

FCL-I/FCL-B series

High-Performance ATC/B-Axis Turn-Mill CNC Machining Center



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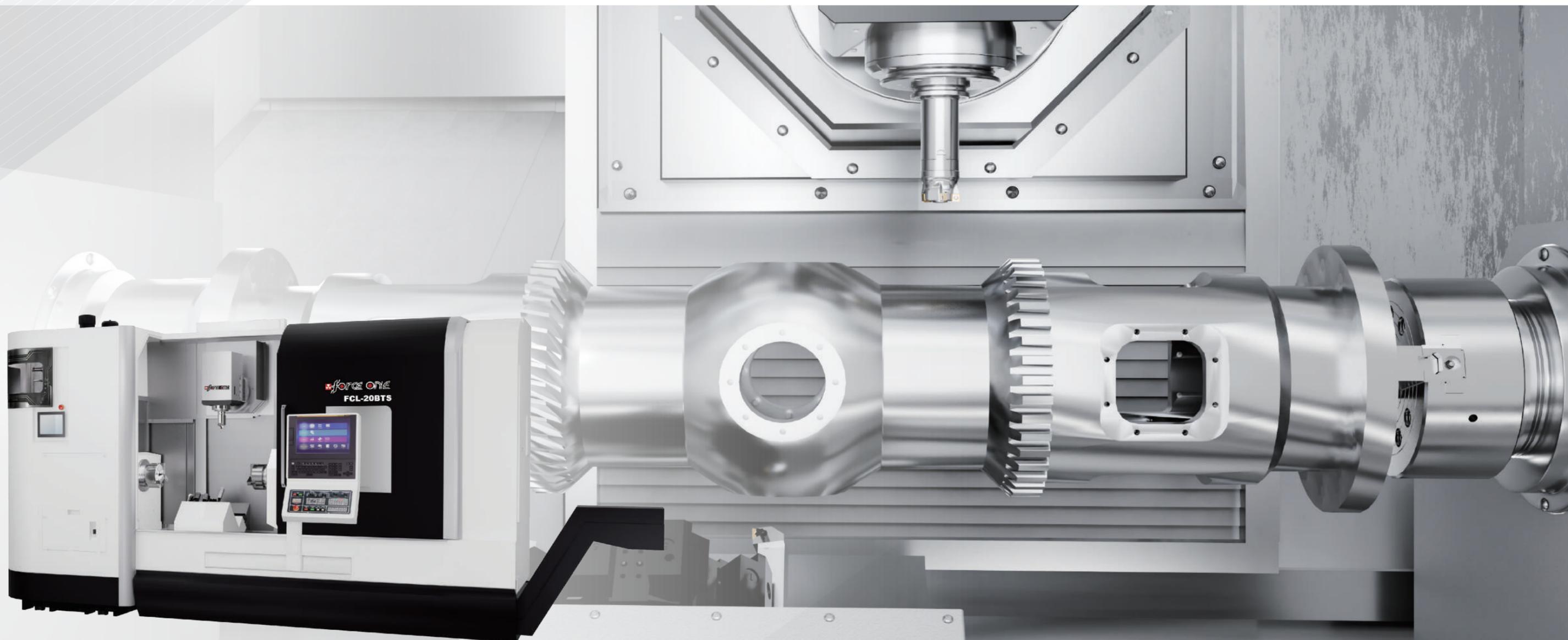
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Second Edition First print 27.FEB 2026

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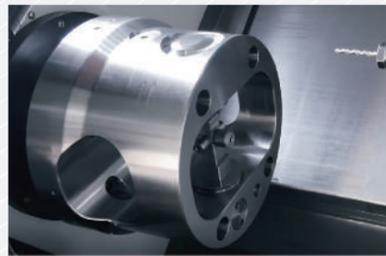
High-Performance ATC/B-Axis Turn-Mill CNC Machining Center

Force One Machinery proudly introduces the FCL-I/FCL-B Series, featuring FCL-20I (Index Positioning Series) and FCL-20B (B-Axis Servo Series). Both models come standard with an ATC 32T automatic tool changer, providing exceptional flexibility for multi-task machining. Additionally, the ST (Lower Turret Model) configuration is available as an option, further enhancing productivity and versatility.



