Kashifuji

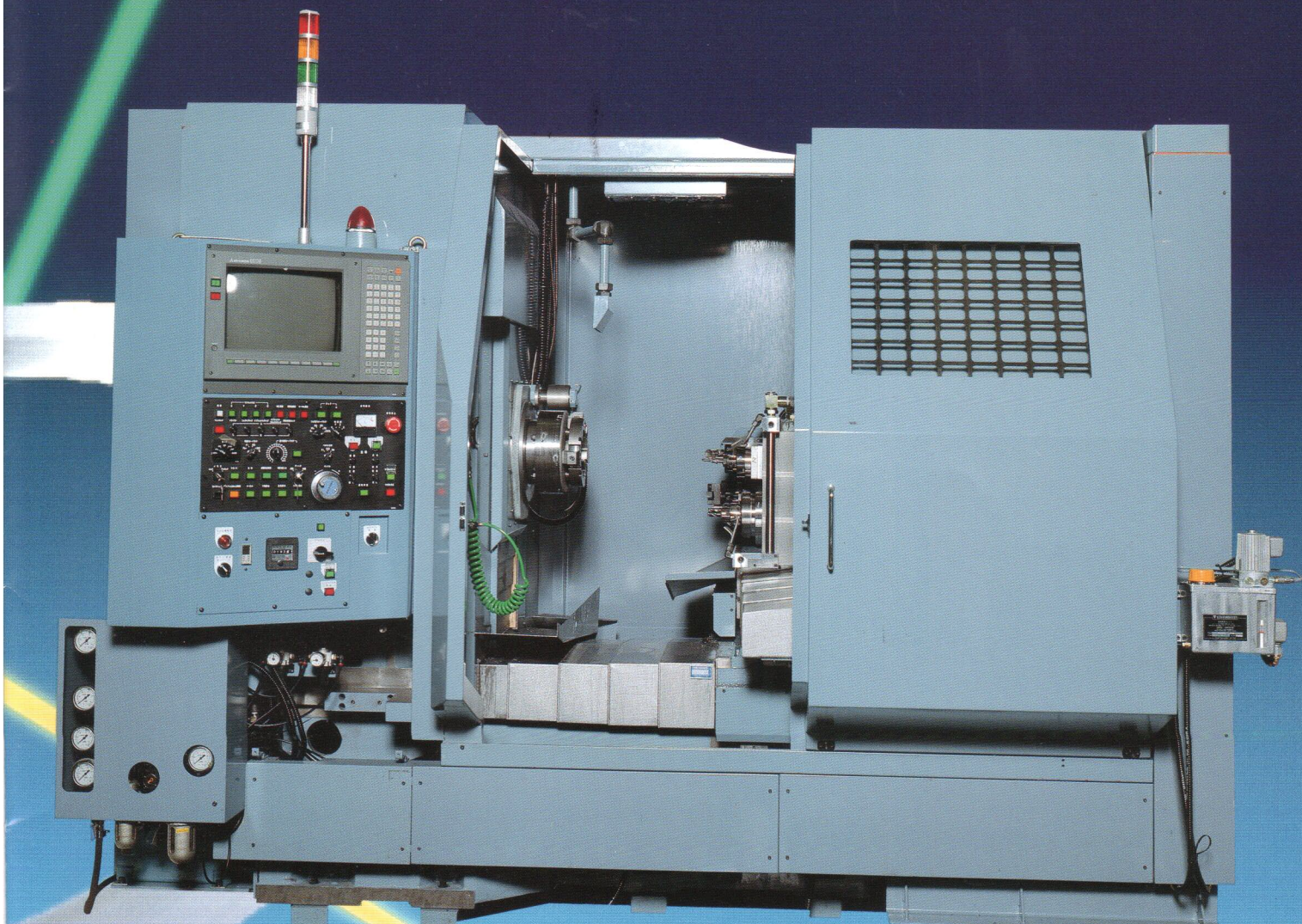
KY10
KY20

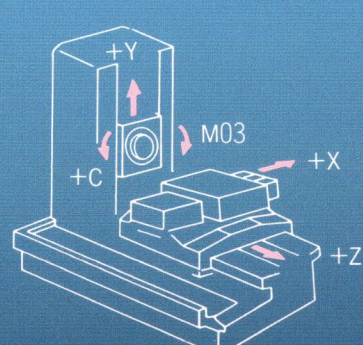
TURN-MILL MACHINE FOR SCROLL CUTTING

HIGH PRECISION TURN-MILL MACHINE FOR SCROLL CUTTING

KY10·KY20

- Y AXIS–VERTICAL FEED OF MAIN SPINDLE
- MATRIX TOOL LAYOUT–2 LAYERS OF FIXED TOOLS
- HIGH ACCURACY POSITIONING AND INDEXING
- SIMULTANEOUS 4 AXIS CONTROL





All the needed processes: MILLING, TURNING, TAPPING, BORING, GRINDING and SLOTTING for a scroll are performed in a single chucking. Error introduced by re-chucking is eliminated!

