

WT-100

NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

WT-100 ——— TOP BRAND **Top Leader**

One Hit Machining

Suitable for Minimum Production

of Multitasking Machine







High productivity

Top leader of one-hit machining

No work in process

One-hit machining

Less set up time

WT-100

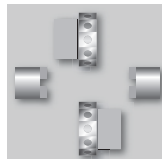
Multi-tasking compact machine



featuring state of the art capabilities

19"
Color LCD
Touch Panel

NT
IPS



T_{x2}
Double turret

M_{x2}
Double Milling Motor

Y
Y-axis

S_{x2}
Twin-Spindle

C_{x2}
C-axes

Capacity

Max. turning diameter / Max. turning length	190mm / 503mm
Distance between spindles	max. 735mm / min. 210mm
Bar capacity	42mm
Chuck size	6" 165mm

Axis travel

Slide travel (X1 / X2)	135 / 135mm
Slide travel (Z1 / Z2 / B)	503 / 503 / 525mm
Slide travel (Y) upper turret	±31mm

Spindle L, R

spindle speed (max.)	6000min ⁻¹
L spindle motor	11/7.5kW 75.4/38.6N·m
R spindle motor	11/7.5kW 75.4/38.6N·m

Upper turret

Number of turrets	1
Driven-tool speed	6000min ⁻¹
Driven-tool motor	7.1/2.2kW 16/8N·m
Type of turret / Number of indexing pos.	Dodecagonal / 24
Drive type / Number of driven-tool stations	Individual rotation / 12

Lower turret

Number of turret	1
Driven-tool speed	6000min ⁻¹
Driven-tool motor	7.1/2.2kW 16/8N·m
Type of turret / Number of indexing pos.	Dodecagonal / 24
Drive type / Number of driven-tool stations	Individual rotation / 12

General

Floor space	2,300mm × 1,620mm × 1,940mm
Machine Weight	5,650kg

WT-100

24
stations
High-rigidity turret

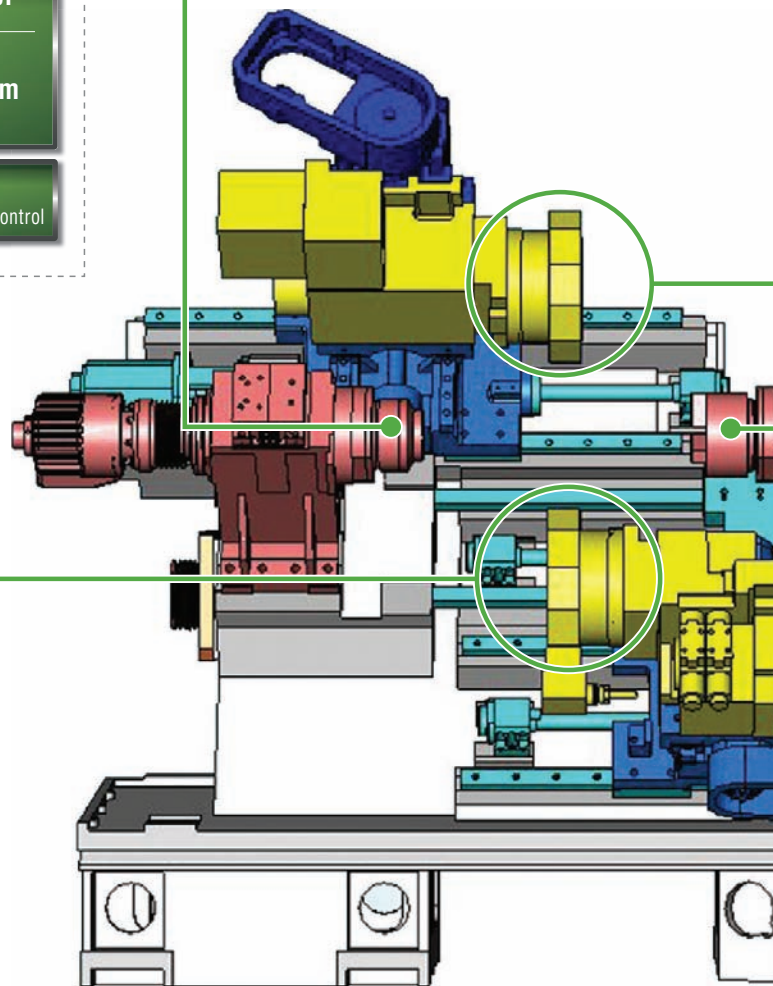
Upper turret



Lower turret



Left Spindle



Lower turret

Dodecagonal / 24-station

- ◆ Number of milling stations : 12
- ◆ Servo-driven turret

Milling

7.1 / 2.2kW
16 / 8N·m
6000min⁻¹

Standard

Stable Accuracy Ensured

Dodecagonal / 24-station

- ◆ Number of milling stations : 12
- ◆ Servo-driven turret

Upper turret

Milling

7.1 / 2.2kW
16 / 8N·m
6000min⁻¹

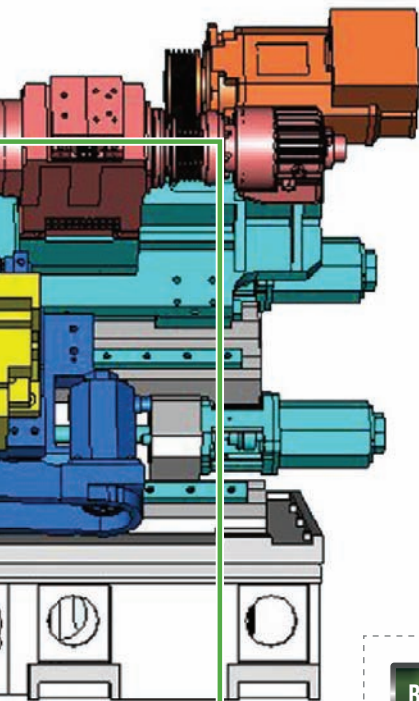
Y-axis stroke ±31mm

Standard

Parts catcher G

Option

Method		Swing / Hand
Workpiece size	Diameter [Dia.mm]	φ 12 - 42
	Length [mm]	15 - 150
	Weight [kg]	1.5
Cycle time [sec.]		6.1
Ejecting method		Belt conveyor & Chute