FCL-20BTS

MACHINE FEATURES



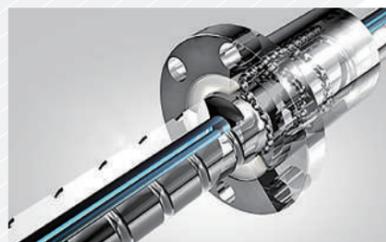
INDEX CHUCK (OPT.)

Capable of turning multi-angle machining parts, such as tees and crosses, with automatic angle adjustment and complete processing at one time.



ROTATE QUILL TAILSTOCK (OPT.)

The higher rigidity rotate quill type tailstock has bigger bearings than live center.



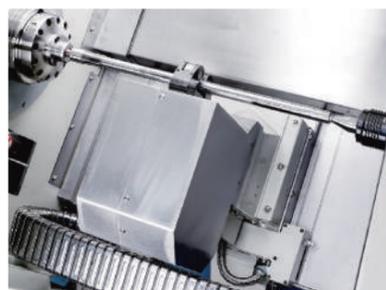
HOLLOW BALL SCREWS WITH COOLANT SYSTEM (OPT.)

The hollow ball screw cooling system can significantly reduce the thermal temperature rise position accuracy error caused by screw friction during machine movement, thereby improving the positioning accuracy of the machine.



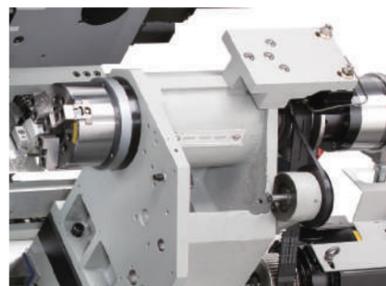
PARTS CUT-OFF DETECTOR (OPT.)

The detector is used for detecting if the part is completely cut off. It prevents cutting problems on twin spindles caused by cut-off failure.



HYDRAULIC STEADY REST (OPT.)

The standard hydraulic steady rest is manual base moving, there are programmable, and servo driven bases for options.



SUB SPINDLE (OPT.)

Synchronization for main and sub spindle. The workpiece can be machining at one time.

ESG (OPT.)



AUTOMATIC GREASE LUBRICATION SYSTEM

It significantly reduces lubricant usage, effectively reduces coolant tank pollution, and improves coolant quality.



VARIABLE FREQUENCY HYDRAULIC SYSTEM

Excellent energy saving effect, smaller fuel tank volume and temperature control.



SMART POWER-OFF SYSTEM

Smart power off system temporarily limits the use of power-hungry devices during standby. After processing is completed, the system can automatically power off the equipment.

AI (OPT.)



SMART MACHINE MONITORING AND PREVENTION SYSTEM

Real-time spindle load monitoring is combined with artificial intelligence software technology to automatically construct a safe processing load zone, and includes intelligent tool performance management to monitor and prevent abnormalities during processing, eliminating the need for human supervision.



OIL MIST COLLECTOR (OPT.)

The oil mist collector uses advanced separation technology to efficiently capture oil mist generated during machining, reducing air pollution and improving workshop environment quality. Recovered cutting fluids can be recycled, saving costs and extending equipment lifespan, making it the perfect blend of environmental and economic benefits.

