



SHENYANG MACHINE TOOL CO., LTD.

# PBC

CNC PLANNER  
HORIZONTAL BORING &  
MILLING MACHINE

PBC series CNC T-type horizontal boring and milling machines are designed and developed on the basis of similar machines manufactured by SMTCL, in response to market requirements, and incorporate advanced German technology. These machines have been designed in a modular way, in order to accommodate various CNC controls, and different capacities and levels of accuracy.

The machines' main functions are boring and milling, but they can also perform drilling, reaming, end-facing and cylindrical turning. They are especially suitable for box-shaped work-pieces with holes located in different positions, where the accuracy of the positions is critical.

The machines can realize auto-positioning of any axis, and interpolation of up to any 4 axes of X,Y,Z,W and B, and therefore can do 3D curves using arc interpolation. As required by the user, the machine can be equipped with a vertical CNC rotary table, right angle milling head, etc. to expand the capabilities of the machine. The machine's main functions are boring and milling, it can also perform drilling, broaching, counterboring, end-face turning and cylindrical turning etc., is particularly useful for machining the housing-type parts with several holes which have high demand on the accuracy of the distance between holes.

The machine can realize auto positioning for each axis and cooperative operation of any four axes among X, Y, Z, W and B, and can machining outlines and 3-dimension curves by arc interpolation. According to customers' requirements, this machine can be equipped with vertical CNC rotary table, right-angle mill head, etc. to expand machining scope.



PBC110



PBC130f



PBC130r x2



PBC130

(With optional protection for worktable area and optional protection for spindle headstock and column)



PBC130qf

(With optional protection for spindle headstock and column)



PBC160



PBC110f



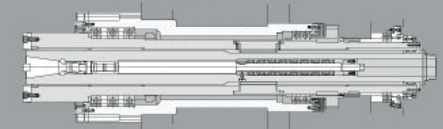
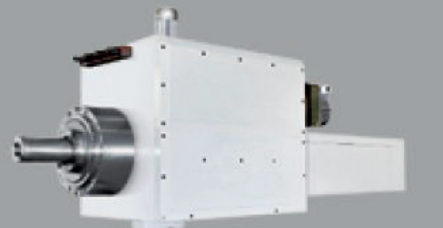
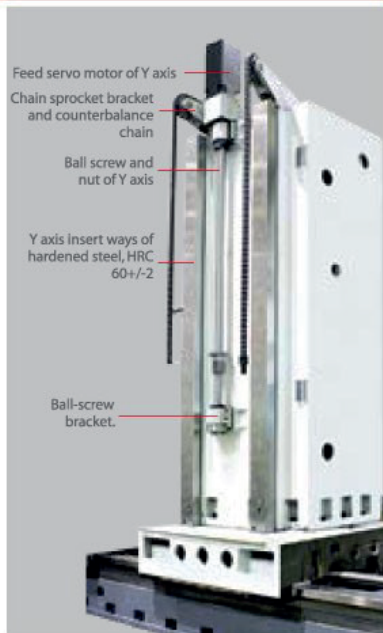
PBC160r



# PBC

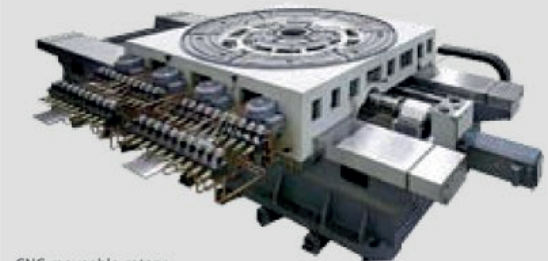
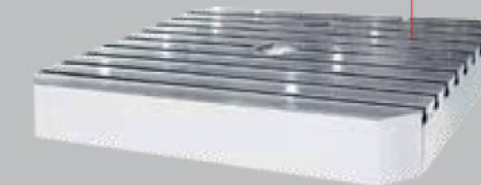
CNC PLANER  
HORIZONTAL BORING &  
MILLING MACHINE

High rigidity  
Optimum design on structure  
Main parts for CNC boring and milling machine

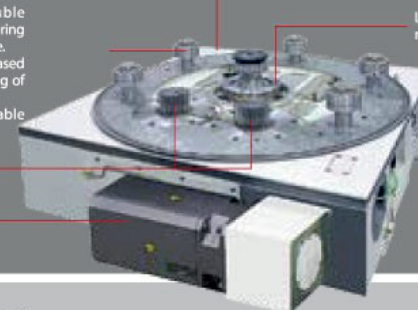


Worktable surface

Spindle  $\varnothing$ 110: 1000 $\times$ 1250, 1250 $\times$ 1400  
Spindle  $\varnothing$ 130: 1400 $\times$ 1600, 1600 $\times$ 1800, 1600 $\times$ 2000, 1800 $\times$ 2000, 1800 $\times$ 2200, 2000 $\times$ 2000  
Spindle  $\varnothing$ 160: 1600 $\times$ 1800, 1800 $\times$ 2000, 2000 $\times$ 2000, 2000 $\times$ 2500, 2500 $\times$ 3000

