

Specifications:

	MODEL	FCL-15TT		FCL-20TT		FCL-25TT	
Capacity	No. of Axes	STD:5-Axis OPT:7-Axis (C-Axis)		STD:5-Axis OPT:7-Axis (C-Axis)		STD:5-Axis OPT:7-Axis (C-Axis)	
	Swing Over Bed	φ 620mm (24.41")		φ 620mm (24.41")		φ 620mm (24.41")	
	Max. Turning Dia.	φ 440mm (17.32")		φ 440mm (17.32")		φ 440mm (17.32")	
	Working Length	310mm (12.20")		290mm (11.41")		270mm (10.62")	
Main and Sub Spindle	Spindle Nose Bar Internal Taper	L:ASA A2-5 R:ASA A2-5		L:ASA A2-6 R:ASA A2-5		L:ASA A2-6 R:ASA A2-6	
	Spindle Bore	φ 56mm (2.2")	φ 56mm (2.2")	φ 61mm (2.4")	φ 56mm (2.2")	φ 77mm (3")	φ 61mm (2.4")
	Bar Capacity	φ 45mm (1.7")	φ 45mm (1.7")	φ 51mm (2")	φ 45mm (1.7")	φ 65mm (2.5")	φ 51mm (2")
	Range of Spindle Speed	10-6000rpm	10-6000rpm	10-4200rpm	10-6000rpm	10-3500rpm	10-4200rpm
	Living Tools Speed	OPT:25-4000rpm		OPT:25-4000rpm		OPT:25-4000rpm	
	No. of Spindle Speed	Infinitely variable		Infinitely variable		Infinitely variable	
Chuck	Hydraulic Chuck	φ 169mm (6")	φ 169mm (6")	φ 210mm (8")	φ 169mm (6")	φ 254mm (10")	φ 210mm (8")
Turret (L/R)	Tool Station (Random)	Servo-VDI30-12T		Servo-VDI30-12T		Servo-VDI30-12T	
	O.D. Tooling	20x20mm		20x20mm		20x20mm	
	I.D. Tooling	φ 32mm (1.26")		φ 32mm (1.26")		φ 32mm (1.26")	
Cross Slide (X1,X2Axis) and Carriage (Z1,Z2Axis, E Axis)	X1, X2 Axis Travel	245mm (9.64")		245mm (9.64")		245mm (9.64")	
	Z1, Z2 Axis Travel	342mm (13.46")		342mm (13.46")		342mm (13.46")	
	E Axis Travel	520mm (20.47")		500mm (19.68")		470mm (18.5")	
	Rapid Traverse Speed(X1,X2 Axis)	20m/min (787ipm)		20m/min (787ipm)		20m/min (787ipm)	
	Rapid Traverse Speed (Z1, Z2Axis)	20m/min (787ipm)		20m/min (787ipm)		20m/min (787ipm)	
	Rapid Traverse Speed (E Axis)	20m/min (787ipm)		20m/min (787ipm)		20m/min (787ipm)	
Motor	Cutting Feed Rate (X and Z Axis)	0.001-500mm/rev.		0.001-500mm/rev.		0.001-500mm/rev.	
	Main Spindle (Continuous)	α p12 i	5.5kw (7.5HP)	α P18 i	9kw (12HP)	α P22 i	11kw (15HP)
	Main Spindle (30 min.Rating)		7.5kw (10HP)		11kw (15HP)		15kw (20HP)
	Sub Spindle (Continuous)	α 6 i	5.5kw (7.5HP)	α 6 i	5.5kw (7.5HP)	α 8 i	7.5kw (10HP)
	Sub Spindle (30 min.Rating)		7.5kw (10HP)		7.5kw (10HP)		11kw (15HP)
	X1, X2 Axis	α 8Bi/3000 1.6kw (2.15HP)x2		α 8Bi/3000 1.6kw (2.15HP)x2		α 12Bi/3000 3kw (4HP)x2	
Tank Capacity	Z1, Z2 Axis	α 8i/3000 1.6kw (2.15HP)x2		α 8i/3000 1.6kw (2.15HP)x2		α 8i/3000 1.6kw (2.15HP)x2	
	E Axis	α 8i/3000 1.6kw (2.15HP)		α 8i/3000 1.6kw (2.15HP)		α 8i/3000 1.6kw (2.15HP)	
	Hydraulic Pump	1.5kw (2HP)		1.5kw (2HP)		1.5kw (2HP)	
	Coolant Pump	750w (1HP)x2		750w (1HP)x2		750w (1HP)x2	
	Hydraulic Tank	60 Liter		60 Liter		60 Liter	
	Coolant Tank	100 Liter		100 Liter		100 Liter	
Measurements	Floor Space (L x W)	4150 x 2100mm		4150 x 2100mm		4150 x 2100mm	
	Height	2350mm		2350mm		2350mm	
	Weight (Nw / GW)	7160 kg / 7830 kg		7300 / 8000 kgs		7400 / 8100 kgs	

Standard Accessories:

1. High Pressure Cooling System (3 Bar)
2. 100 Liter Capacity Cooling Tank
3. Servo Turret 12-Position
4. Auto Lubrication System
5. Tool Kit
6. Work Light
7. Tricolor Alarm Light
8. Hydraulic Unit
9. Heat Exchanger for Electric Cabinet
10. Chip Conveyor and Bucket

Optional Accessories:

1. C.E. Electric Control
2. Auto Tool Setter Measurement
3. Manual Tool Setter Measurement
4. Cs axis Contour Capability
5. Main Transformer
6. Safety Door Interlocker
7. Sub Spindel Parts Catcher and bouncing equipment
8. Prevent Crash Install of Each Axis(Safety Equipment)
9. Bar Feeder
10. Parts Cut off Detector