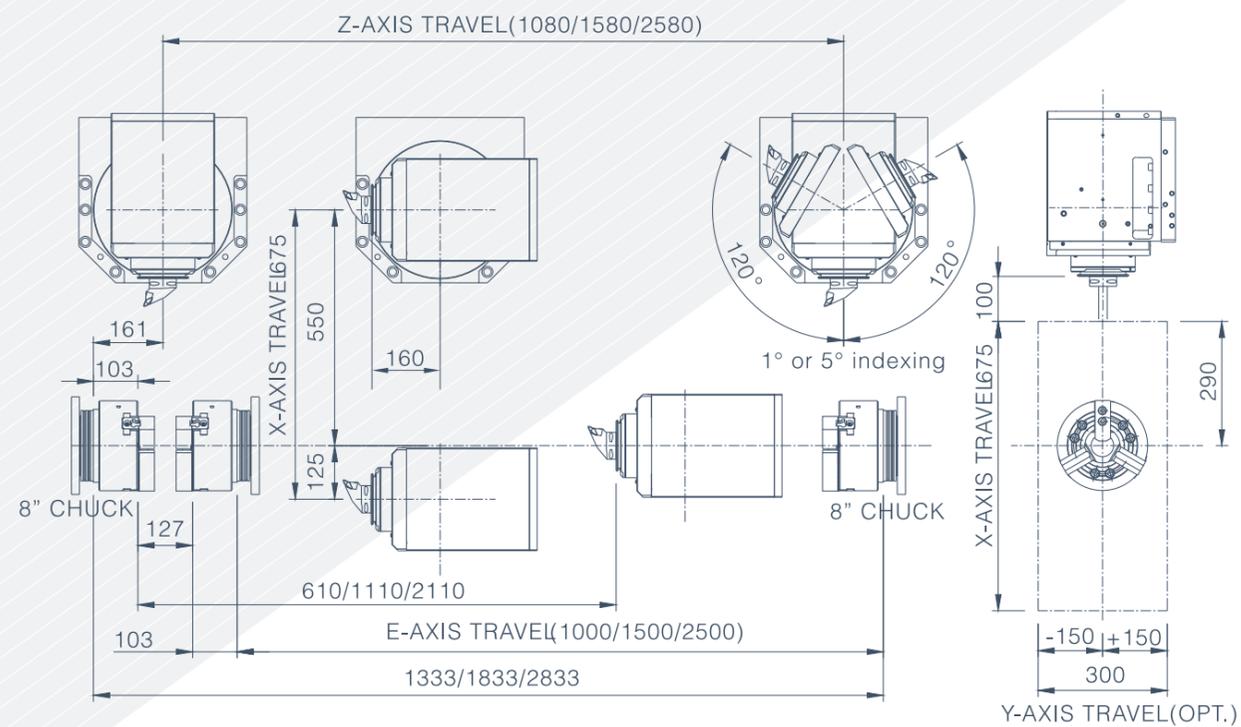
DUST COLLECTOR (OPT.)

The dust collector is designed for efficient dust management, swiftly capturing fine particles and debris during machining to maintain a clean workspace, enhance machining accuracy, and improve operational safety. Its advanced filtration system ensures discharged air meets environmental standards, while also extending equipment lifespan, making it an ideal solution for maintaining a productive environment.