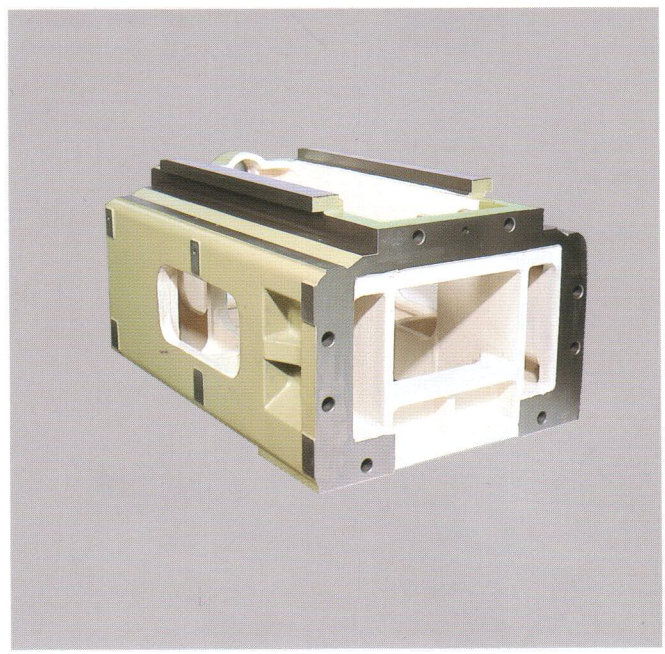
KY10

RIGID STRUCTURE

● Bed

High static and dynamic rigidity is obtained by using a double walled base casting.

● Column



The spindle head stock is symmetrical in design for high thermal stability.

● Main spindle

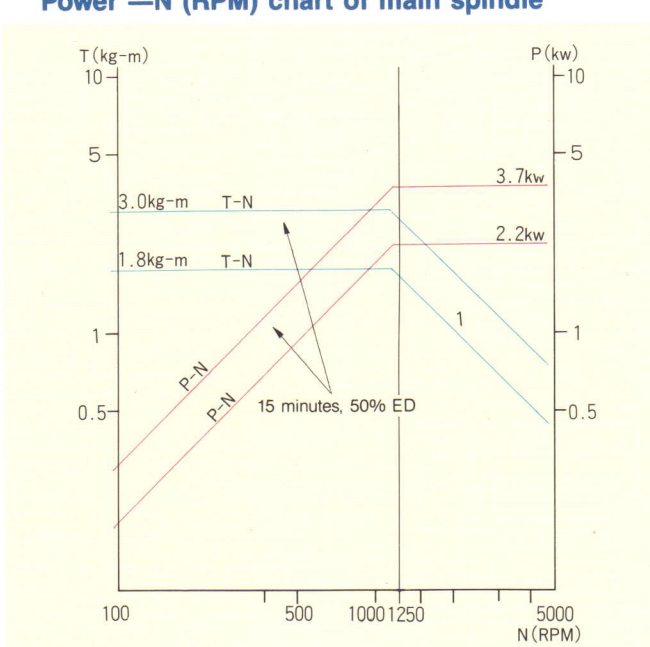
The main spindle utilizes ultra high precision angular ball and cylindrical roller bearings. Special care is taken during assembly and dynamic balancing. The C axis incorporates an optical scale to ensure index accuracy.

● Tool spindle

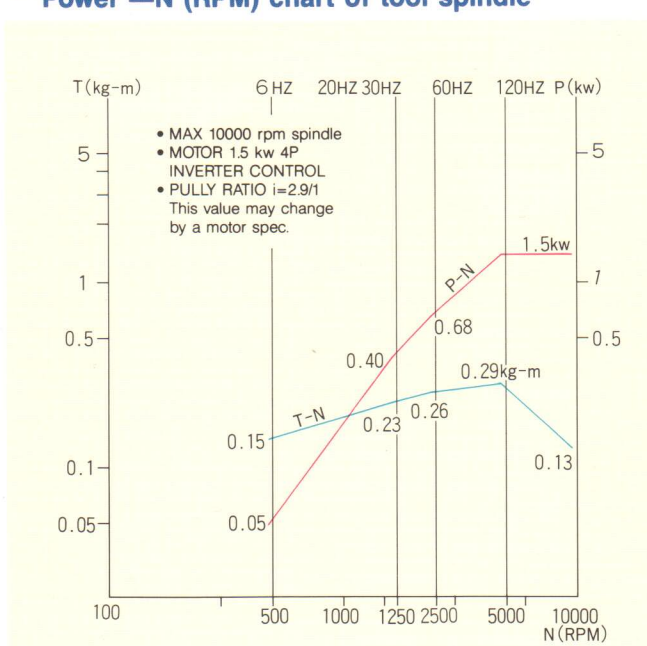
The tool spindles are mounted in high precision angular ball bearings to allow high speed machining.

KY10 PERFORMANCE

● Torque—N (RPM), Power —N (RPM) chart of main spindle



● Torque—N (RPM), Power —N (RPM) chart of tool spindle

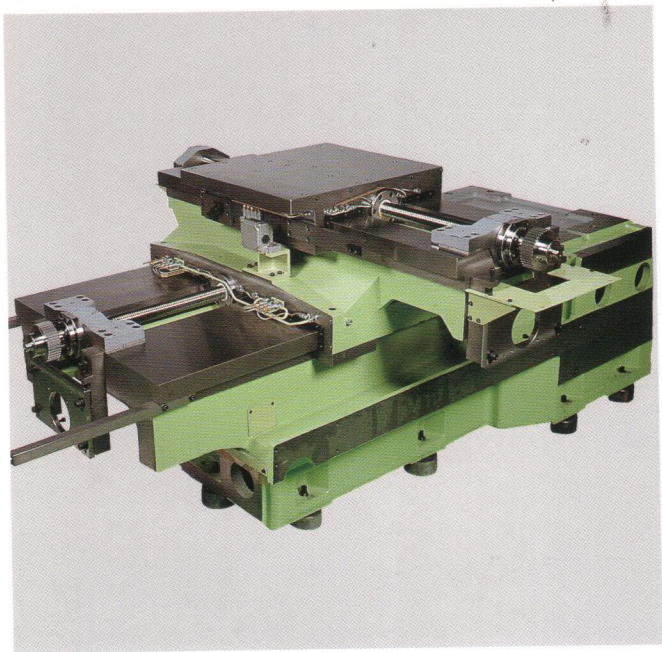


Higher tool spindle speeds are available.