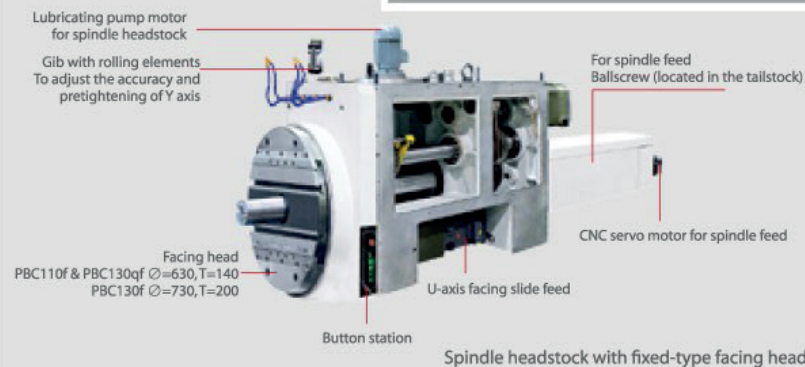


Slide of worktable  
Plastic anti-friction material on the under side of the table, against steel way.  
Transmission: Motor, belt wheel, double worms and worm wheels, pinion and gear ring eliminating backlash transmission clearance.  
Table clamping by heavy spring load, released by hydraulic pressure for accurate clamping of rotary and longitudinal position.  
Sealed angular encoder for accurate table positioning in rotary axis.  
System of dynamically opposing gears eliminate backlash of rotary axis of table.  
Servo motor for worktable rotation



Large bearings permit ease of rotation and accuracy.

Gibs with roller bearings increase the accuracy of the longitudinal movement of the table.



The bearing holder of ballscrew can reduce thermal deformation error due to ballscrew pretensioning

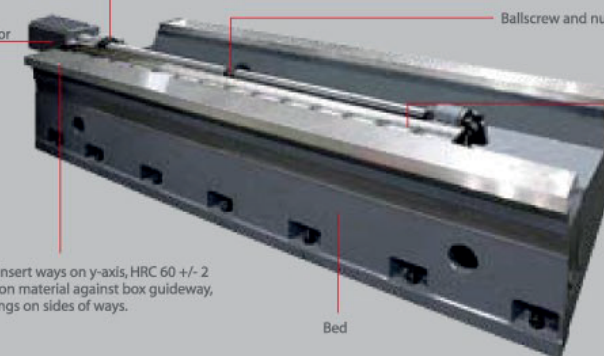
Servo motor for Z(X) axis

Ballscrew and nut of Z(X) axis

The sealed encoder/scale can be supplied according to users' requirement

Hardened steel insert ways on y-axis, HRC 60  $\pm$ 2  
Plastic anti-friction material against box guideway, with roller bearings on sides of ways.

Bed



# PBC

CNC PLANNER  
HORIZONTAL BORING &  
MILLING MACHINE

Hardware configuration SIEMENS 840D  
(Optional configuration: FANUC 18i,  
HEIDENHAIN ITNC 530)

Control axes: X-axis, Y-axis, Z-axis, B-axis, W-axis, U-axis  
and spindle

Axis interpolation: Any four axes among X-axis, Y-axis,  
Z-axis, B-axis, W-axis and U-axis

Display screen: color TFT display screen of 10.4" (display  
language: Chinese/English)

Operation panel: full-function CNC keyboard  
Human-computer communication interface: PCU50  
(standard configuration)

Control panel of the machine: standard control panel  
with 30 defined keys and button switches  
6 levels of data protection

PLC: Built in sky-blue SIMATIC S7 CPU315-2DP

Input-output module: S7-300 separable input-output  
module which is expanded by IM361 interface module

Memory capacity of CNC user's: 3MB (standard  
configuration), it is used for storing applications and data.

## CNC function

Min pulse equivalence: Linear axis is 0.001mm, rotary axis  
is 0.001°

Program preprocessing: 10 or more program segments  
Compensation: anti-backlash, pitch error of the ball  
screw, over quadrant error compensation, radius and  
length compensations of tools

Feed: rapid feed, adjusting for feed override, feed rate per  
minute, feed rate per revolution, countdown feed and  
programmable acceleration limit

Spindle functions: spindle speed control, spindle override  
adjusting, auto selection for spindle steps, spindle stop at  
required position, speed limit and constant cutting.