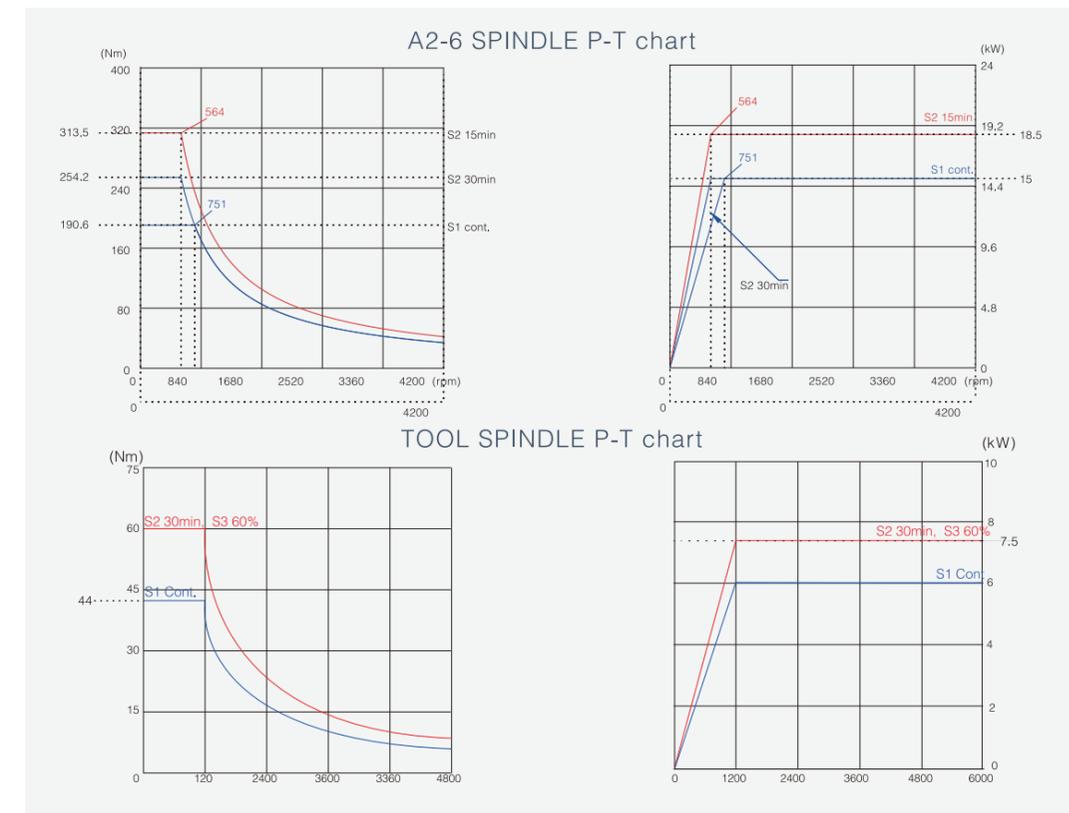


WORKING RANGE

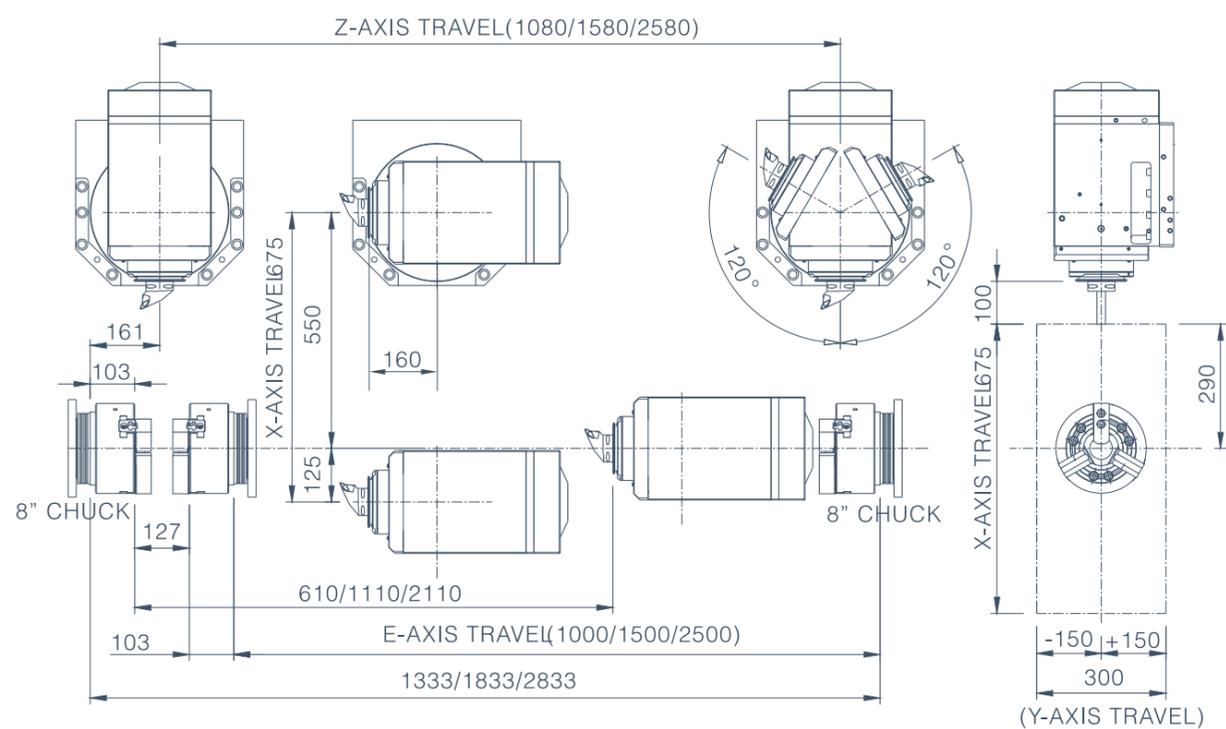
FCL-I Series



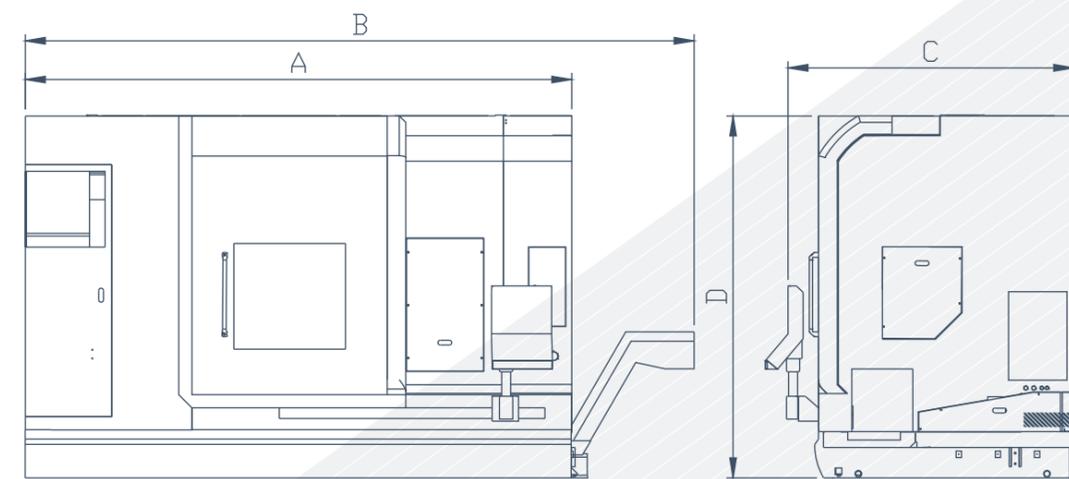
SPINDEL OUTPUT



FCL-B Series



DIMENSIONAL DRAWINGS



MODEL	A (mm)	B (mm)	C (mm)	D (mm)	W (kg)
FCL-20B/30B/20I/30I(1050)	4580	5480	2850	2720	14500
FCL-20B/30B/20I/30I(1550)	5080	5980	2850	2720	16600
FCL-20B/30B/20I/30I(2550)	6080	6980	2850	2720	18800
FCL-20B/30B/20I/30I(1050)	4580	5480	2850	2720	14100
FCL-20B/30B/20I/30I(1550)	5080	5980	2850	2720	16700
FCL-20B/30B/20I/30I(2550)	6080	6980	2850	2720	18900

- All specification, design and characteristics shown on this catalogue are subject to change without prior notice.