KY20

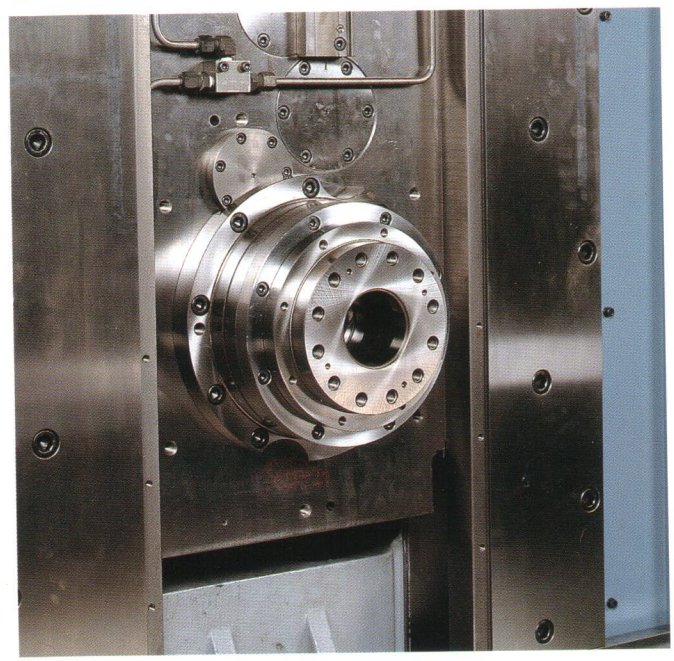
RIGID STRUCTURE

● Bed



Increased rigidity with tilted rib construction.

● Column



Our extensive expertise in hobbing machine design is put to use on the spindle head slide (Y axis).

● Main spindle

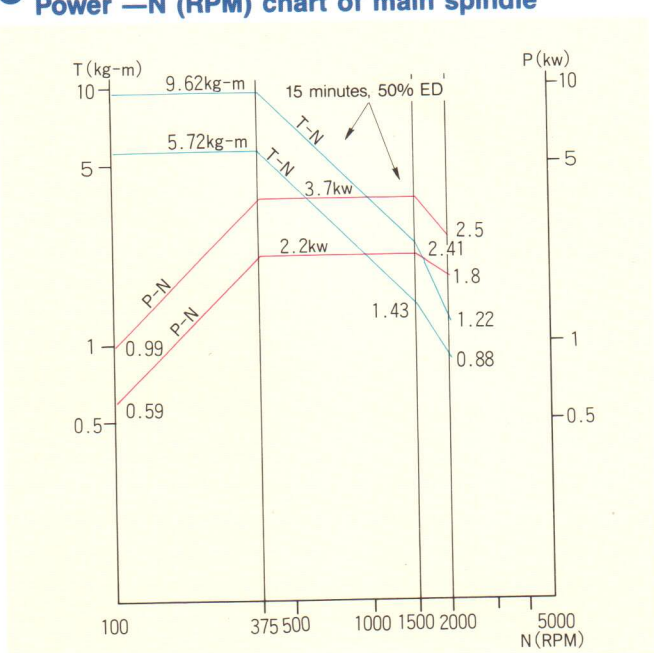
The main spindle utilizes ultra high precision angular ball and cylindrical roller bearings. Special care is taken during assembly and dynamic balancing. The C axis incorporates an optical scale to ensure index accuracy.

● Tool spindle

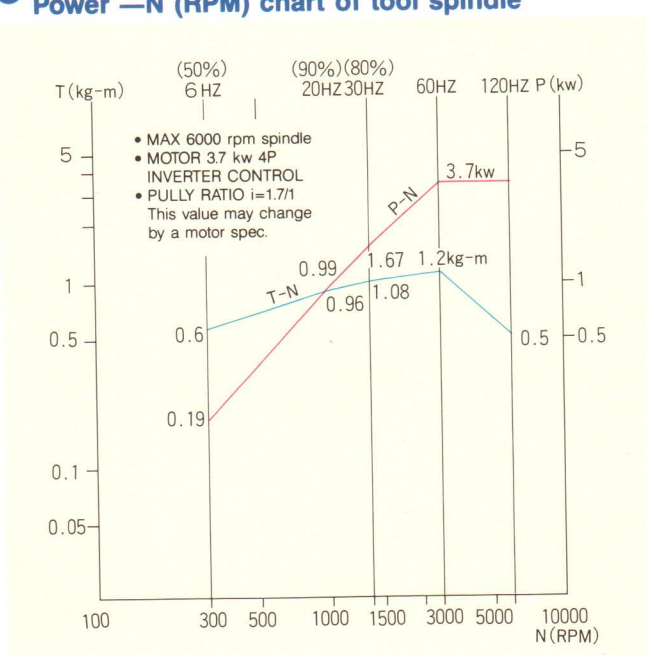
The tool spindles are mounted in high precision angular ball bearing to allow a high speed machining.