Right spindle

Bar capacity φ 42mm

Spindle motor

11 / 7.5kW
75.4 / 38.6N·m
6000min⁻¹

C-axis

C-axis synchronization control

Standard

Larger window ensures better visibility



Reliable Covers

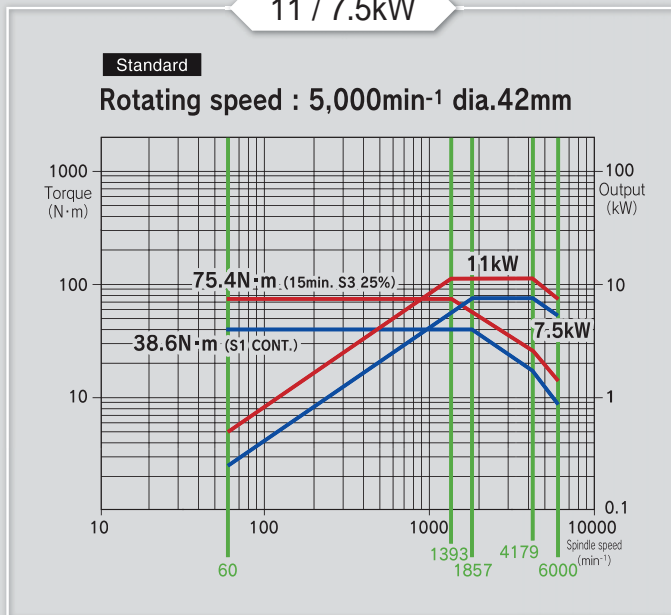
All moving units including the upper slide, lower slide and B-Axis unit, are equipped with top class stainless-steel covers and protective wipers, preventing cutting chip accumulation, and providing cover against cutting chips and coolant. The whole machining area is leakage-proof thanks to fully protective covering.

Machine Paint : Environment-friendly non-toxic high quality powder coating.



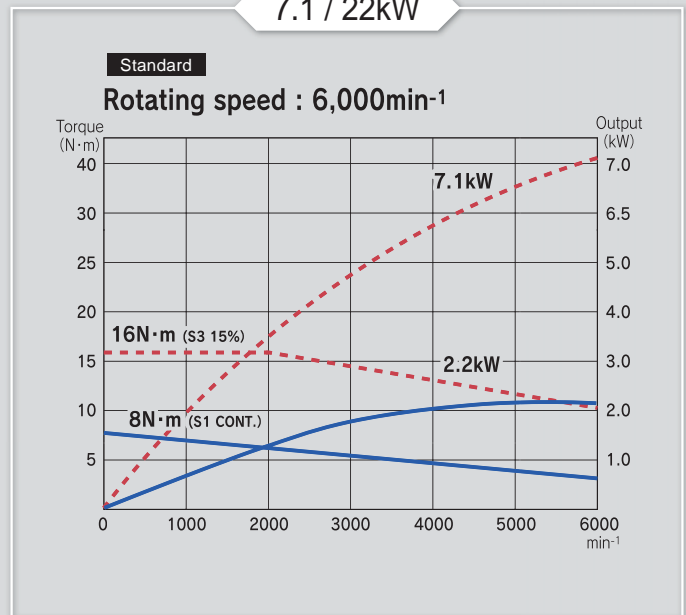
L/R Spindle motors

11 / 7.5kW



Driven-tool motor

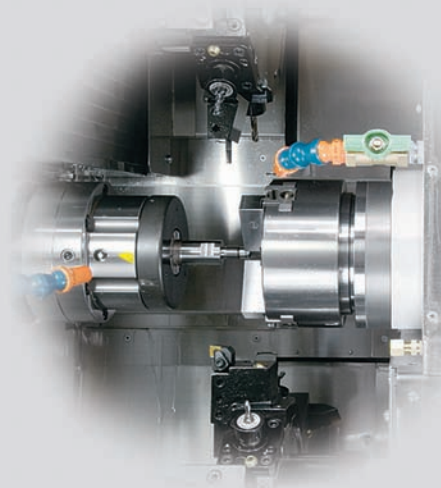
7.1 / 22kW



The left and right hand side spindles feature 11/ 7.5 kW, with a maximum 75 N·m high-output motors. This means that a round part with Dia. 48 mm × Length 110 mm can be reduced into cutting chips within 26 Seconds, or 2.3 parts can be turned per minute.

Part size	Dia. 48 × 110 mm
Metal volume	199ml / Part
Material	S45C (JIS)
Cutting depth	4mm
Feed rate	0.6mm/rev
Cutting Speed	250m/min

Shaft work clamped with both chucks, can be turned with synchronized spindles, with up to 22/15KW cutting power.

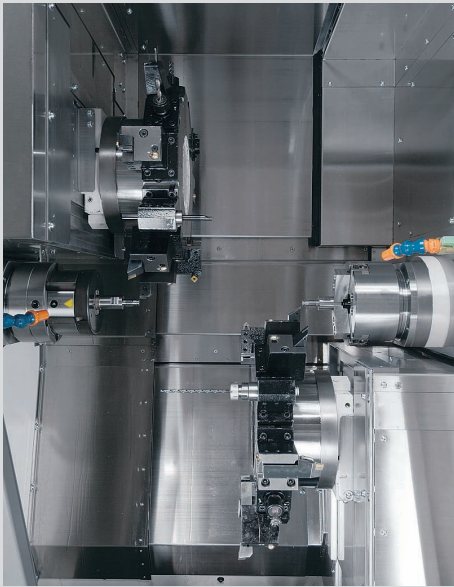


Milling

Faster Cycle Time
From diversified small-lot production to mass production

Flexibility

Whether it is shaft work, bar work, or chuck work, the most suitable machining for various types of materials can be done in one-chucking.
Get maximum productivity from a machine requiring a compact space



Upper-Left / Lower-Right



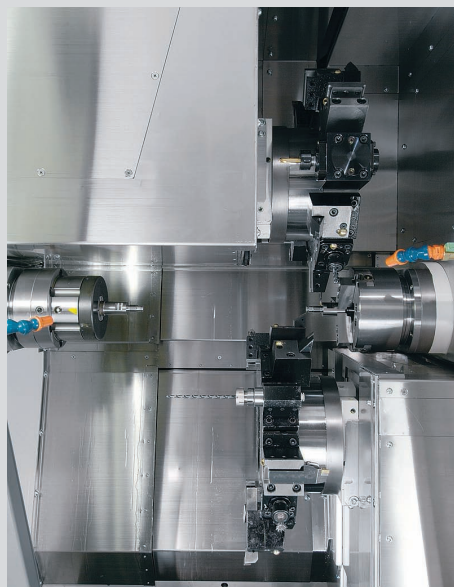
Transfer



Upper-Right / Lower-Left



Left hand side 4-axis turning



Right hand side 4-axis turning



Milling

Largest Display : 19" Touch Panel

NT NURSE

LUCK-BEI II

AIRBAG

NT Work Navigator

NT Collision Guard

Manual Handle Retrace

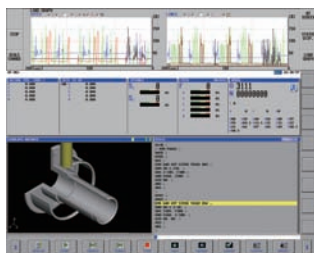
(option)

19" Color LCD Monitor

With the user in mind, a large high-resolution (19" SXGA 1280x1024) color LCD is introduced. Nakamura-Tome's original screens are featured on a large CNC display unit. Switch between machine status screen and load graph screen by pressing a single button, or return to the previous NT screen by simply pressing the NT screen button.