FCL-I SPECIFICATIONS

MODEL	ITEM	UNIT	FCL-20I	FCL-20IS
Capacity	Max. swing of workpiece	mm	660	660
	Swing over cross slide	mm	660	660
	Max. turning diameter (Tool Holder / Lower Turret)	mm	Ø660	Ø660
	Max. turning length	mm	1050/1550/2550	1050/1550/2550
	Center high	mm	1170	1170
	Bar work capacity	mm	65	65
Travel	X-axis travel (tool holder)	mm	675(-125~+550)	675(-125~+550)
	Z-axis travel (tool holder)	mm	1080/1580/2580	1080/1580/2580
	X2-axis travel (Lower turret)	mm	-	-
	Z2-axis travel (Lower turret)	mm	-	-
	E-axis travel (tailstock / sub-spindle)	mm	1050/1550/2550	1050/1550/2550
	B direction rotation range (tool holder)	deg.	±120°	±120°
Spindle 1	Max. spindle speed	min ⁻¹	4200	4200
	Type of spindle nose		A2-6	A2-6
	Chuck size	inch	8	8
	Through-spindle hole diameter	min	77	77
	Min. spindle indexing increment		0.001°	0.001°
	Spindle bearing inner diameter	mm	110	110
	Spindle power (cont / 30min)	kW	15/18.5	15/18.5
Spindle 2	Max. spindle speed	min ⁻¹	-	4200
	Type of Spindle nose		-	A2-6
	Chuck size	inch	-	8
	Through-spindle hole diameter	min	-	77
	Min. spindle indexing increment		-	0.001°
	Spindle bearing inner diameter	mm	-	110
Spindle power (cont / 30min)	kW	-	15/18.5	
Tool Spindle	Min. B-axis indexing increment		5°	5°
	Taper hole of rotary tool spindle		HSK-T63(OPT.Capto C6)	HSK-T63(OPT.Capto C6)
	Tool storage capacity		32(OPT.40/60)	32(OPT.40/60)
	Max. tool diameter (with adjacent tools)	mm	90	90
	Max. tool diameter (without adjacent tools)	mm	130	130
	Max. tool length	mm	300	300
	Max. tool mass	kg	7	7
	Tool changing time (tool-to-tool)	s	3.3	3.3
Tool changing time (chip-to-chip)	s	7.5	7.5	
Lower Turret	Number of tool stations		-	-
	Shank height for square tool	mm	-	-
Tailstock	Taper hole of tailstock spindle		Live center MT5	-
Feedrate	Rapid traverse rate	m/min	Tool spindle X: 30, Y: 30, Z: 30 Spindle 2 E: 30	Tool spindle X: 30, Y: 30, Z: 30 Spindle 2 E: 30
Machine Size	Machine height (from floor)	mm	2720	2720
	Floor space (width X depth)	mm	4580/5080/6080 X 2850	4580/5080/6080 X 2850
	Mass of machine	kg	14500/16600/18800	14800/16900/19100

FCL-20ITS	FCL-30I	FCL-30IS	FCL-30ITS
660	660	660	660
660	660	660	660
Ø300(Lower Turret)	Ø660	Ø660	Ø660
1050/1550/2550	1000/1500/2500	1000/1500/2500	1000/1500/2500
1170	1170	1170	1170
65	77	77	77
675(-125~+550)	675(-125~+550)	675(-125~+550)	675(-125~+550)
1080/1580/2580	1080/1580/2580	1080/1580/2580	1080/1580/2580
220	-	-	220
680/1180/2180	-	-	680/1180/2180
1000/1500/2500	1000/1500/2500	1000/1500/2500	1000/1500/2500
±120°	±120°	±120°	±120°
4200	3500	3500	3500
A2-6	A2-8	A2-8	A2-8
8	10	10	10
77	90	90	90
0.001°	0.001°	0.001°	0.001°
110	130	130	130
15/18.5	18.5/22	18.5/22	18.5/22
4200	-	3500	3500
A2-6	-	A2-8	A2-8
8	-	10	10
77	-	90	90
0.001°	-	0.001°	0.001°
110	-	130	130
15/18.5	-	15/18.5	15/18.5
5°	5°	5°	5°
HSK-T63(OPT.Capto C6)	HSK-T63(OPT.Capto C6)	HSK-T63(OPT.Capto C6)	HSK-T63(OPT.Capto C6)
32(OPT.40/60)	32(OPT.40/60)	32(OPT.40/60)	32(OPT.40/60)
90	90	90	90
130	130	130	130
300	300	300	300
7	7	7	7
3.3	3.3	3.3	3.3
7.5	7.5	7.5	7.5
9 positions	-	-	9 positions
25	-	-	25
-	Live center MT5	-	-
Tool spindle X: 30, Y: 30, Z: 30 Lower turret X2: 30, Z2: 30 Spindle 2 E: 30	Tool spindle X: 30, Y: 30, Z: 30 Spindle 2 E: 30	Tool spindle X: 30, Y: 30, Z: 30 Spindle 2 E: 30	Tool spindle X: 30, Y: 30, Z: 30 Lower turret X2: 30, Z2: 30 Spindle 2 E: 30
2720	2720	2720	2720
4580/5080/6080 X 2850	4580/5080/6080 X 2850	4580/5080/6080 X 2850	4580/5080/6080 X 2850
14800/16900/19100	14600/16700/18900	14900/17000/19200	15100/17200/19400