KY20 PERFORMANCE

● Torque—N (RPM), Power —N (RPM) chart of main spindle



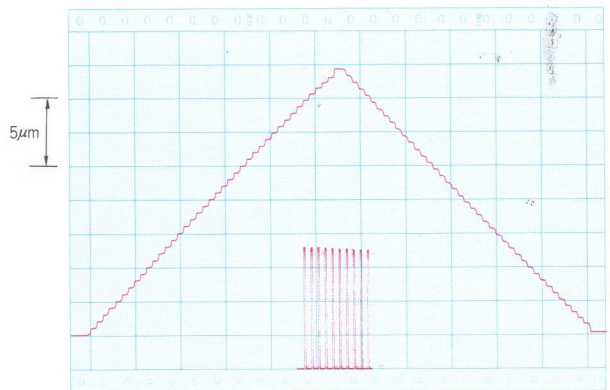
● Torque—N (RPM), Power —N (RPM) chart of tool spindle



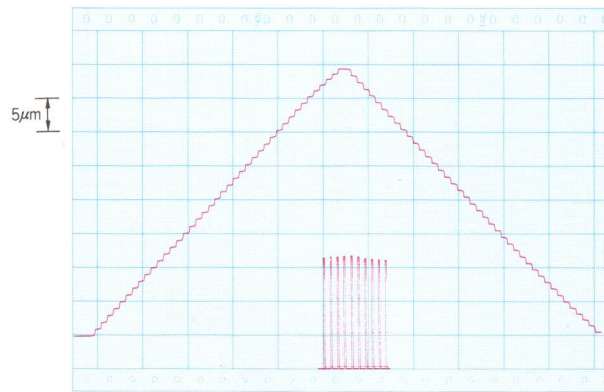
Higher tool spindle speeds are available.

PULSE RESPONSE AND REPEATABILITY OF X, Y, Z & C

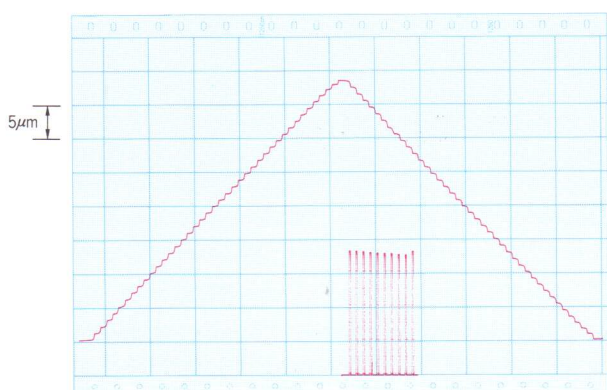
X axis
Pulse response and repeatability over 40 pulses, 0.5μm per pulse.



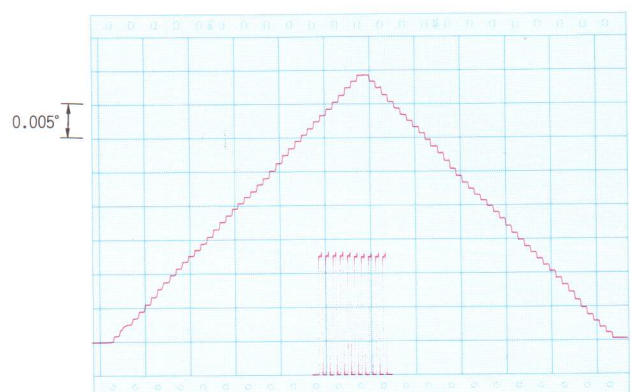
Z axis
Pulse response and repeatability over 40 pulses, 1μm per pulse.



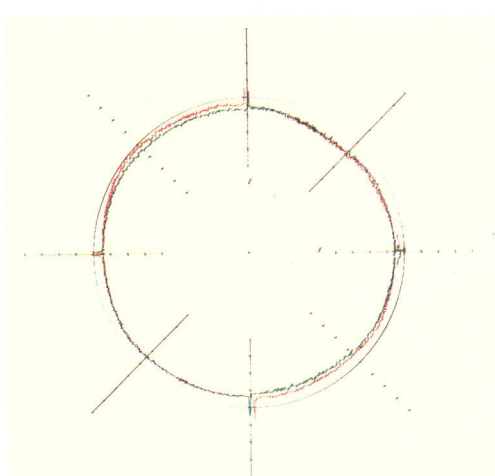
Y axis
Pulse response and repeatability over 40 pulses, 1μm per pulse.



C axis
Pulse response and repeatability over 40 pulses, 0.001° per pulse.