FRAME function: translation, rotation, mirror and  
scaling for the coordinate system. Settable zero offset,  
programmable zero offset

Tapping/ Rigid Tapping



## CNC program

Programming language: standard programming language  
DIN66025 and high-level programming language SINUMERIK  
Fixed repeating function for drilling and milling

Programming in metric/inch size or combined programming  
of metric size and inch size

Programming and machining can run at the same time

Absolute or incremental programming

program alarm for approaching reference point.

Calculation for variables and parameters

7-class nested subprograms

Skip and branch for programs

Macroprogramming capability

Chamfering/rounding transitions

Panel selection

Coordinate system of workpieces

## Interpolation:

Positioning, correct stop, linear interpolation of 3 axes, arc  
interpolation of any two coordinates, helical interpolation  
(arc interpolation + linear interpolation of 2 axes at most),  
feed pause, thread cutting, simultaneous cutting.

## Edit function

Retrieval of program segment, retrieval of program number,  
background edit, teach program, program protection.

## Security protection function

The security functions include program test, the limit for  
programmable machining area, the monitor for software  
limit, the monitor for hardware limit, E-stop, running monitor,  
speed monitor, position monitor and outline monitor. The  
security functions also include the monitors for circuits,  
overheating, batteries, voltage and internal memory.

## Standard Accessories

Centralized lubricating device

Helical chip conveyor (for PBC110)

Cooling device

Air conditioner for electric cabinet

Hydraulic tank

Illuminating lamp for working area

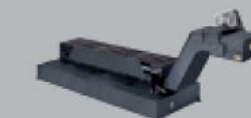
RS232C interface

Pneumatic conditioning system

Manual pulse generator

Accordion type protective cover for column

Chain chip conveyor with cooling tank



Chain chip conveyor (for PBC130/PBC160)



Hydraulic station



Centralized lubricating device



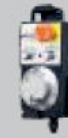
Air conditioner for  
electric cabinet



Sealed rotary encoder



Pneumatic components



Manual Pulse Generator

## Examples for some functions



Helical chip conveyor  
(for PBC110)



Accordion-style  
protective cover  
(for column  
guideway)



# PBC

CNC PLANNER  
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Dimensional drawing for special accessories  
of horizontal boring and milling center  
(The special accessories cannot be used for  
the machine with facing head)

## Optional accessories

Sealed encoder/scale for X,Y and Z axis (standard  
configuration for export machine)  
Sealed rotary encoder for B axis  
protection of worktable area  
Protection for spindle headstock and column  
Larger worktable  
6511: 1250X1250 1250X1400  $\varnothing$ 1600  
6513/6813: 1600X1800 1600X2000 1800X2200  
1800X2000 2000X2000 2000X2500  
6516/6816: 2000X2500 2500X3000  
Through spindle cooling system.  
Tool number of tool magazine (40 or 60 tool ATC)  
CNC system (FANUC 18i, Heidenhain iTNC 530)  
Water gun for cleaning  
Vertical NC rotary worktable of  $\varnothing$ 1500  
Dismountable facing head  
Universal milling head (manual indexing)  
Standard/extended right-angle milling head  
(manual indexing)



Dismountable NC facing head



Heidenhain system



Water gun for cleaning



FANUC system



Sealed linear scale/encoder



Rolling-up curtain protection (for  
guideway and ballscrew of column  
with side hanging headstock)

