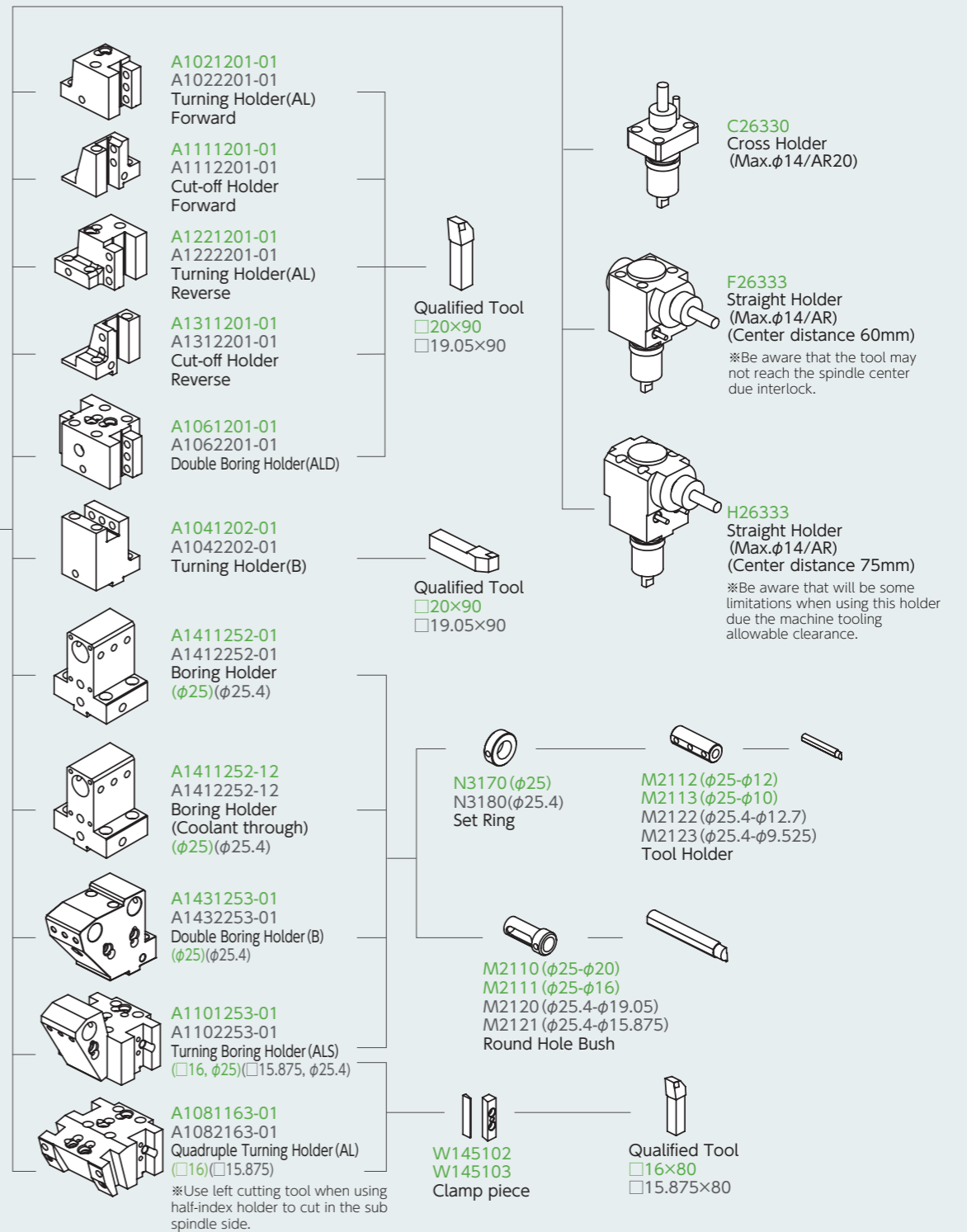
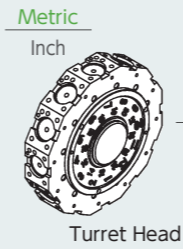
Sub Spindle Motor  
Option  
Bar capacity  $\phi 42\text{mm}$