Circular Motion Generated by Z and X axis
(measured by Double Ball Bar Method)

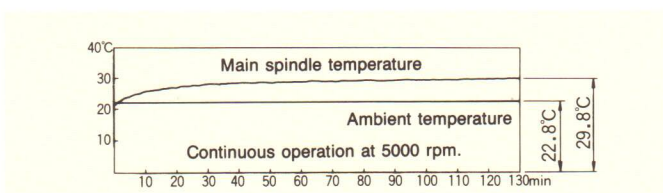


ky20zx2
F= 503
R= 150
x 2000
CW
DR= 0
〔 0. 0〕

ky20zx3
F= 503
R= 150
x 2000
CCW
DR= 0
〔 0. 0〕

(optional closed loop is used in Z & X axis)

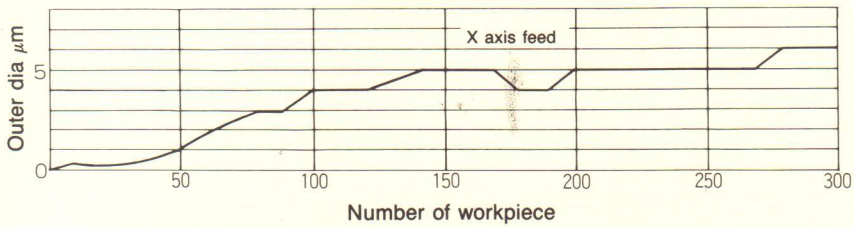
THERMAL VARIATION IN MAIN SPINDLE

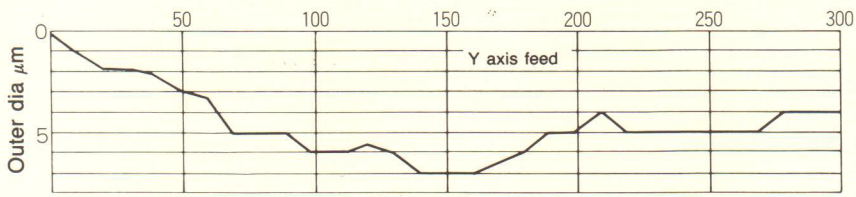


Measured on front flange of main spindle by a direct contact thermo sensor.

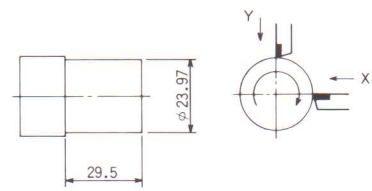
ACCURACY CAPABILITY IN CONTINUOUS OPERATION

KY10

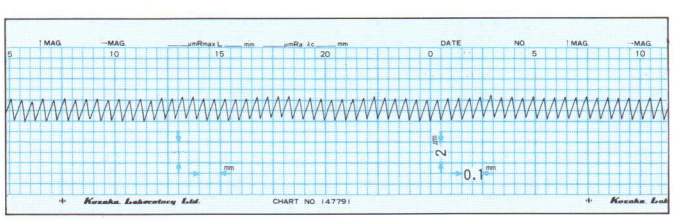




Material : ϕ24.5 x ℓ30 cast iron
Cutter : diamond
Cutter tip radius : R0.4 mm
Cutting condition : speed/1500 rpm
radial feed/0.04 mm
axial feed/0.05 mm/rev.
cycle time/60 sec.
room temp./22 ~ 24°C

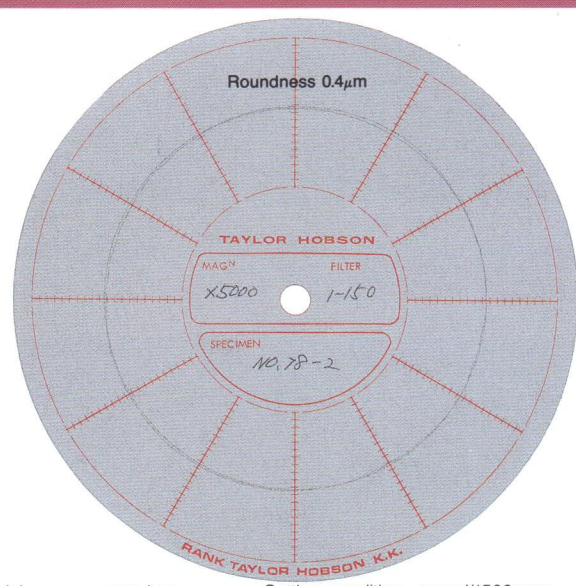


SURFACE ROUGHNESS



Material : aluminum
Cutter : diamond
Cutter tip radius : R0.15 mm
Cutting condition : speed/2000 rpm
radial feed/0.04 mm
axial feed/0.05 mm/rev.

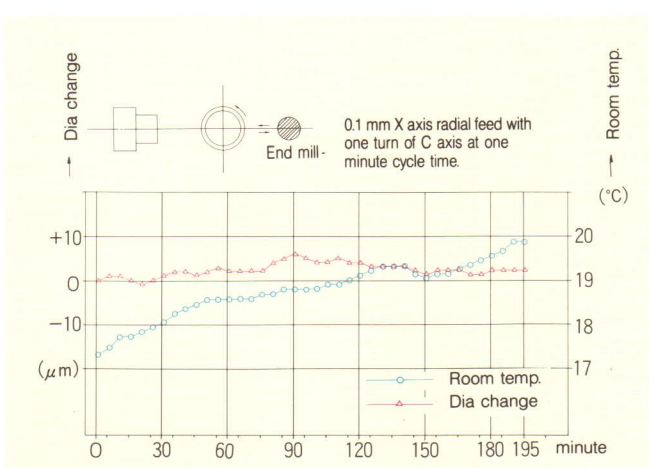
ROUNDNESS



Material : cast iron
Cutter : diamond
Cutter tip radius : R0.15 mm
Cutting condition : speed/1500 rpm
radial feed/0.04 mm
axial feed/0.01 mm/rev.