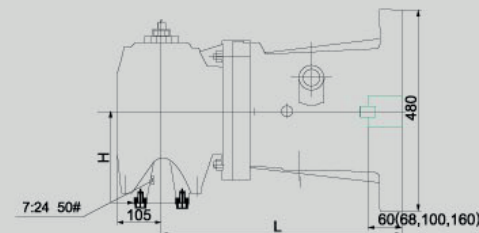


40 or 60 tool Automatic  
Tool Changer

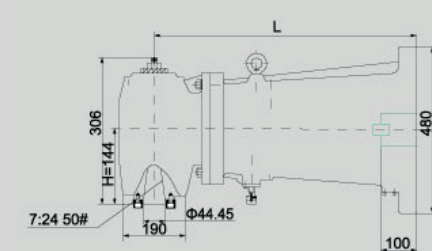


Protection for worktable area

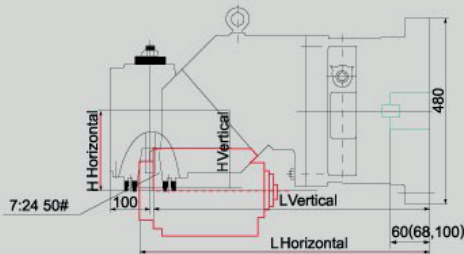
## Right-angle milling head



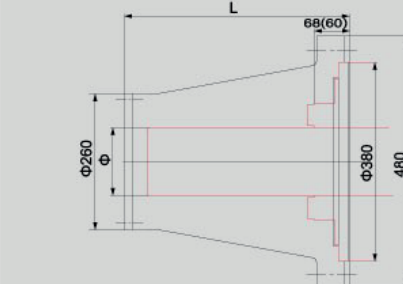
## Lengthening right-angle milling head



## Universal milling head



## Fixture for power arm (bearing)



ZTK150L vertical CNC rotary worktable of  $\varnothing$ 1500



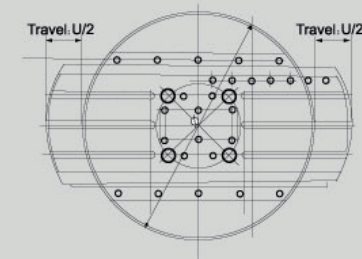
Power arm



Chain chip conveyor and  
paper band filter for spindle  
inner cooling system



## Dismountable facing head



Right-angle milling head



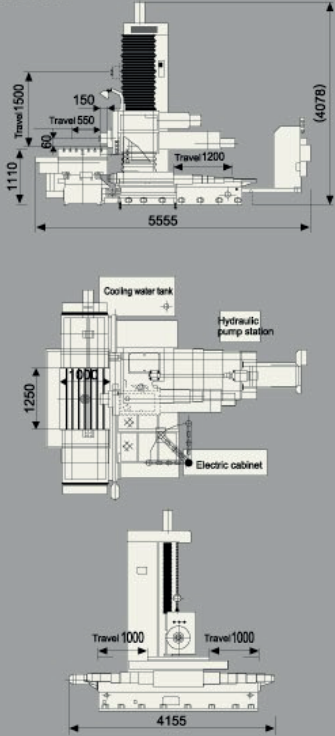
Universal milling head



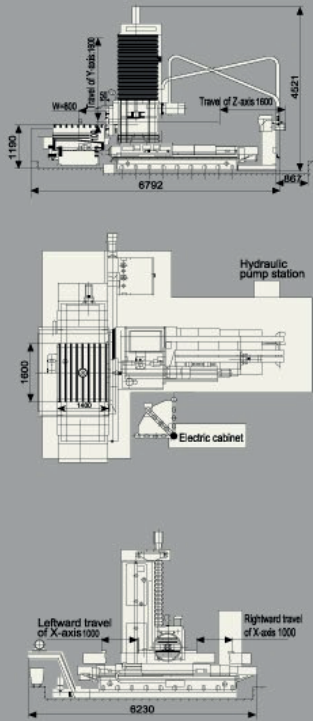
Lengthening milling head

# APPEARANCE DRAWING OF THE MACHINE

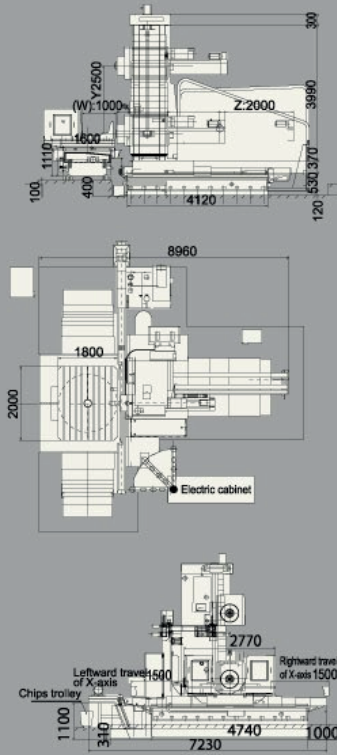
PBC110



PBC130 PBC130f

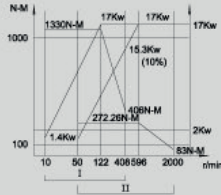


PBC160( Optional: protection for worktable)