STATUS DISPLAY



LOAD GRAPH

Open CNC

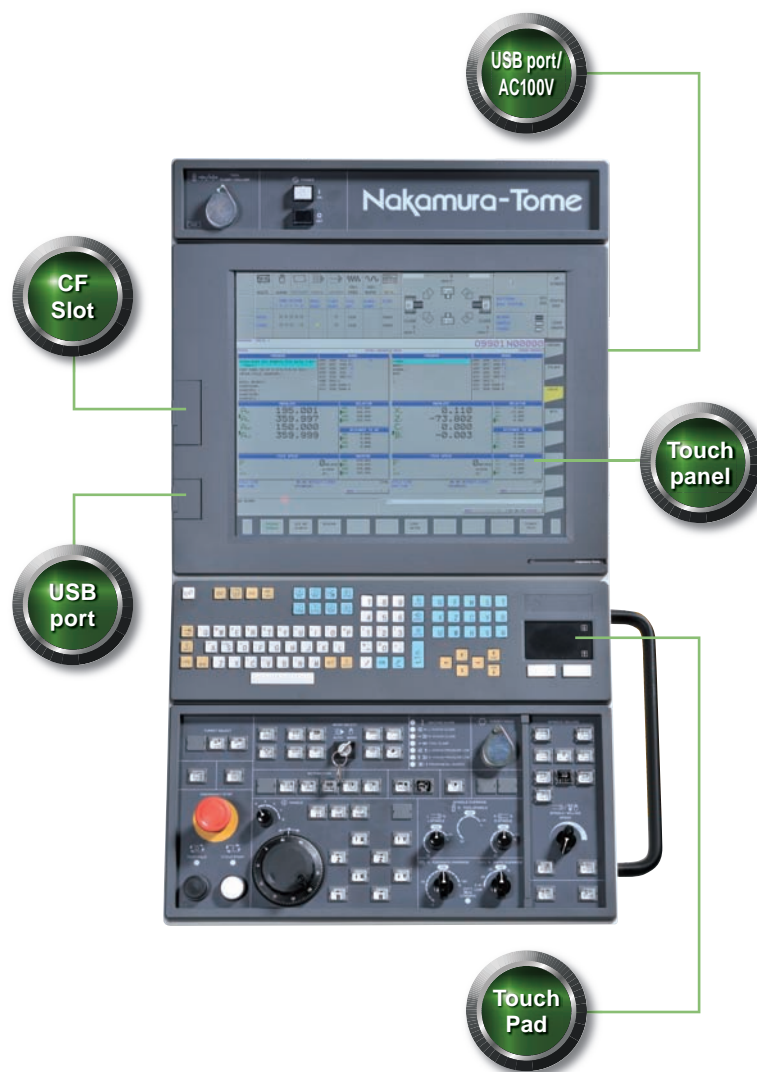
Several original screens developed by Nakamura-Tome, such as Tool Setting Screen and Work-piece Status Screen, are featured on this machine to ensure ease of set up and ease of operation with loading / unloading devices.



CNC SCREEN



PROGRAM CHECK



Program storage length	320mm + 320mm	640mm + 640mm	1280mm + 1280mm	2560mm + 2560mm	5120mm + 5120mm	10240mm + 10240mm
Program registered number	250 + 250	500 + 500	500 + 500 or 1000 + 1000	500 + 500 or 2000 + 2000		
Tool offset pairs	99+ 99					

Standard Option

Evolution of User Interface for Improved Support

NT-IPS

Full operator support for more ease of use and reliability

Illuminated Switches

LED light switches are introduced on the operation panel.

When machine power is on, a backlight makes it possible to see the switch even in a dark condition. When pressed, the switch is fully illuminated. When the spindle, tool spindle or feed override rotary switches are set to 100%, the lit LED switches enable the operator to see the override condition from a distance.



NT-Original screen

Setting and operation integrated in one screen

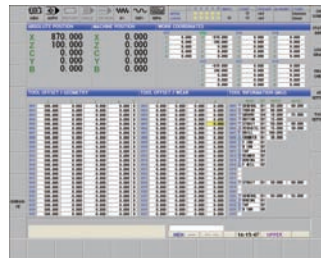
Switches on the control panel, NT-setting screen commands and other buttons were all put together in one screen. All setting operations can be done from within one screen, which is displayed by pushing one button, ensuring easy operation.



NT SETTING

All required information displayed on one screen

Set up can be easily performed without changing screens. Graphic displays of working-area units, such as chucks, parts, tool spindle, ...etc, are great visual aids to ensure ease of understanding.



TOOL SETTING

Coolant setting screen

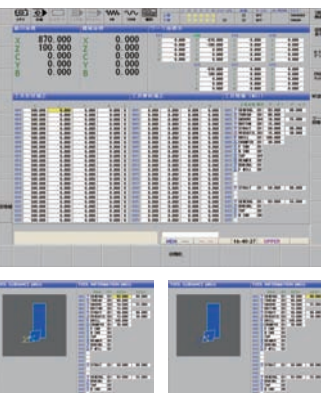
Coolant setting screen pops up by pushing one button on the control panel. Easy to see! Easy to use!



TOOL INFORMATION

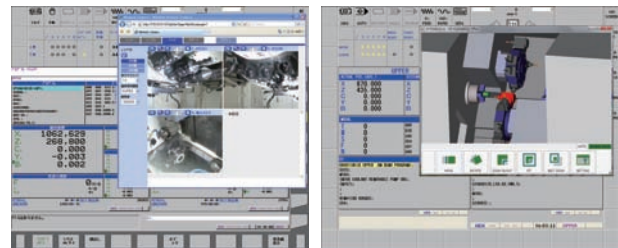
Coordinate and tool setting integrated in one Screen

Geometry & wear offsets, work coordinates and Manual Guide i tool information are all put together in one screen. Easy to see! Easy to use!



Pop up display

By pressing the AUX key, registered screens subsequently pop up, showing machine conditions on several screens. Thanks to the NTIPS large screen, it became possible to look at the NC program while watching 3D interference check, or to look at the CNC coordinates while watching the machining area through a video camera, ... etc. Easy to see! Easy to understand! Easy to use!



Monitoring System (op.)

It is possible to mount an external CCD camera inside the machine. Using the screen controller, the video camera can be panned, tilted or zoomed. Additionally, it is possible to pre-register up to 6 camera positions, which can be quickly recalled later by simply pressing the "AUX" key. Full screen display is also available by pressing the provided "□" button, similar to several Windows applications.



NT Manual Guide i

LUCK-BEII

Featuring new functions!

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.

New

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.



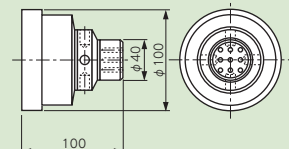
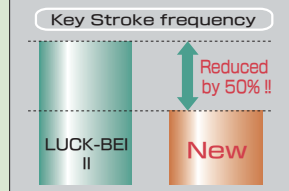
By selecting the material, cutting conditions are automatically input.