STANDARD ACCESSORIES

- 3 bar ~ 750w coolant pump
- Tools & tool box
- Heat exchanger for electrical cabinet
- Coolant tank
- Working light
- Three color alarm light
- Chip conveyor and bucket
- Automatic lubrication system
- Hydraulic unit

OPTIONAL ACCESSORIES

- Y-AXIS
- C-AXIS
- CE / TS electric control
- Automatic tool setter
- Main power transformer
- Automatic door & safety switch
- Automatic parts catcher
- Prevent crash installation of each axis (safety equipment)
- Bar feeder
- Parts cut off detector
- Larger hydraulic chuck
- Air conditioner for electrical cabinet
- Larger Spindle power
- High pressure coolant pump
- Oil mist collector
- Oil skimmer
- Manual / Hydraulic steady rest
- tailstock
- BMT type turret

FCL-B SPECIFICATIONS

MODEL	ITEM	UNIT	FCL-20B	FCL-20BS
Capacity	Max. swing of workpiece	mm	660	660
	Swing over cross slide	mm	660	660
	Max. turning diameter (Tool spindle / Lower Turret)	mm	Ø660	Ø660
	Max. turning length	mm	1050/1550/2550	1050/1550/2550
	Center high	mm	1170	1170
	Bar work capacity	mm	65	65
Travel	X-axis travel (tool spindle)	mm	675(-125~+550)	675(-125~+550)
	Y-axis travel (tool spindle)	mm	±150	±150
	Z-axis travel (tool spindle)	mm	1080/1580/2580	1080/1580/2580
	X2-axis travel (tool spindle)	mm	-	-
	Z2-axis travel (tool spindle)	mm	-	-
	E-axis travel (tool spindle/sub-spindle)	mm	1050/1550/2550	1050/1550/2550
	B-axis rotation range (tool spindle)	deg.	±120°	±120°
Spindle 1	Max. spindle speed	min ⁻¹	4200	4200
	Type of spindle nose		A2-6	A2-6
	Chuck size	inch	8	8
	Through-spindle hole diameter	min	77	77
	Min. spindle indexing increment		0.001°	0.001°
	Spindle bearing inner diameter	mm	110	110
	Spindle power(cont/30 min)	kW	15/18.5	15/18.5
Spindle 2	Max. spindle speed	min ⁻¹	-	4200
	Type of Spindle nose		-	A2-6
	Chuck size	inch	-	8
	Through-spindle hole diameter	min	-	77
	Min. spindle indexing increment		-	0.001°
	Spindle bearing inner diameter	mm	-	110
Spindle power (cont/30 min)	kW	-	15/18.5	
Tool Spindle	Min. B-axis indexing increment		0.001°	0.001°
	Max. tool spindle speed	min ⁻¹	12000	12000
	Taper hole of rotary tool spindle		HSK-T63(OPT.Capto C6)	HSK-T63(OPT.Capto C6)
	Inner diameter of rotary tool spindle bearing	mm	70	70
	Tool storage capacity		32(OPT.40/60)	32(OPT.40/60)
	Max. tool diameter (with adjacent tools)	mm	90	90
	Max. tool diameter (without adjacent tools)	mm	130	130
	Max. tool length	mm	300	300
	Max. tool mass	kg	8	8
	Tool changing time (tool-to-tool)	s	3.3	3.3
	Tool changing time (chip-to-chip)	s	7.5	7.5
	Spindle power (cont/30 min)	kW	9/11	9/11
Lower Turret	Number of tool stations		-	-
	Shank height for square tool	mm	-	-
Tailstock	Taper hole of tailstock spindle		Live center MT5	-
Feedrate	Rapid traverse rate	m/min	Tool spindle X: 30 , Y: 30 , Z: 30 Spindle 2 E: 30	Tool spindle X: 30 , Y: 30 , Z: 30 Spindle 2 E: 30
Machine Size	Machine height (from floor)	mm	2720	2720
	Floor space (width X depth)	mm	4580/5080/6080 X 2850	4580/5080/6080 X 2850
	Mass of machine	kg	14500/16600/18800	14800/16900/19100