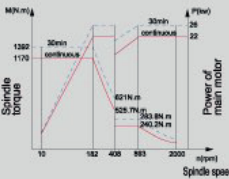


Drawing for power & torque

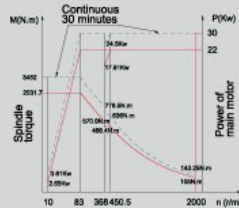
SIEMENS 840D (Standard)  
PBC110



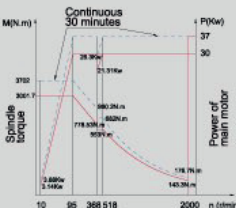
FANUC 18i (Optional)  
PBC110



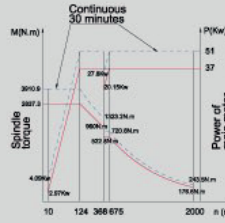
SIEMENS 840D (Standard)  
PBC130



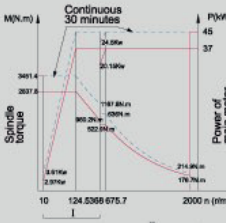
FANUC 18i (Optional)  
PBC130



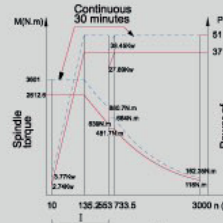
SIEMENS 840D (Standard)  
PBC130



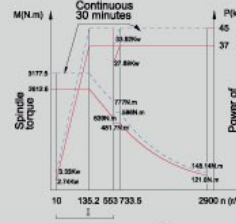
FANUC 18i (Optional)  
PBC130



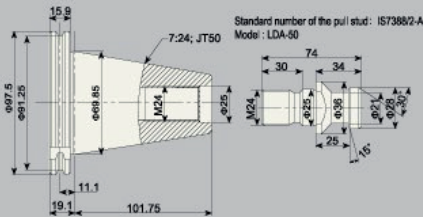
SIEMENS 840D (Standard)  
PBC130



FANUC 18i (Optional)  
PBC130



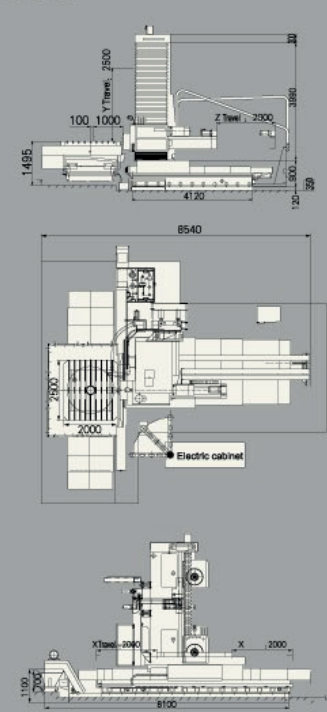
Dimensional drawing for shanks and studs