By setting the surface roughness, machining conditions are automatically input



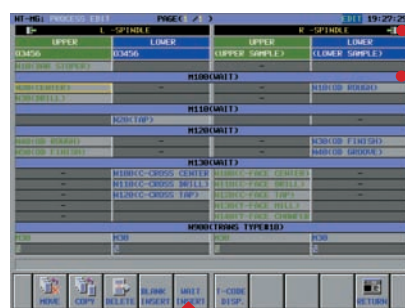
Cutting conditions. End mill



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

Process Editing

A function that automatically recognizes and extracts the name and order of all machining processes, then displays them in table layout. Machining processes can be moved, copied or swapped easily. In addition, waiting M-codes can be added with the click of a button.



- Separate display based on spindle selection or turret selection.
- Displayed in a clear layout according to waiting functions
- Program Display

Waiting function is easily input with the push of a button

Fixed Forms

Generous fixed forms with over 600 patterns (10 times more than before) are standard.

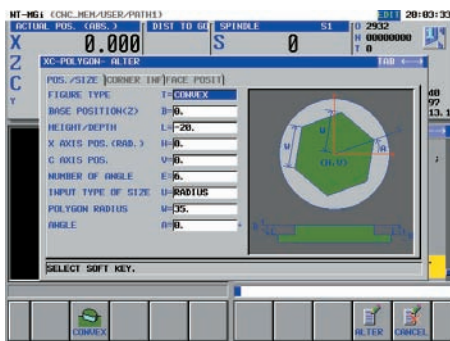
Fixed forms are easily selected from a menu.

Additional custom made programs can be registered.

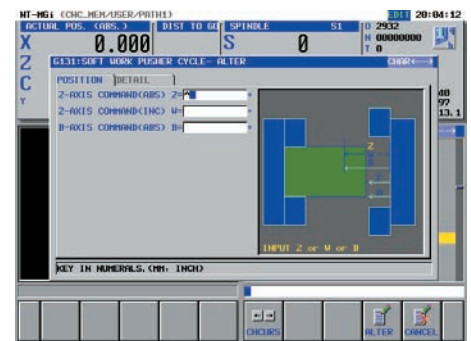


Machining Cycle (conversational) Function

In addition to Nakamura-Tome's original NT Work Navigator, which is essential for multitasking, "soft quill pusher" and other NT-Nurse functions can be programmed easily.



Work navigator programming screen



Soft work pusher programming screen

Advanced NT Nurse

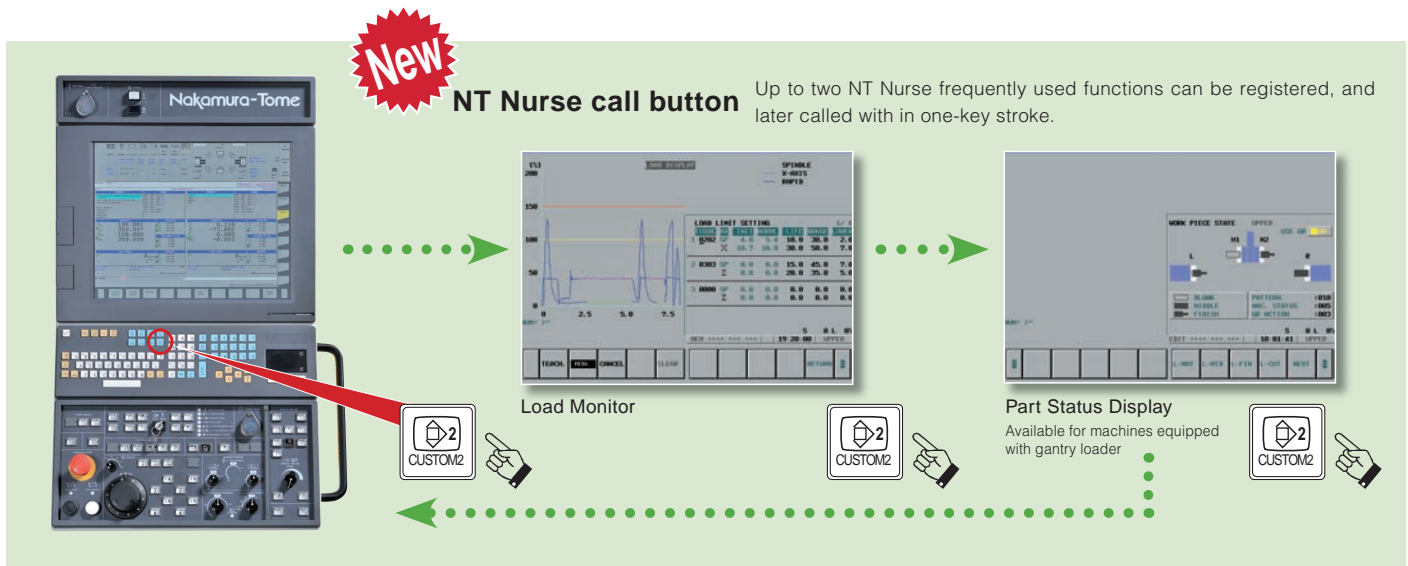
–Generous User-friendly Support System–

NT NURSE

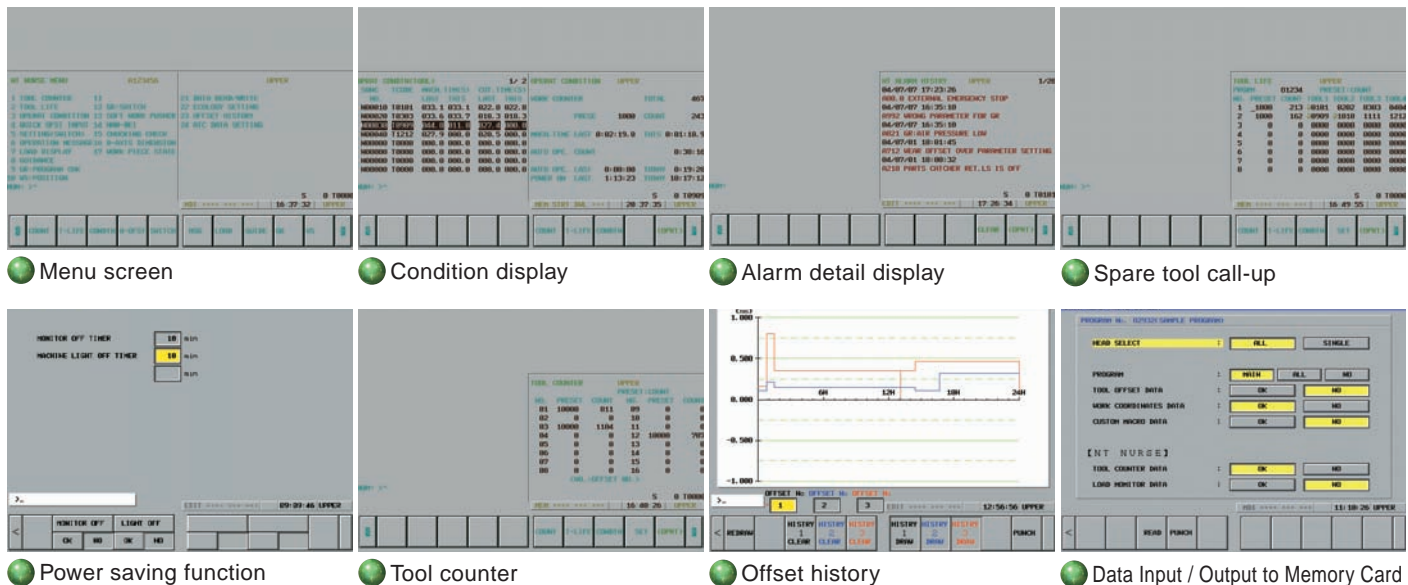
Full operator support for more ease of use and reliability

For Increased Productivity!