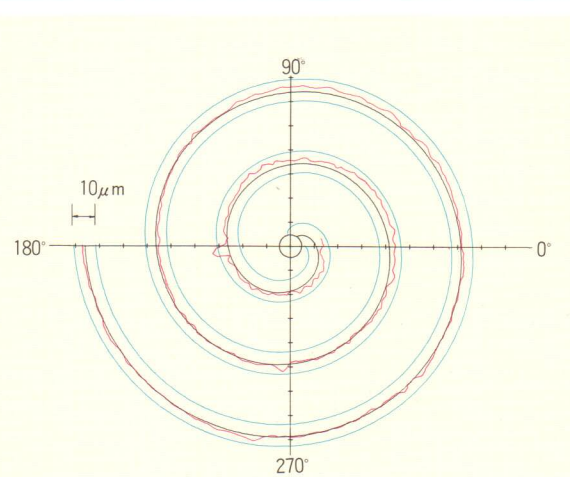
KY20

ACCURACY CAPABILITY IN CONTINUOUS OPERATION OF CONTOURING BY X & C AXIS



Each part machined in 5 minutes interval.

MACHINED SCROLL EXAMPLE

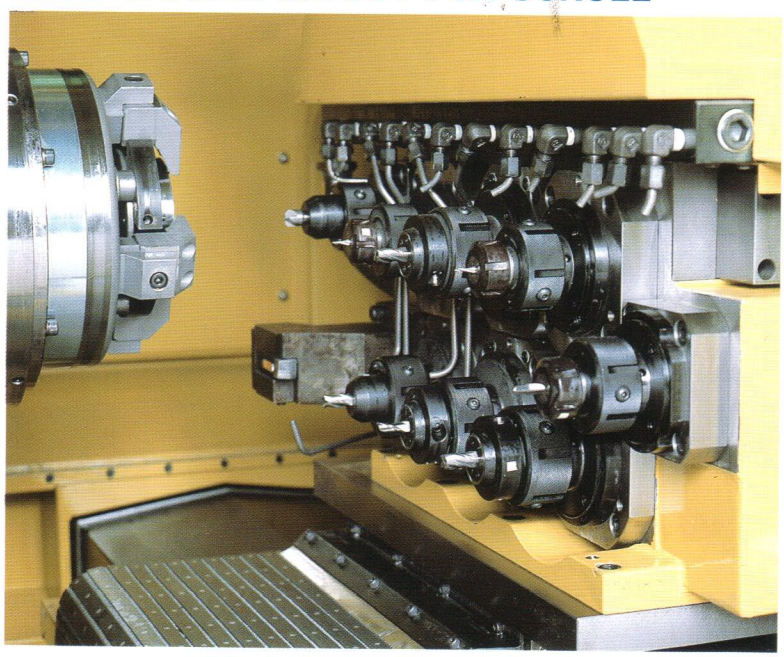


Kashifuji KY10·KY20

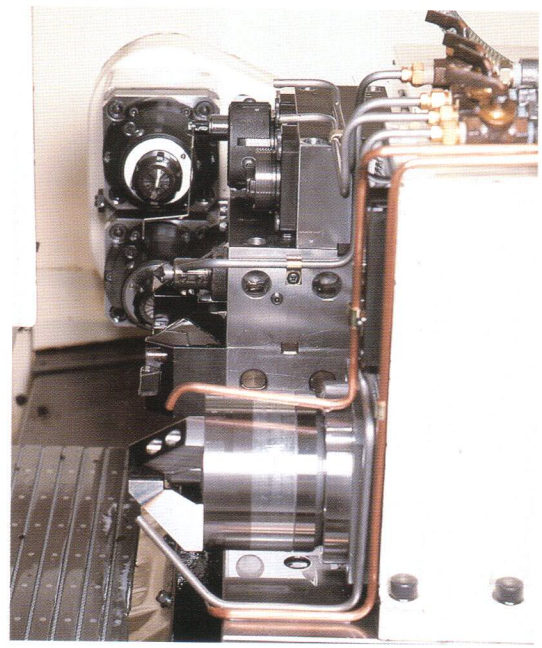
MATRIX TOOLING

- Tool spindles are mounted according to operation requirements.
- No accuracy deterioration by ATC.