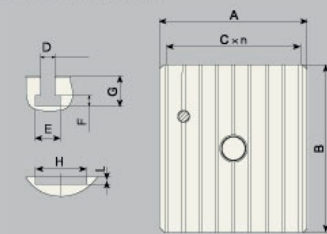


APPEARANCE  
DRAWING OF  
THE MACHINE

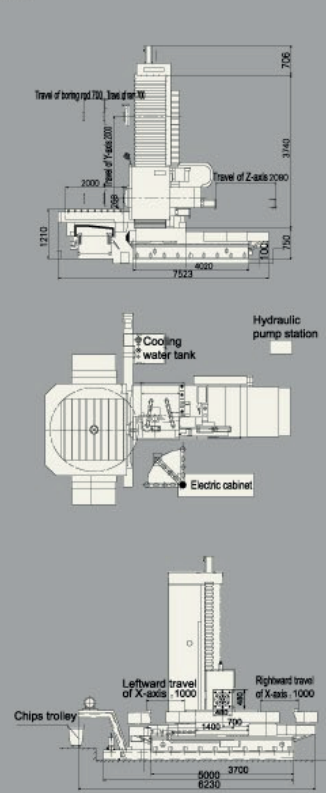
PBC160



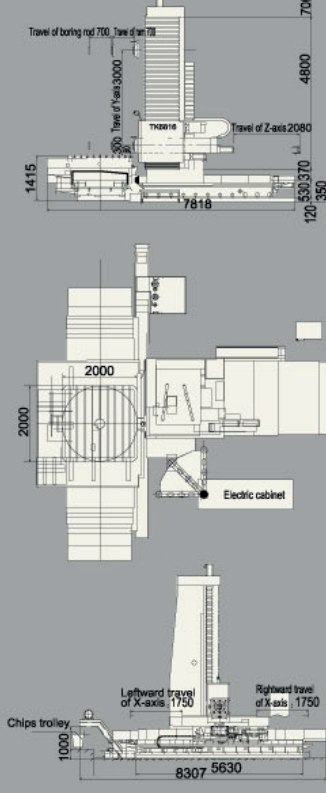
Size of worktable



PBC130r

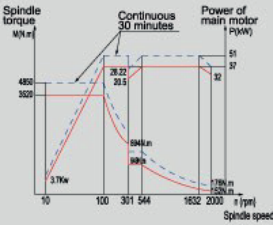


PBC160r

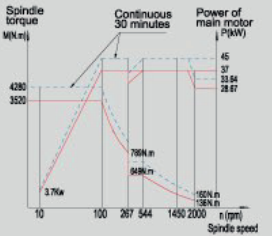


Drawing for power & torque

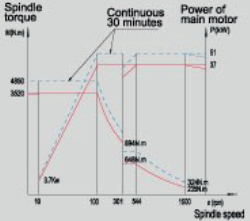
SIEMENS 840D (Standard)  
PBC160



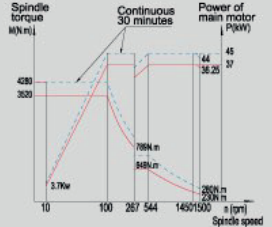
FANUC 18i (Optional)  
PBC160



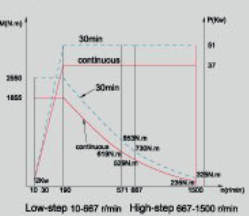
SIEMENS 840D (Standard)  
PBC160



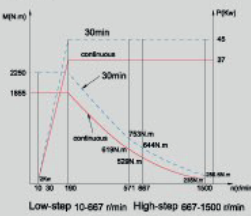
FANUC 18i (Optional)  
PBC160



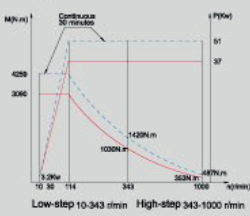
SIEMENS 840D (Standard)  
PBC130r



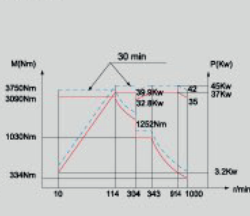
FANUC 18i (Optional)  
PBC130r



SIEMENS 840D (Standard)  
PBC160r



FANUC 18i (Optional)  
PBC160r



| Model                                         |          | Units  | PBC110                                        | PBC110f                                       | PBC130q                                       | PBC130qf                                      | PBC130                                                                                         | PBC130f                                                                                        | PBC160                                        | PBC130r                                       | PBC160r                                       |
|-----------------------------------------------|----------|--------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| Table size                                    |          | mm     | 1000×1250(1250×1400)                          | 1000×1250(1250×1400)                          | 1000×1250(1250×1400)                          | 1000×1250(1250×1400)                          | 1400×1600(1600×1800)                                                                           | 1400×1600(1600×1800)                                                                           | 1600×1800<br>(2000×2500)(2500×3000)           | 1600×2000<br>(2000×2000)(2000×2500)           | 2000×2000(2000×2500)A<br>(2500×3000)B         |
| Max. load on the table                        |          | kg     | 5000                                          | 5000                                          | 5000                                          | 5000                                          | 10000                                                                                          | 10000                                                                                          | 10000(20000)(30000)                           | 10000(20000)                                  | 10000(20000)A(30000)B                         |
| Worktable and T slot                          |          |        | 22×7                                          | 22×7                                          | 22×7                                          | 22×7                                          | 28×9                                                                                           | 28×9                                                                                           | 28×9                                          | 28×9                                          | 28×9                                          |
| Dia. of spindle                               |          | mm     | 110                                           | 110                                           | 130                                           | 130                                           | 130                                                                                            | 130                                                                                            | 160                                           | 130 box ram of 480×480                        | 160 box ram of 480×480                        |
| Taper of spindle                              |          |        | ISO 7:24 No50                                 | ISO 7:24 No50                                 | ISO 7:24 No50                                 | ISO 7:24 No50                                 | ISO 7:24 No50                                                                                  | ISO 7:24 No50                                                                                  | ISO 7:24 No50                                 | ISO 7:24 No50                                 | ISO 7:24 No50                                 |
| Speed of spindle                              |          | r/min  | 10-2500(10-3000)                              | 10-2000                                       | 10-2000                                       | 10-2000                                       | 10-2000(10-3000)                                                                               | 10-2000                                                                                        | 10-1500                                       | 10-1500                                       | 10-1000                                       |
| Max. torque                                   |          | N.m    | 1300/1700                                     | 1300/1700                                     | 1300/1700                                     | 1300/1700                                     | 2500/3000                                                                                      | 2500/3000                                                                                      | 3500/4800                                     | 1800/2500                                     | 3000/4100                                     |
| Distance between spindle center and table top |          | mm     | 60-1560(30-1530)                              | 60-1560(30-1530)                              | 70-1570                                       | 70-1570                                       | 100-1700                                                                                       | 100-1700                                                                                       | 100-2100                                      | 267-2267(300-2300)                            | 300-2300                                      |
| Min. distance between spindle end and table   |          | mm     | 350 zero position of spindle                  | 487 zero position of spindle                  | 487 zero position of spindle                  | 487 zero position of spindle                  | 50 spindle extending<br>(worktable width of 250/2000/10T)<br>(worktable width of 400/2000/20T) | 50 spindle extending<br>(worktable width of 250/2000/10T)<br>(worktable width of 400/2000/20T) | 0 spindle extending<br>(100/A, 350/B)         | 833 spindle extending<br>(1033, 1173A)        | 1033 spindle extending<br>(1033, 1423/B)      |
| Transverse travel of table X                  |          | mm     | 2000(2500,3000)                               | 2000(2500,3000)                               | 2000(2500,3000)                               | 2000(2500,3000)                               | 2000(3000,3500,4000)                                                                           | 2000(3000,3500,4000)                                                                           | 3000(3500,4000)                               | 2000(3000,3500,4000)                          | 3000(3500,4000)                               |
| Vertical travel of headstock Y                |          | mm     | 1500                                          | 1500                                          | 1500                                          | 1500                                          | 1600(2000,2500,3000)                                                                           | 1600(2000,2500,3000)                                                                           | 2000(2500,3000)                               | 1600(2000,2500,3000)                          | 2000(2500,3000)                               |
| Longitudinal travel of column Z               |          | mm     | 1200(2000)                                    | 1200(2000)                                    | 1200(2000)                                    | 1200(2000)                                    | 1600(2000)                                                                                     | 1600(2000)                                                                                     | 2000                                          | 1600(2000)                                    | 2000                                          |