Milling motor  
Standard



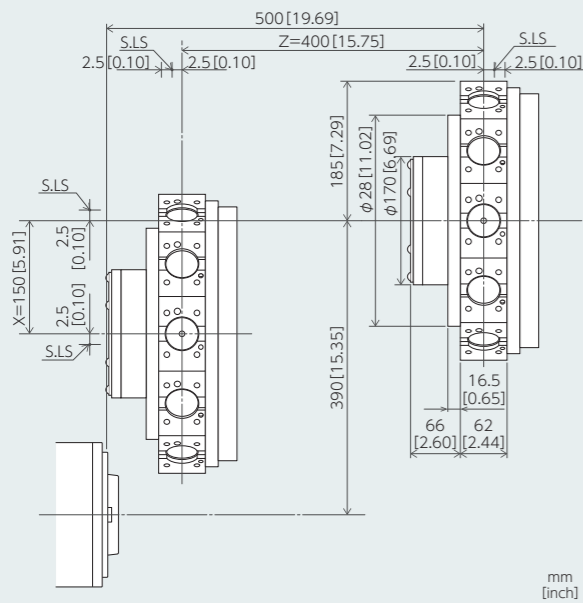
Tooling System



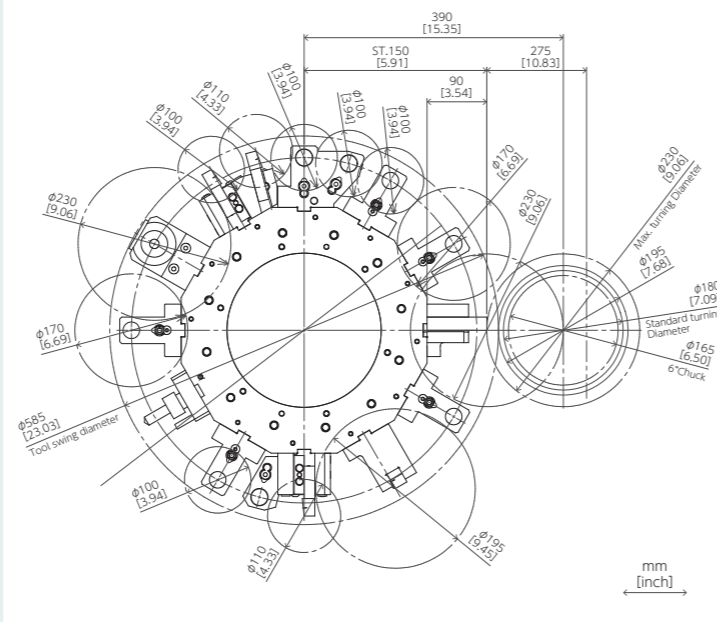


Travel Range

Standard specification

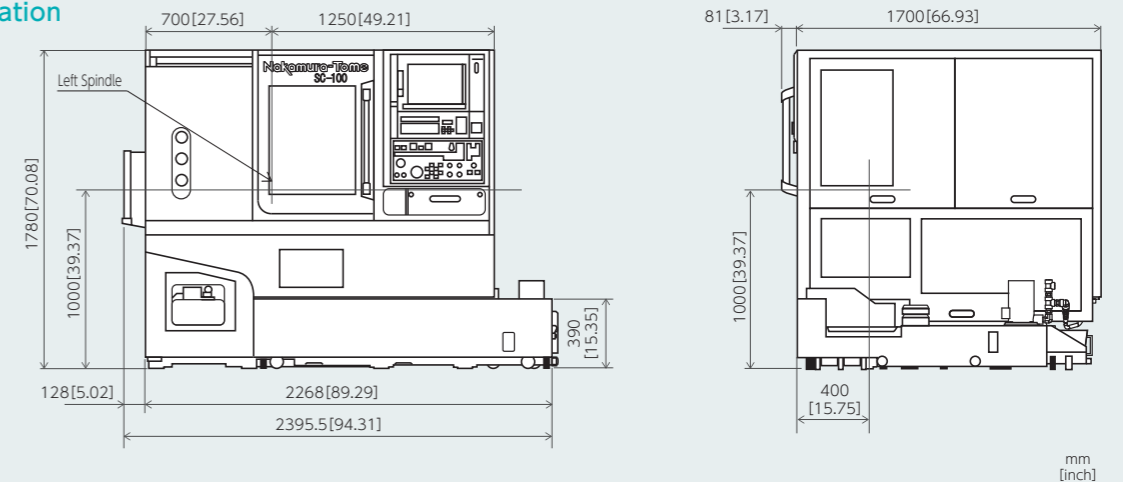


Tool Interference

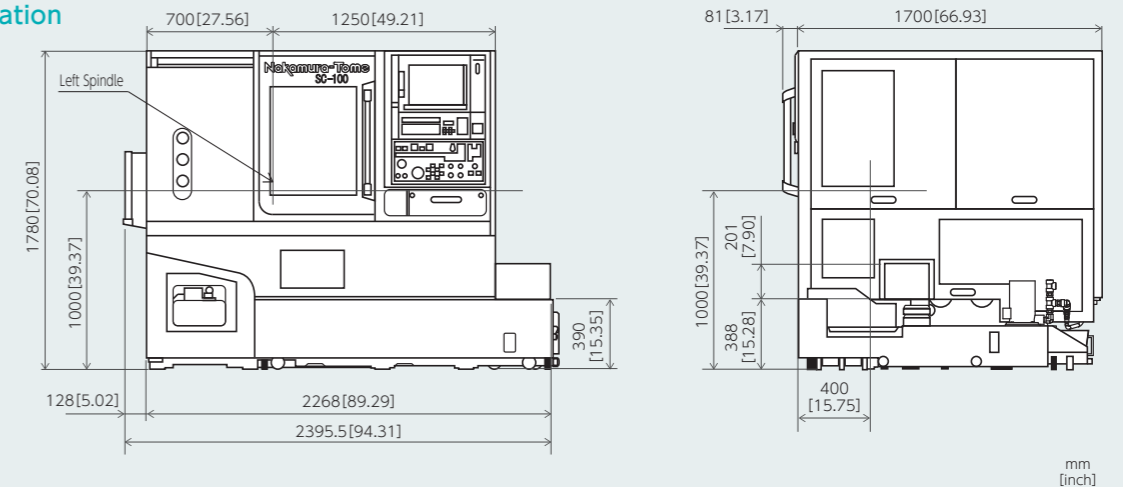


Floor Space

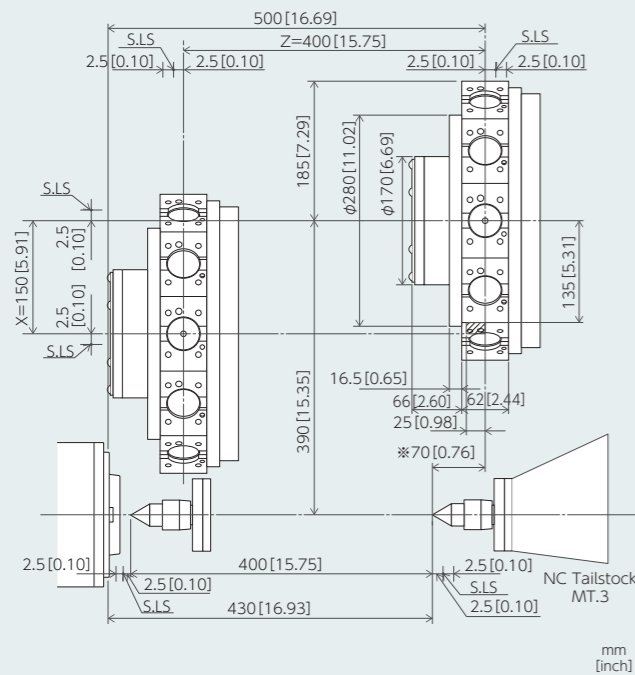