"NT Nurse" which is standard on all machines, has a new function called "Screen registration". NT Nurse Functions that are frequently used can be registered, and later called up with one-key stroke. More than 34 NT Nurse functions are available to support improving your productivity.



These are only a few of the available 20 NT Nurse user support functions.



In case of 19-inch screen, Auto Monitor-off function is not available.
Power saving function for PC can be used.

Program data, tool offsets, coordinate offsets, NT-Nurse data and all other part related-data, can be easily transferred to one single folder on the memory card with one single stroke, making machining data for one single part easy to manage and to recall. A memory card is required for data input/output.

- TOOL COUNTER
- TOOL LIFE (Spare tool call-up)
- OPERATION CONDITION
- QUICK OFFSET INPUT
- SETTING (SWITCH)
- OPERATION MESSAGE
- LOAD DISPLAY
- GUIDANCE
- GR : LOADER PROGRAM CHECK
- WS : WORK STOCKER POSITION
- GR : SETTING
- SOFT WORK PUSHER
- HAN-BEI (IN PROCESS MEASUREMENT)
- CHUCKING CHECK
- B-AXIS DIMENTION SETTING
- WORK-PIECE MACHINING STATUS
- DATA READ/WRITE
- POWER-SAVE SETTING
- OFFSET HISTORY
- ATC DATA SETTING

Dual safety

NT Collision
Guard



Airbag

Double safety features

NT Collision Guard

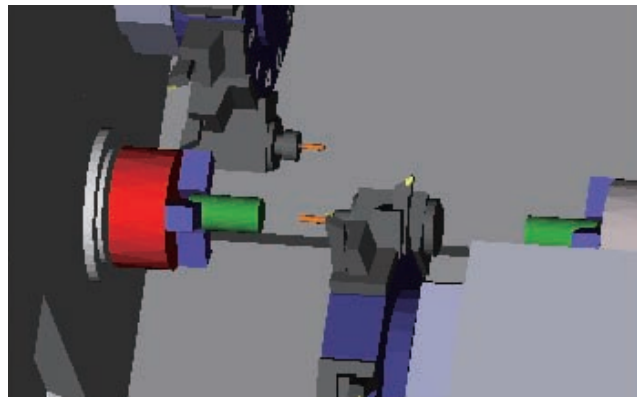
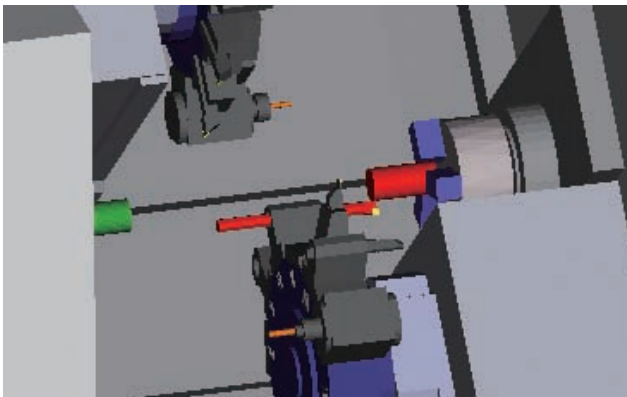
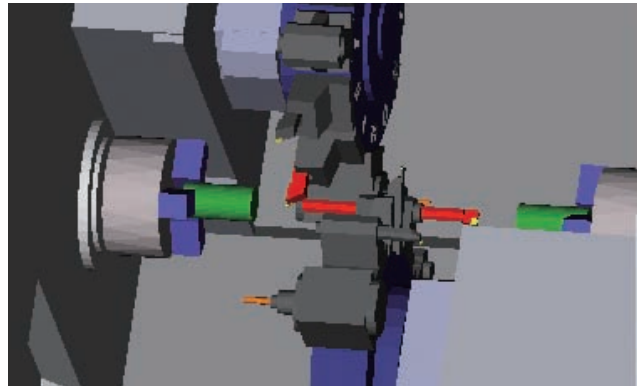
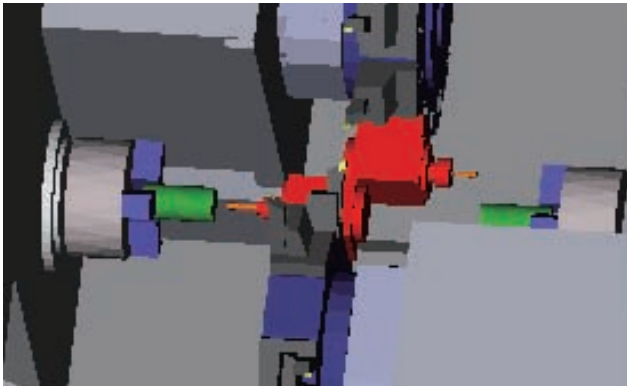
ACTIVE
SAFETY



NT Collision Guard to avoid machine collision before machining and Air bag function (Abnormal load detection) to minimize damage even in case of collision during actual machining.

**Preventive safety technology –
Machine collisions are avoidable!**

If interference is detected, the machine stops with the affected area highlighted in red on the CNC display.



**Jig less!
Set-up less!
Skill less!**

This essential function for multitasking machines is standard.

Safety Technology.

"Program and setup is difficult...." "If the machine stops during the process...." "Costly jigs and fixtures for Complex parts...." You may have similar production concerns. Having the NT Nurse system, NT Work Navigator and Overload detection, reduces manufacturing headaches and provides precious production support.

NT Work Navigator

ACTIVESAFETY



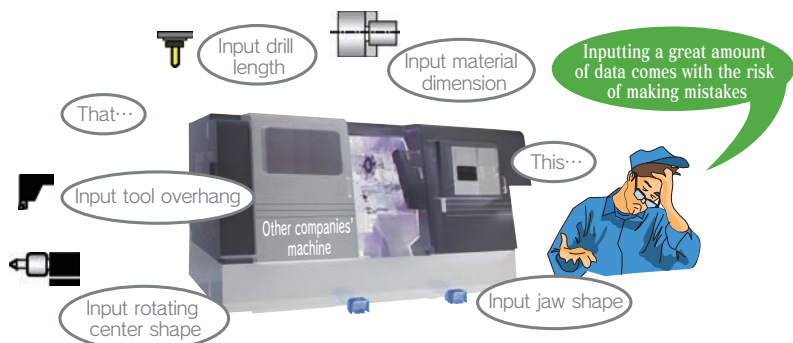
- Advanced NT Work Navigator !
- No fixtures required

for maximum machine protection

Full operator support for more ease of use and reliability

Airbag (Overload detection)

PASSIVE
SAFETY



**Even with barrier function,
machine collisions
may occur**

Soft barrier function is not perfect.
If wrong data is input, a collision will occur.