| W spindle travel                              |          | mm     | 550                                           | 550                                           | 550                                           | 550                                           | 800                                                                                            | 800                                                                                            | 1000                                          | 700                                           | 700                                           |
| V Travel of ram                               |          | mm     | —                                             | —                                             | —                                             | —                                             | —                                                                                              | —                                                                                              | —                                             | 700                                           | 700                                           |
| U slide travel of facing plate                |          | mm     | —                                             | 140                                           | 140                                           | 140                                           | —                                                                                              | 200                                                                                            | —                                             | —                                             | —                                             |
| Rotation of rotary table B                    |          |        | 0.001°×360°                                   | 0.001°×360°                                   | 0.001°×360°                                   | 0.001°×360°                                   | 0.001°×360°                                                                                    | 0.001°×360°                                                                                    | 0.001°×360°                                   | 0.001°×360°                                   | 0.001°×360°                                   |
| Feed speed                                    |          |        |                                               |                                               |                                               |                                               |                                                                                                |                                                                                                |                                               |                                               |                                               |
| X、Y、Z                                         |          | mm/min | 1-6000                                        | 1-6000                                        | 1-6000                                        | 1-6000                                        | 1-6000                                                                                         | 1-6000                                                                                         | 1-6000                                        | 1-6000                                        | 1-6000                                        |
| W、U                                           |          | mm/min | W:1-2000                                      | W:1-2000; U:1-1000                            | W:1-2000; U:1-1000                            | W:1-2000; U:1-1000                            | W:1-3000                                                                                       | 1-3000                                                                                         | 1-3000                                        | W,V:1-3000                                    | W,V:1-3000                                    |
| B                                             |          | r/min  | 0-2.5                                         | 0-2.5                                         | 0-2.5                                         | 0-2.5                                         | 0-1                                                                                            | 0-1                                                                                            | 0-1                                           | 0-1                                           | 0-1                                           |
| Rapid speed                                   |          |        |                                               |                                               |                                               |                                               |                                                                                                |                                                                                                |                                               |                                               |                                               |
| X、Y、Z                                         |          | m/min  | 9                                             | 9                                             | 9                                             | 9                                             | 9                                                                                              | 9                                                                                              | 9                                             | 6                                             | 6                                             |
| W、U                                           |          | m/min  | 2.4                                           | 2.4                                           | 2.4                                           | 2.4                                           | W:3                                                                                            | 3                                                                                              | W:3                                           | W,V:3                                         | W,V:3                                         |
| B                                             |          | r/min  | 2.5                                           | 2.5                                           | 2.5                                           | 2.5                                           | 1                                                                                              | 1                                                                                              | 1                                             | 1                                             | 1                                             |
| Tool magazine capacity                        |          | Pcs    | 40(60 floor type)                             | 40(60 floor type)                             | 40(60 Floor type)                             | 40(60 floor type)                             | 40(60)                                                                                         | 40(60)                                                                                         | 40(60)                                        | 40(60)                                        | 40(60)                                        |
| Shank specification                           |          |        | ISO 7:24 JT50                                 | ISO 7:24 JT50                                 | ISO 7:24 JT50                                 | ISO 7:24 JT50                                 | ISO 7:24 JT50                                                                                  | ISO 7:24 JT50                                                                                  | ISO 7:24 JT50                                 | ISO 7:24 JT50                                 | ISO 7:24 JT50                                 |