Standard specification



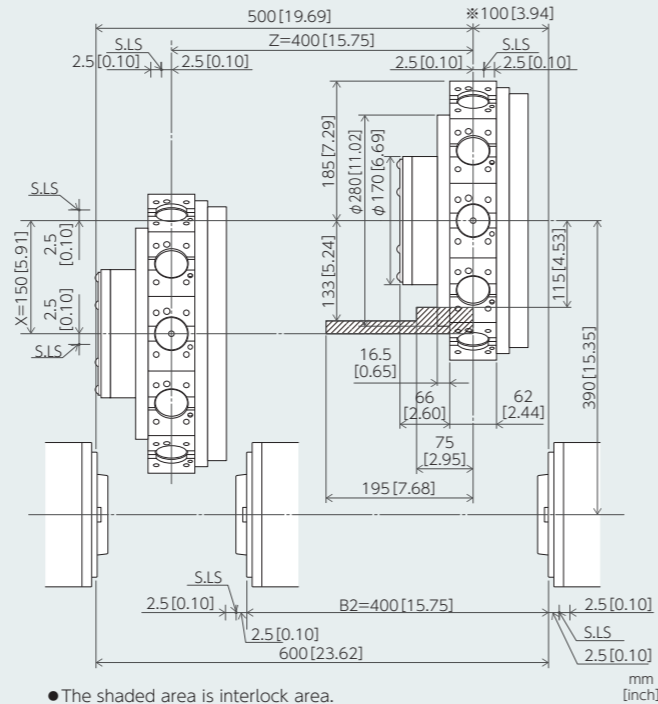
Tailstock specification



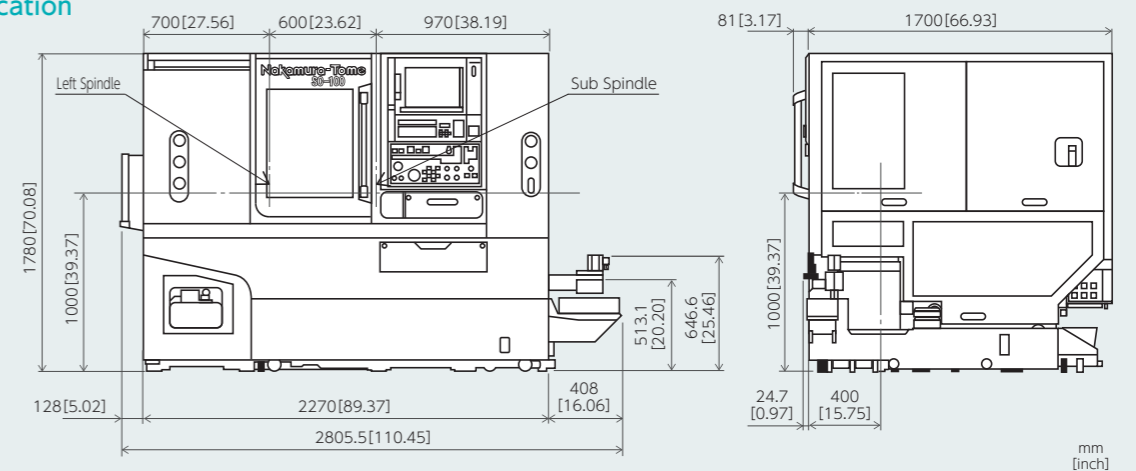
Tailstock specification



Mata-Bei specifications (Sub Spindle)



Mata-Bei specification (Sub Spindle)



- The shaded area is interlock area. Interlock area for Z-axis direction depends on the transfer of tailstock.
- Tailstock cannot approach more than 70mm; relative distance with Z-axis. (marked as ※)

- The shaded area is interlock area. Interlock area for Z-axis direction depends on the transfer of B2-axis.
- B2-axis cannot approach less than 100mm; relative distance with Z-axis. (marked as ※)