**When unavoidable human error
results in machine collision,
there is no reason to panic.**



Without Airbag

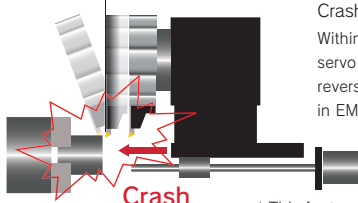
Machine will not be stop immediately.
The slide continues to move even after collision.



With Airbag

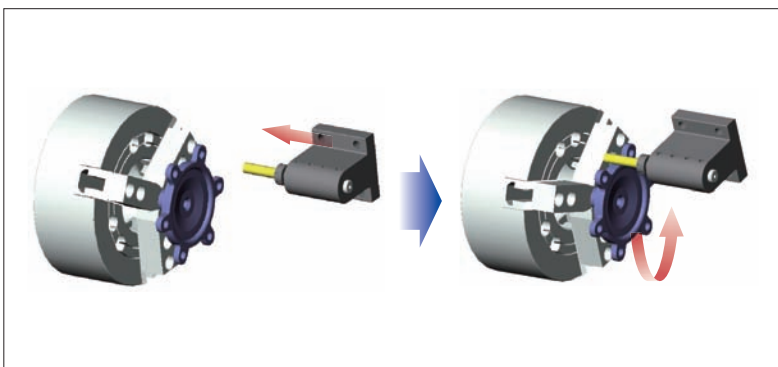
Retraction within 0.008 sec

Crash !
Within 8 milliseconds after the crash,
servo motor-feeding direction is
reversed and the machine stops
in EMG mode.



* This feature does not mean zero impact.

All Nakamura-Tome machines are equipped with a safety feature called "airbag" (overload detection), which will greatly reduce the impact force and prevent heavy damage to the machine.



● Air Cutting Mode

● Index Speed override

Machine set-up essentials

● Jump Programming (G411)

Continuous-machining essentials

● Axis Torque Limit Function (G359)

● Cut-in Check

● Program Resume Function

● Manual Handle Retrace (op.)

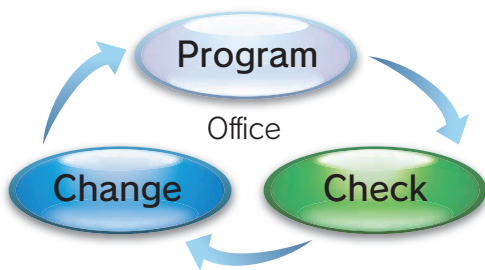
NT Multitasking Office



By integrating 3D CAD models of the machine, chucks, tools and part, with the dynamics of the real machine (parameter settings) as well as guided programming, Multitasking Office enables virtual planning and verification of the production process.

Efficient Programming for Higher productivity

Shorter set-up times

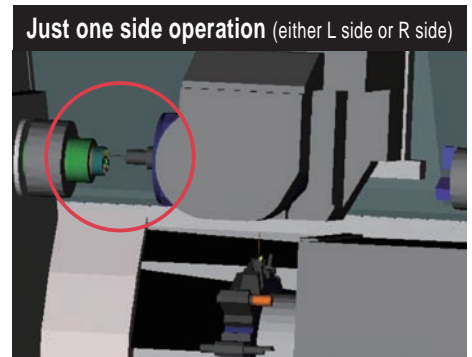
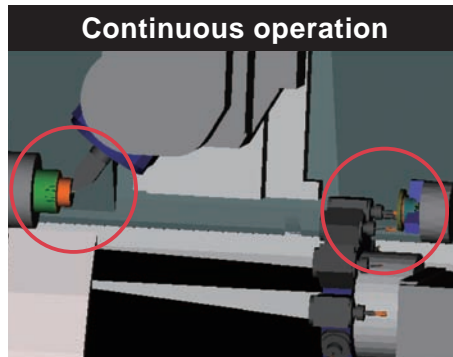
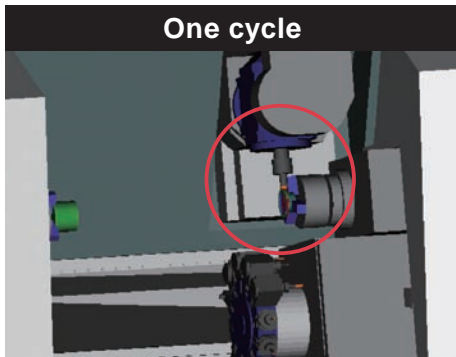


Drastically reducing set-up time leads to higher productivity

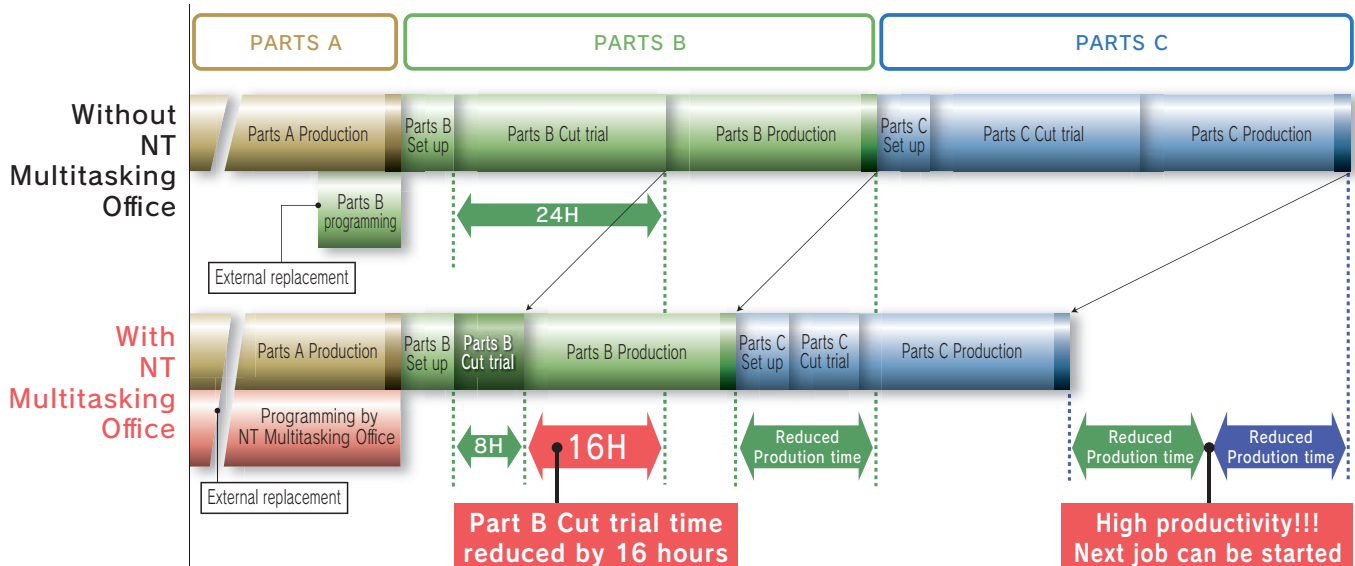
Virtual simulation of the machining processes using 3D solid models of the machine, chucks, tool holders and tools, coupled with all the features of NT-Manual guide I, contribute to not only high efficiency programming and reduced cycle times, but also prevent collisions and reduce set up time.