| Pin standard                                  |          |        | LDA-50                                        | LDA-50                                        | LDA-50                                        | LDA-50                                        | LDA-50                                                                                         | LDA-50                                                                                         | LDA-50                                        | LDA-50                                        | LDA-50                                        |
| Power of main motor                           |          | kW     | 17/22.5(continuous/30min)                     | 17/22.5(continuous/30min)                     | 17/22.5(Continuous/30min)                     | 17/22.5(continuous/30min)                     | 22/30                                                                                          | 22/30                                                                                          | 37/51                                         | 37/51                                         | 37/51                                         |
| Positioning accuracy                          |          |        |                                               |                                               |                                               |                                               |                                                                                                |                                                                                                |                                               |                                               |                                               |
| Implement JB/T8772.4-1998 standard            | X、Y、Z    | mm     | X:0.025; Y,Z,W:0.020                          | X:0.025; Y,Z,W:0.020; U:0.045                 | X:0.025; Y,Z,W:0.020; U:0.045                 | X:0.025; Y,Z,W:0.020; U:0.045                 | X,Y,Z:0.026; W:0.020                                                                           | X,Y,Z:0.026; W:0.020; U:0.032                                                                  | X:0.030; Y,Z:0.026; W:0.020                   | X,Y,Z:0.026; W,V:0.025                        | X,Y,Z:0.026; W,V:0.025                        |
|                                               | B(4×90°) | "      | 15(3.2)                                       | 15(3.2)                                       | 15(3.2)                                       | 15(3.2)                                       | 18(4)                                                                                          | 18(4)                                                                                          | 18(4)                                         | 18(4)                                         | 18(4)                                         |
| Implement JIS standard                        | X、Y、Z    | mm     | X,Y,Z,W:±0.008                                | X,Y,Z,W:±0.008                                | X,Y,Z,W:±0.008                                | X,Y,Z,W:±0.008                                | X,Y,Z,W:±0.008                                                                                 | X,Y,Z,W:±0.008                                                                                 | X,Y,Z,W:±0.01                                 | X,Y,Z,W:±0.008                                | X,Y,Z,W:±0.008                                |
|                                               | B(4×90°) | "      | ±7.5(±2)                                      | ±7.5(±2)                                      | ±7.5(±2)                                      | ±7.5(±2)                                      | ±7.5(±2)                                                                                       | ±7.5(±2)                                                                                       | ±7.5(±2)                                      | ±7.5(±2)                                      | ±7.5(±2)                                      |
| Repeatability                                 |          |        |                                               |                                               |                                               |                                               |                                                                                                |                                                                                                |                                               |                                               |                                               |
| Implement JB/T8772.4-1998 standard            | X、Y、Z    | mm     | X:0.020; Y,Z,W:0.016                          | X:0.020; Y,Z,W:0.016; U:0.032                 | X:0.020; Y,Z,W:0.016; U:0.032                 | X:0.020; Y,Z,W:0.016; U:0.032                 | X,Y,Z:0.020; W:0.018                                                                           | X,Y,Z:0.020; W,U:0.018                                                                         | X,Y,Z:0.020; W:0.018                          | X,Y,Z:0.018; W,V:0.015                        | X,Y,Z:0.018; W,V:0.015                        |
|                                               | B(4×90°) | "      | 9(2)                                          | 9(2)                                          | 9(2)                                          | 9(2)                                          | 10(2)                                                                                          | 10(2)                                                                                          | 10(2)                                         | 10(2)                                         | 10(2)                                         |
| Implement JIS standard                        |          | mm     | X,Y,Z,W:±0.005                                | X,Y,Z,W:±0.005                                | X,Y,Z,W:±0.005                                | X,Y,Z,W:±0.005                                | X,Y,Z,W:±0.005                                                                                 | X,Y,Z,W:±0.005                                                                                 | X,Y,Z,W:±0.006                                | X,Y,Z,W:±0.005                                | X,Y,Z,W:±0.005                                |
| Overall dimensions of machine(L×W×H)          |          | mm     | 5555×4155×4200                                | 5555×4155×4200                                | 5555×4155×4200                                | 5555×4155×4200                                | 6700×7800×4700                                                                                 | 6700×7800×4700                                                                                 | 7250×7250×5000(8000×8000×5000)                | 7600×6300×5300                                | 8200×8000×5300                                |
| CNC system                                    |          |        | SIEMENS 840D(option item : 18i, FANUC system) | SIEMENS 840D(option item : 18i, FANUC system) | SIEMENS 840D(option item : 18i, FANUC system) | SIEMENS 840D(option item : 18i, FANUC system) | SIEMENS 840D(option item : 18i, FANUC system)                                                  | SIEMENS 840D(option item : 18i, FANUC system)                                                  | SIEMENS 840D(option item : 18i, FANUC system) | SIEMENS 840D(option item : 18i, FANUC system) | SIEMENS 840D(option item : 18i, FANUC system) |
| Total power capacity                          |          | KVA    | 50                                            | 50                                            | 60                                            | 60                                            | 100                                                                                            | 100                                                                                            | 100/130/150(A,B)                              | 100/130/150(A,B)                              | 100/130/150                                   |

Note: PBC110f、PBC130f are equipped with fixed-type facing plate.