FCL-20BTS	FCL-30B	FCL-30BS	FCL-30BTS
660	660	660	660
660	660	660	660
Ø300(Lower Turret)	Ø660	Ø660	Ø300(Lower Turret)
1050/1550/2550	1000/1500/2500	1000/1500/2500	1000/1500/2500
1170	1170	1170	1170
65	77	77	77
675(-125~+550)	675(-125~+550)	675(-125~+550)	675(-125~+550)
±150	±150	±150	±150
1080/1580/2580	1080/1580/2580	1080/1580/2580	1080/1580/2580
220	-	-	220
680/1180/2180	-	-	680/1180/2180
1000/1500/2500	1000/1500/2500	1000/1500/2500	1000/1500/2500
±120°	±120°	±120°	±120°
4200	3500	3500	3500
A2-6	A2-8	A2-8	A2-8
8	10	10	10
77	90	90	90
0.001°	0.001°	0.001°	0.001°
110	130	130	130
15/18.5	18.5/22	18.5/22	18.5/22
4200	-	3500	3500
A2-6	-	A2-8	A2-8
8	-	10	10
77	-	90	90
0.001°	-	0.001°	0.001°
110	-	130	130
15/18.5	-	15/18.5	15/18.5
0.001°	0.001°	0.001°	0.001°
12000	12000	12000	12000
HSK-T63(OPT.Capto C6)	HSK-T63(OPT.Capto C6)	HSK-T63(OPT.Capto C6)	HSK-T63(OPT.Capto C6)
70	70	70	70
32(OPT.40/60)	32(OPT.40/60)	32(OPT.40/60)	32(OPT.40/60)
90	90	90	90
130	130	130	130
300	300	300	300
8	8	8	8
3.3	3.3	3.3	3.3
7.5	7.5	7.5	7.5
9/11	9/11	9/11	9/11
9 positions	-	-	9 positions
25	-	-	25
-	Live center MT5	-	-
Tool spindle X: 30 , Y: 30 , Z: 30 Lower turret X2: 30 , Z2: 30 Spindle 2 E: 30	Tool spindle X: 30 , Y: 30 , Z: 30 Spindle 2 E: 30	Tool spindle X: 30 , Y: 30 , Z: 30 Spindle 2 E: 30	Tool spindle X: 30 , Y: 30 , Z: 30 Lower turret X2: 30 , Z2: 30 Spindle 2 E: 30
2720	2720	2720	2720
4580/5080/6080 X 2850	4580/5080/6080 X 2850	4580/5080/6080 X 2850	4580/5080/6080 X 2850
15000/17100/19300	14100/16700/18900	14900/17000/19200	15100/17200/19400

STANDARD ACCESSORIES

- 3 bar ~ 750w coolant pump
- Tools & tool box
- Heat exchanger for electrical cabinet
- Coolant tank
- Working light
- Three color alarm light
- Chip conveyor and bucket
- Automatic lubrication system
- Hydraulic unit

OPTIONAL ACCESSORIES

- CE / TS electric control
- Automatic tool setter
- Main power transformer
- Automatic door & safety switch
- Automatic parts catcher
- Prevent crash installation of each axis (safety equipment)
- Bar feeder
- Parts cut off detector
- Larger hydraulic chuck
- Air conditioner for electrical cabinet
- Larger Spindle power
- High pressure coolant pump
- Oil mist collector
- Oil skimmer
- Manual / Hydraulic steady rest
- tailstock
- BMT type turret