Features

- 1 Simulation is possible either from Manual guide program (including 4-digit G-codes), or from ISO NC program.
- 2 Simulation of Canned cycles such as G71, G83, ...etc.
- 3 Simulation of programs using Jump programming function (G411) is available as well.

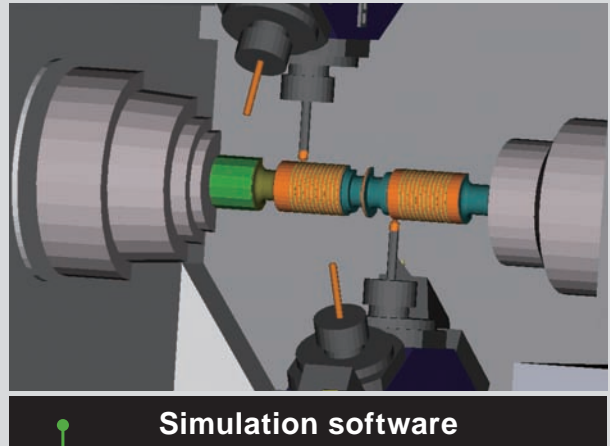
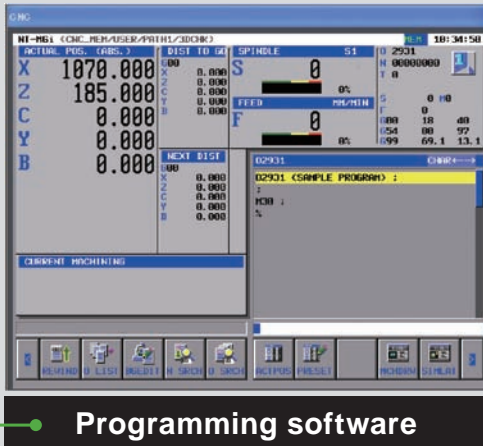


Effect of NT Multitasking Office

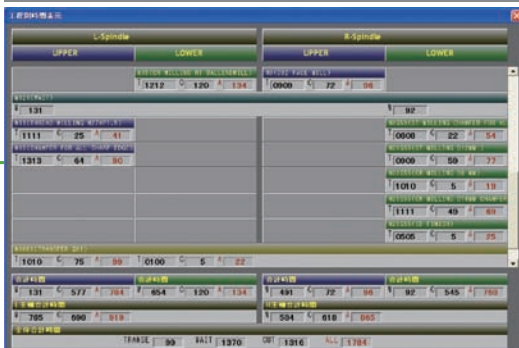


Programming and machining simulation can be done in the office.

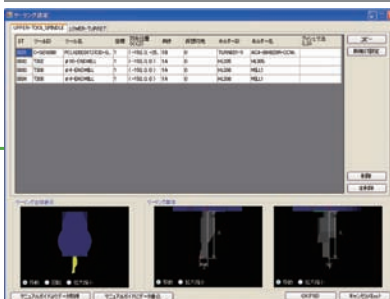
NT Multitasking Office



Process split display function



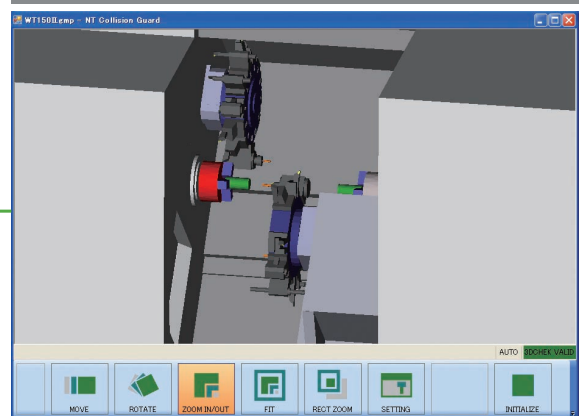
Tool setting display



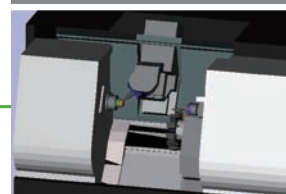
Tool data 300 kinds, all standard holders, chuck 20 kinds data are already registered, and also possible to create and register other some data at exclusive display.



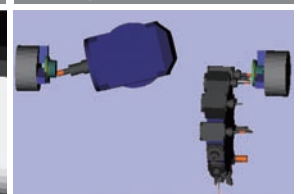
Interference check



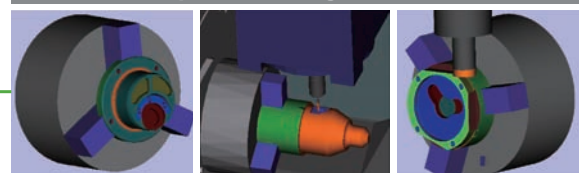
Mechanical structural simulation



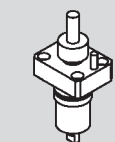
Workpiece simulation



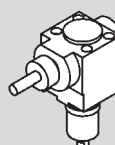
Workpiece cutting simulation



* Other PC is required when working this function.



C26330
Cross holder
(MAX. ϕ 13)



F26333
Straight holder
(MAX. ϕ 13)



Qualified tool
 $\square 20 \times 90$
 $\square 19.05 \times 90$



C21410/C21411
Turning Holder (A)
Forward



C21430/C21431
Cut-off holder
Forward



C21420/C21421
Turning Holder (A)
Reverse



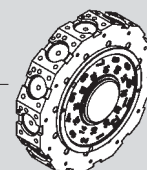
C21440/C21441
Cut-off holder
Reverse



C21416/C21417
Double turning
holder



Z8415/Z8425
Turning Holder (B)



Turret Head



Qualified tool
 $\square 20 \times 90$
 $\square 19.05 \times 90$



M2112 (ϕ 25- ϕ 12)
M2113 (ϕ 25- ϕ 10)
M2122 (ϕ 25.4- ϕ 12.7)
M2123 (ϕ 25.4- ϕ 9.525)
Reducing bush