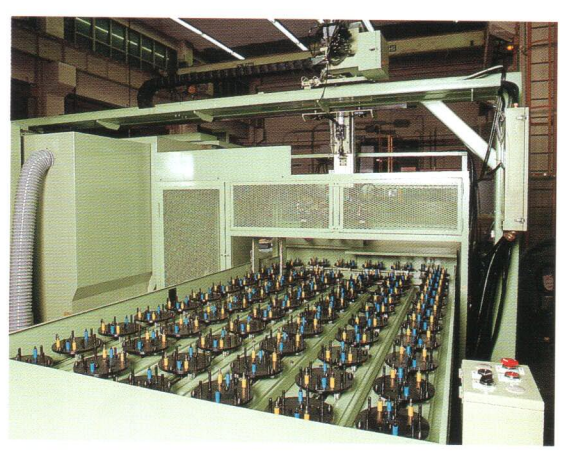
TOOL SPINDLE LAYOUT FOR SCROLL

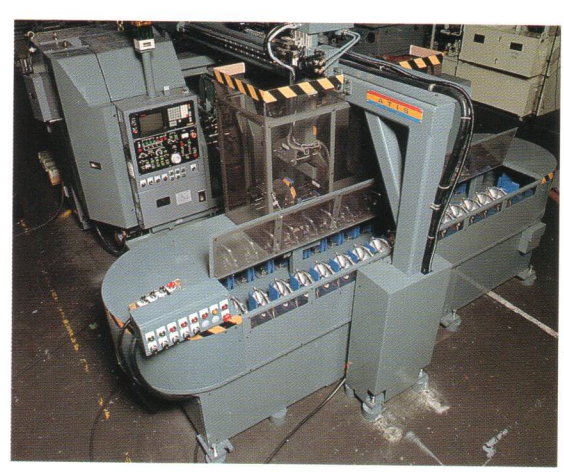


SIDE TOOL SPINDLE

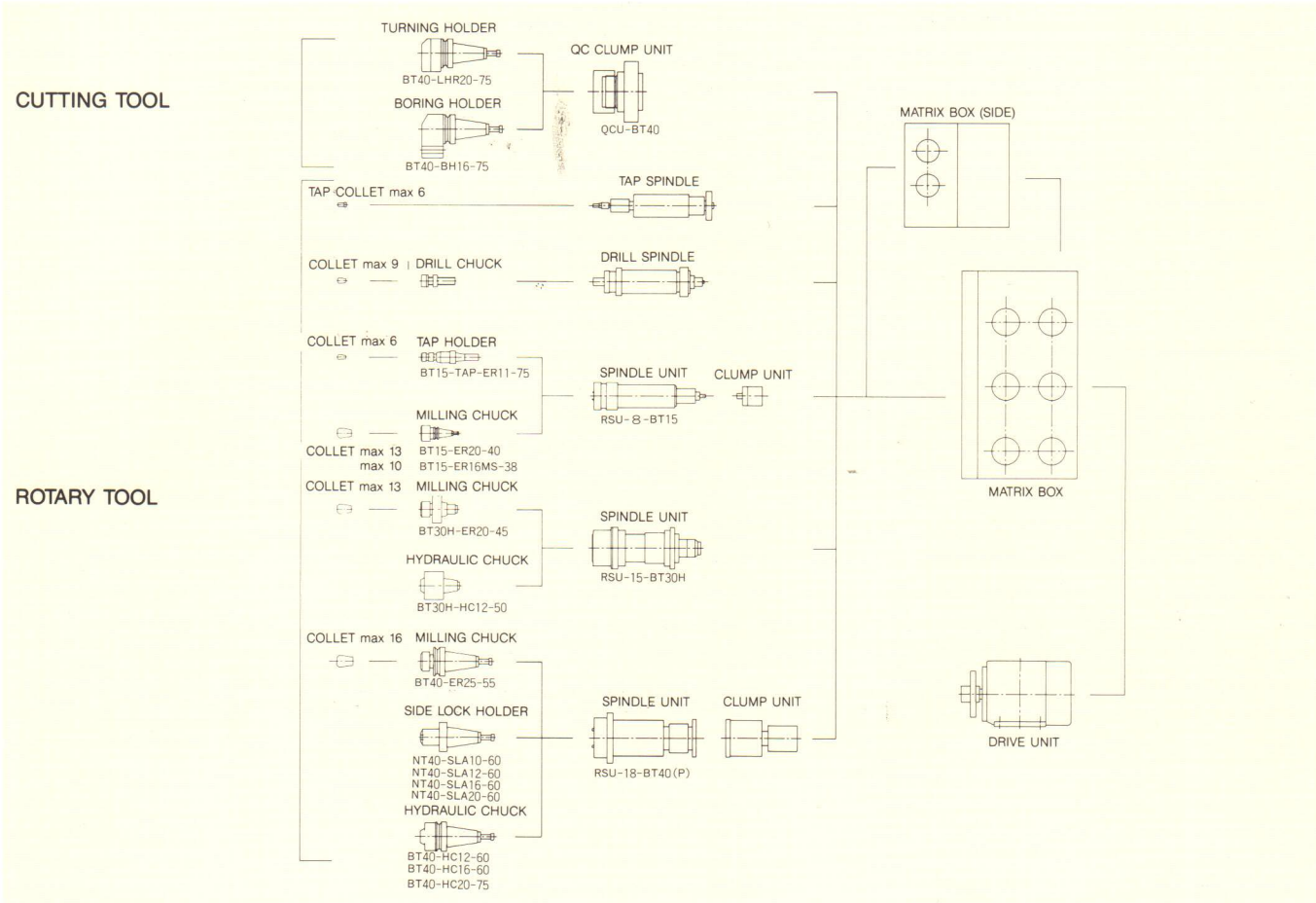


WORKPIECE AND LOADER EXAMPLES

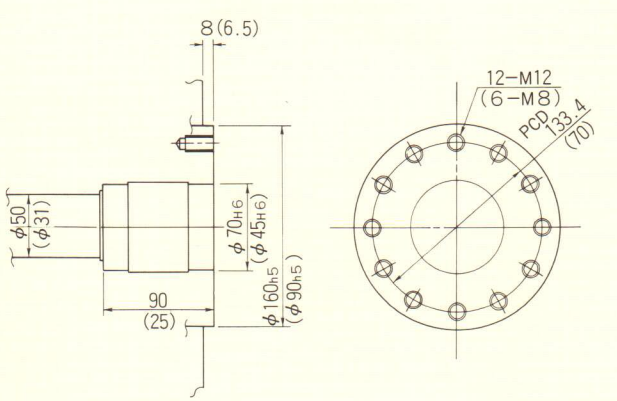




TOOLING SYSTEM CHART