■ Capacity

Max.turning diameter	230mm	
Standard turning diameter	180mm	
Max.turning length	Standard / Sub-Spindle	400mm
	Tailstock	300mm
Bar capacity(L/R)	φ51mm / φ42mm	
Chuck size (L/R)	6" / 5"(6")	

■ Axis Travel/ Rapid Feed

Slide travel X	150mm
Slide travel Z	400mm
Slide travel Y	±40mm
Rapid feed X	20m/min
Rapid feed Z	36m/min
Rapid feed Y	6m/min

■ Main Spindle φ51mm

Spindle speed	5,000min <sup>-1</sup>
Spindle speed range	Stepless
Spindle nose	A2-5
Hole through spindle	63mm
I. D.of front bearing	90mm
Hole through draw tube	52mm

■ Sub Spindle(op.) φ42mm

Spindle speed	6,000min <sup>-1</sup>
Spindle speed range	Stepless
Spindle nose	A2-5
Hole through spindle	56mm
I. D.of front bearing	80mm
Hole through draw tube	43mm

■ C axis

Least input increment	0.001°
Least command increment	0.001°
Rapid index speed	600min <sup>-1</sup>
Cutting feed rate	1 ~ 4,800° /min
C-axis clamp	Disk clamp
C-axis connecting time	1.5sec.

■ Turret

Type of turret head	Dodecagonal drum turret
Number of tool stations	12 (max.24)
Number of indexing positions	24
Tool size (square shank)	□20mm (12st) / □16mm (24st)
Tool size (round shank)	φ25mm

■ Driven Tools

Driven system	Individual rotation
Speed	6,000min <sup>-1</sup>
Speed range	Stepless
Number of driven-tool stations	12
Holder type and Tool size	Straight holder φ1mm ~ φ14mm
	Cross Holder φ1mm ~ φ14mm

■ Drive motor power

L - spindle	11/7.5kW
R - spindle	7.5/5.5kW
Milling Spindle	7.1/2.2kW

■ General

Height	1,780mm	
Floor space (L × W)	Standard	2,396mm × 1,781mm
	Right Spindle	2,806mm × 1,781mm
	Tail stock	2,396mm × 1,781mm
Machine weight	Standard	4,500kg
	Right Spindle / Tail stock	5,000kg

■ Power supply

Power supply	17.4kVA(20.2kVA) (Standard)
	22.0kVA(24.8kVA) (Sub spindle)

● Safety quality specifications

Various interlocks, such safety fences, auto extinguisher devices, and other safety related equipment may be required. These have to be selected during the configuration of the machine.

① Safety devices include electromagnetic door lock, chuck interlock, hydraulic pressure switch, air pressure switch, short circuit breaker and quill interlock. (Door interlock and chuck interlock are standard equipment.)

② In case of automation, various safety fences may be required, such as work stocker safety fences, robot safety fences, ...etc.

During the configuration of machine specifications, please discuss these requirements with the Nakamura-Tome machine sales representative.

● Precautions on the use of cutting fluids and lubricating oils

Some types of cutting fluids (coolant) are harmful to machine components, causing damages such as peeling of paint, cracking of resin, expanding of rubber, corrosion and rust build up on aluminum and copper. To avoid causing damage to the machine, never use synthetic coolants, or any coolants containing chlorine. In addition, never use coolants and lubricating oils which contain organic solvents such as butane, pentane, hexane and octane.

\* Machine warranty terms are void for any claims or damage arising from the use of inappropriate cutting fluids or lubricating oils.