V1115 (MT-2)
M2114 (MT-1)
V1125 (MT-2)
M2124 (MT-1)
Drill socket



M2110 (ϕ 25- ϕ 20)
M2111 (ϕ 25- ϕ 16)
M2120 (ϕ 25.4- ϕ 19.05)
M2121 (ϕ 25.4- ϕ 15.875)
Tool bush



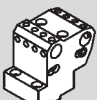
N3170 (ϕ 25)
N3180 (ϕ 25.4)
Set ring



C22410 (ϕ 25)
C22411 (ϕ 25.4)
Boring Holder



C22416 (ϕ 25)
C22417 (ϕ 25.4)
Boring Holder
Coolant through



C22412 (ϕ 25)
C22413 (ϕ 25.4)
Multi-Boring Holder



C21470 ($\square 16$, ϕ 25)
C21471 ($\square 15.875$, ϕ 25.4)
Turning Boring Holder



C21478 ($\square 16$)
C21479 ($\square 15.875$)
Double turning holder



Qualified tool
 $\square 16 \times 80$
 $\square 15.875 \times 80$



W145103



W145102

Metric
Inch

24ST

Machine Specification



Capacity

Max. turning diameter	190mm
Standard turning doameter	170mm
Distance between spindle noses	max.735mm / min.210mm
Max. turning length	503mm
Bar capacity	42mm
Chuck size	165mm (6")

Axis travel

Slide travel (X1/X2)	135mm
Slide travel (Z1/Z2)	503mm
Slide travel (Y)	±31mm (op.)
Slide travel (B)	525mm
Rapid feed X1/X2	16m/min
Rapid feed Z1/Z2	40m/min
Rapid feed B axis	40m/min
Rapid feed Y axis	6m/min

Left spindle Right spindle

Spindle speed	6000min ⁻¹
Spindle speed range	Stepless
Spindle nose	A2-5
Hole through spindle	56mm
Front bearing I.D.	80mm
Hole through draw tube	43mm

C-axis

Least input increment	0.001°
Least command increment	0.001°
Rapid index speed	600min ⁻¹
Cutting feed rate	1 - 4800°/min
C-axis clamp	Disk clamp
C-axis engage time	1.5sec.

Upper & Lower turrets

Type of turret head	Dodecagonal drum turret
Number of tool stations	12station
Number of index positions	24
Tool size (square shank)	□ 20mm
Tool size (round shank)	φ 25mm

Rotating tool

Rotary system	Individual rotation
Spindle speed	6000min ⁻¹
Spindle speed range	Stepless
Number of rotation tool station	12 × 2
Tool shank	Straight holder φ 1mm - φ 13mm Cross holder φ 1mm - φ 13mm

Drive motor

Left spindle	11/7.5kW 75.4/38.6N·m
Right spindle	11/7.5kW 75.4/38.6N·m
Driven tools	7.1/2.2kW Max16N·m

General

Machine height	1940mm
Floor space	2300mm × 1620mm
Floor space	3600mm × 1620mm *1
Machine weight	5650kg (Y-Axis Spec)

Power requirements

Power supply	52.5kVA
Air supply	150 - 200NL/min, 0.5 - 0.7MPa

*1) including right side chip conveyor

- Safety devices such as various interlocks, fences for robotics, auto loading device, work stocker, automatic fire extinguisher etc. are available as options which can be included in your purchase package. Please contact our local distributor and dealer for your specific requirements.

Precautions about the use of cutting coolant

Synthetic Coolants are Damaging to Machine Components. Concerning the use of cutting fluids, cautions have to be taken on the type of coolant being used. Among coolants available in the market, some types are damaging to machine components and should be avoided. Typical damages are turcite wear, peeling of paint, cracking and damage to plastics and polymers, expansion of rubber parts, corrosion and rust build up on aluminum and copper. To prevent such damages, coolants that are synthetic, or containing chlorine have to be avoided. Machine warranty terms do not apply to any claims or damage arising from the use of improper coolant.

Control Specification



items

Control type	FANUC 31i-B 2CPU 2-PATH
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Controlled axes

Controlled axes	7axes
Simultaneously controlled axes	3axes (X1, Z1, C) + 4axes (X2, Z2, C, B)

Input command

Least input increment	0.001mm / 0.0001inch (diameter for X-axis) 0.001 degree
Least command increment	X : 0.0005mm, Z : 0.001mm, B : 0.001mm, C : 0.001 degree
Max. programable dimension	±999999.999mm / ±39370.0787in, ±999999.999°
Absolute / Incremental programing	X, Z, C, B (absolute only for B) / U, W, H
Decimal input	Standard
Program code	EIA / ISO automatic recognition
Inch / Metric conversion	G20 / G21
Programable data input	G10

Feed function

Cutting feed	feed/min X : 1 - 4800mm/min , 0.01 - 188inch/min Z : 1 - 4800mm/min , 0.01 - 188inch/min C : 1 - 4800degree/min B : 1 - 4800mm/min , 0.01 - 188inch/min feed/rev : 0.0001 - 500.0000mm/rev, 0.000001 - 9.999999inch/rev
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Dwel	G04
Feed per minute / Feed per revolution	G98 / G99 (feed per rev. for rotating tool will be available from end of December, 2004)
Thread cutting	G32 + F (for rotating tool will be available from end of December, 2004)
Thread cutting retract	Standard
Continuous thread cutting	Standard (for rotating tool will be available from end of December, 2004)
Variable lead threading	G34 (for rotating tool will be available from end of December, 2004)
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 override	F0, 25%, 100% (changeable to every 10% by switch)
Cutting feed override	0 - 150% (each 10%)
AI contouring control I	G5.1

Programming functions

Part program storage length	320m (for each turret)
Part program editing	delete, insert, change
Program number search	Standard
Sequence number search	Standard
Address search	Standard
Number of registerable programs	250programs (for each turret)
Program storage memory	Backed up by battery
Malultiple program simultaneous editing	Standard
DNC operation through memory card	Standard (Only one turret can access memory card at a time) (not including memory card)
Extended part program editing	Available

Operation&display

Operation panel: Display	19" color LCD
: Keyboard	Separate type MDI unit (standard keys)

Programming assist function

Circular interpolation R programming	Standard
Direct drawing dimension programmingor Chamfering/Corner R	Standard (Direct drawing dimension programming is standard)
Canned cycle	G90, G92, G94
Multiple repetitive canned cycle	G70 - G76
Multiple repetitive canned cycle II	Standard
Canned cycle for drilling	G80 - G89
Axis recomposition	Standard
Sub program	Standard
Balance cut	G68, G69
Custom macro	Standard
Addition to custom macro common variables	Standard (After addition, #100 - #199, #500 - #999)
FS15 tape format	Standard
Luck-bei II	Standard
Mechanical error compensation	Standard
NT work navigator (torque type)	Standard (not including contact bar)
NT Nurse	Standard
NT Collision Guard	Standard

NT-IPS

O/S	Windows XP Embedded
Pointing device	Touch pad

NOTE) Both GR and Parts catcher G are not available on same machine.



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* This catalog was published in October, 2012. Specifications, illustrations and data given herein are subject to change without notice.

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