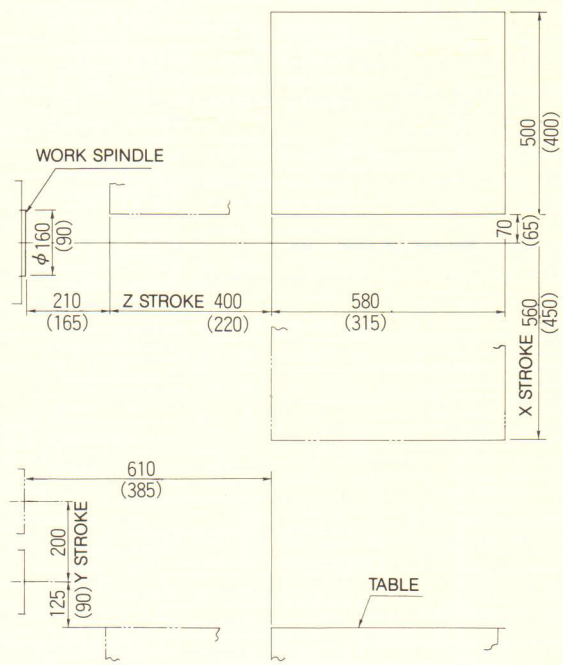


DETAIL OF WORK SPINDLE



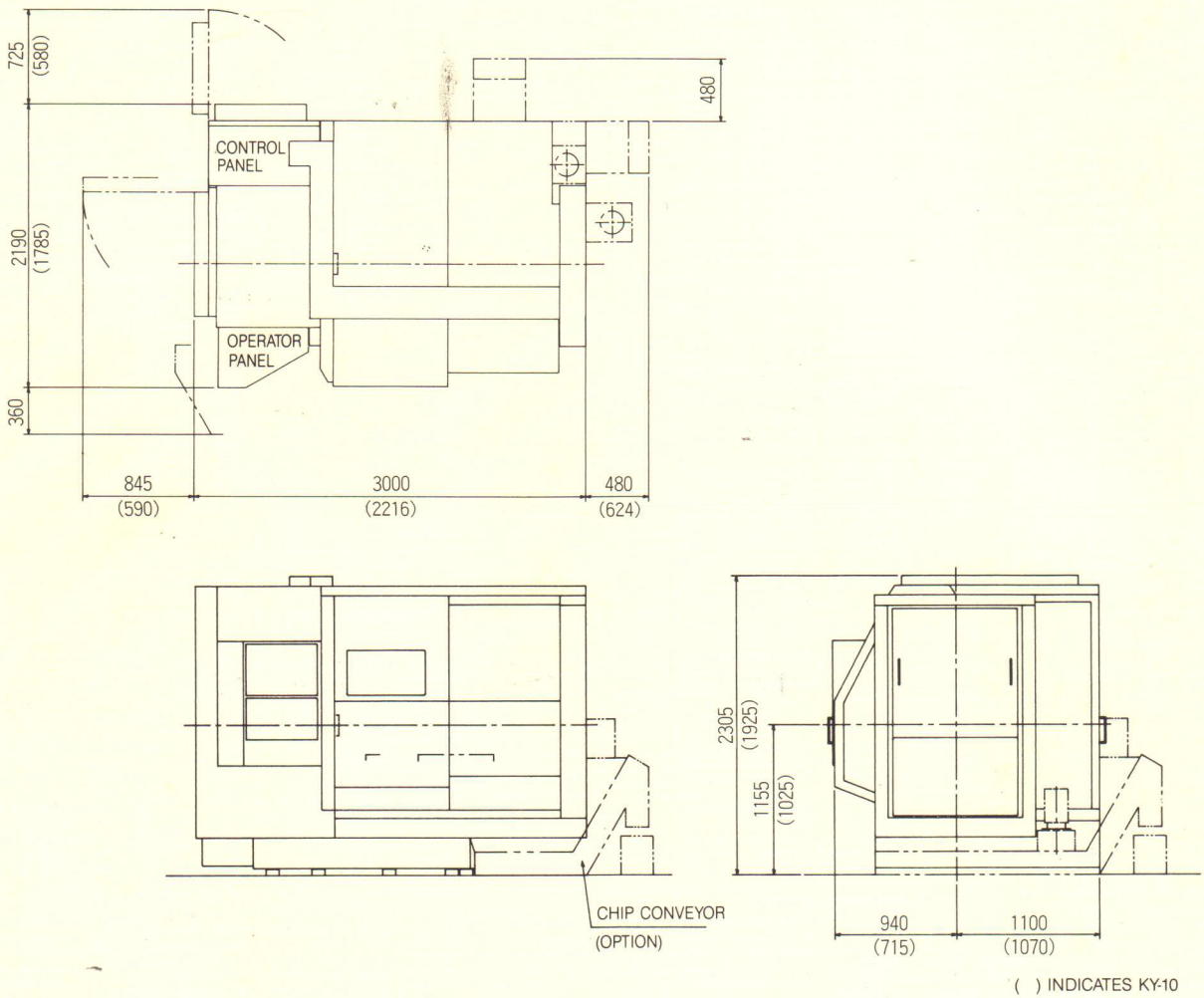
( ) INDICATES KY-10

WORKING RANGE



( ) INDICATES KY-10

MACHINE LAYOUT



( ) INDICATES KY-10

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9109-2
PRINTED IN JAPAN