■ Items

Control Type	Nakamura-Tome FANUC (0i-TF)
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■ Controlled axes

Controlled axes	4 axes : X,Z,C,Y
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■ Input command

Least input increment	0.001mm/0.0001inch (X in diameter) .0001°
Least command increment	X : 0.0005mm / Z, Y : 0.001mm / C : 0.001°
Max. programmable dimension	±999999.999mm/ ±39370.0787in, ±999999.999°
Absolute / incremental programming	X, Z, C, Y / U, W, H, V
Decimal input	Standard
Inch / Metric conversion	G20 / G21
programmable date input	G10

■ Feed function

Cutting feed	Feed mm/min 1 ~ 8000mm/min, 0.01 ~ 314inch/min X-axis, Z-axis (1 ~ 4800mm/min, 0.01 ~ 188inch/min)  Y-axis 1 ~ 6000mm/min, 0.01 ~ 236inch/min (1 ~ 4800mm/min 0.01 ~ 188inch/min)  C-axis 1 ~ 4800° /min  Feed mm/rev 0.0001 ~ 500.0000mm/rev 0.000001 ~ 9.999999inch/rev  The maximum cutting feed rate is the value in AI contour control mode. It is also on with G316 command. The values in parentheses are normal value.
	Dwell
Feed per minute/ Feed per revolution	G98 / G99
Thread cutting	G32F
Thread cutting retract	Standard
Continuous thread cutting	Standard
Variable lead threading	G34
Handle feed	Manual pulse generator 0.001/0.01/0.1mm (per pulse)
Automatic acceleration/ deceleration	Standard
linear accel. decel. after cutting feed interpolation	Standard
Rapid feed override	F0/25/50/100% (NT setting display 0 ~ 100%, 10% per step)
Cutting feed rate override	0 ~ 150% (each 10%)
AI Contouring control I	G5.1
spindle override	50%~ 120% Set every 10%

■ Program memory

Part program storage length	512Kbyte (Total 1280m / Standard) 1Mbyte (Total 2560m / Sub spindle) 2Mbyte (Total 5120m / op.)
Parts program editing	delete, insert, change
Program number search	Standard
Sequence number search	Standard
Address search	Standard
Number of registerable programs (Part program storage length / Standard or Sub spindle)	400(512Kbyte / Standard), 800(1Mbyte / Sub spindle) 400 (2Mbyte / Standard)(op.) 800 (2Mbyte / Sub spindle)(op.) 1000 (512Kbyte, 2Mbyte / Standard)(op.) 1000 (1Mbyte, 2Mbyte / Sub spindle)(op.)
Program storage memory	Backed up by battery
Multiple program simultaneous editing	Standard
DNC operation through memory card	Standard (not including memory card)
Extended parts program editing	Standard

■ Operation and display

Display	15inch color LCD
Keyboard	QWERTY keyboard

■ Programming assist function

Circular interpolation R programming	Standard
Direct drawing dimension programming or Chamfering/Corner R	Standard (switched by setting parameter)
Canned cycle	G90, G92, G94
Multiple repetitive canned cycle	G70 ~ G76
Multiple repetitive canned cycle II	G71,G72
Canned cycle for drilling	G80 ~ G89
Sub program	Standard
Custom macro	Standard (#100 ~ #149, #500 ~ #549)
Addition to custom macro common variables	Standard (After addition #100 ~ #199, #500 ~ #999)
FS10/11 tape format	Standard
Luck-bei II / NT Manual Guide i	Option
Abnormal load detection function	Standard
NT Work navigator	Standard (not including contact bar)
NT NURSE	Standard

■ Mechanical support

Rigid tap	Standard
Spindle orientation	Standard (any angle is available within 360° ,Control unit: 0.088°)
Driven-Tool rigid tapping	Standard
Polygon function	Standard

■ ECO function

Servo motor off	Standard (selected on energy saving setting screen)
Control of motor output during acceleration and deceleration	Standard (selected on energy saving setting screen)
G code for servo motor energy-saving acceleration and deceleration	G356/G357
Fan motor stop	Standard(Fan motor on/off is controlled by detecting temperature of spindle motor )
Auto machine-light off	Standard(selected on energy saving setting display)
Auto monitor off	Standard(selected on energy saving setting display)



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\* This catalog was published in September 2019. Specifications, illustrations and data given herein are subject to change without notice.

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