Specifications:

	MODEL	FCL-15TS		FCL-20TS		FCL-30TS	
Capacity	No. of Axes	STD:3-Axis OPT:5-Axis (C-Axis)		STD:3-Axis OPT:5-Axis (C-Axis)		STD:3-Axis OPT:5-Axis (C-Axis)	
	Swing Over Bed	φ 600mm (23.62")		φ 650mm (25.59")		φ 650mm (25.59")	
	Max. Turning Dia.	φ 245mm (9.64")		φ 490mm (19.29")		φ 470mm (18.5")	
	Working Length	260mm (10.23")		500mm (19.68")		470mm (18.5")	
Main and Sub Spindle	Spindle Nose Bar Internal Taper	L:ASA A2-5 R:ASA A2-5		L:ASA A2-6 R:ASA A2-5		L:ASA A2-8 R:ASA A2-6	
	Spindle Bore	φ 56mm (2.2")	φ 56mm (2.2")	φ 61mm (2.4")	φ 56mm (2.2")	φ 90mm (3.54")	φ 61mm (2.4")
	Bar Capacity	φ 45mm (1.7")	φ 45mm (1.7")	φ 51mm (2")	φ 45mm (1.7")	φ 77mm (3")	φ 51mm (2")
	Range of Spindle Speed	10-6000rpm	10-6000rpm	10-4200rpm	10-6000rpm	10-3500rpm	10-4200rpm
	Living Tools Speed	OPT:25-4000rpm		OPT:25-4000rpm		OPT:25-4000rpm	
	No. of Spindle Speed	Infinitely variable		Infinitely variable		Infinitely variable	
Chuck	Hydraulic Chuck	φ 169mm (6")	φ 169mm (6")	φ 210mm (8")	φ 169mm (6")	φ 254mm (10")	φ 210mm (8")
Turret	Tool Station (Random)	STD:Hyd LS-200-12T OPT:Servo LS-200-12T		STD:Hyd LS-240-12T OPT:Servo LS-240-12T		STD:Hyd LS-240-12T OPT:Servo LS-240-12T	
	O.D. Tooling	20x20mm		20x20mm		25x25mm	
	I.D. Tooling	φ 32mm (1.26")		φ 32mm (1.26")		φ 40mm (1.57")	
Cross Slide (X Axis) and Carriage (Z Axis, E Axis)	X Axis Travel	165mm (6.5")		280mm (11.02")		280mm (11.02")	
	Z Axis Travel	310mm (12.2")		560mm (22.05")		540mm (21.26")	
	E Axis Travel	260mm (10.23")		500mm (19.68")		470mm (18.5")	
	Rapid Traverse Speed (X Axis)	30m/min (1180ipm)		30m/min (1180ipm)		30m/min (1180ipm)	
	Rapid Traverse Speed (Z Axis)	30m/min (1180ipm)		30m/min (1180ipm)		30m/min (1180ipm)	
	Rapid Traverse Speed (E Axis)	20m/min (787ipm)		20m/min (787ipm)		20m/min (787ipm)	
Motor	Cutting Feed Rate (X and Z Axis)	0.001-500mm/rev.		0.001-500mm/rev.		0.001-500mm/rev.	
	Main Spindle (Continuous)	α P12 i	5.5kw (7.5HP)	α P18 i	9kw (12HP)	α P22 i	11kw (15HP)
	Main Spindle (30 min.Rating)		7.5kw (10HP)		11kw (15HP)		15kw (20HP)
	Sub Spindle (Continuous)	α 6 i	5.5kw (7.5HP)	α 6 i	5.5kw (7.5HP)	α 8 i	7.5kw (10HP)
	Sub Spindle (30 min.Rating)		7.5kw (10HP)		7.5kw (10HP)		11kw (15HP)
	X Axis	α 8Bi/3000 1.6kw (2.15HP)		α 8Bi/3000 1.6kw (2.15HP)		α 12Bi/3000 3.0kw (4HP)	
Tank Capacity	Z Axis	α 8i/3000 1.6kw (2.15HP)		α 8i/3000 1.6kw (2.15HP)		α 12i/3000 3.0kw (4HP)	
	E Axis	α 8i/3000 1.6kw (2.15HP)		α 8i/3000 1.6kw (2.15HP)		α 8i/3000 1.6kw (2.15HP)	
	Hydraulic Pump	1.5kw (2HP)		1.5kw (2HP)		1.5kw (2HP)	
	Coolant Pump	750w (1HP)		750w (1HP)		750w (1HP)	
	Hydraulic Tank	60 Liter		60 Liter		60 Liter	
	Coolant Tank	100 Liter		100 Liter		100 Liter	
Measurements	Floor Space (L x W)	3750 x 2000mm		4150 x 2100mm		4150 x 2100mm	
	Height	2000mm		2100mm		2100mm	
	Weight (Nw / GW)	5280 kg / 5830kg		6440 kg / 7030 kg		6630 kg / 7280kg	

Standard Accessories:

1. High Pressure Cooling System (3 Bar)
2. 100 Liter Capacity Cooling Tank
3. Hydraulic Turret 12-Position
4. Auto Lubrication System
5. Tool Kit
6. Work Light
7. Tricolor Alarm Light
8. Hydraulic Unit
9. Heat Exchanger for Electric Cabinet
10. Chip Conveyor and Bucket

Optional Accessories:

1. C. E. Electric Control
2. Auto Tool Setter Measurement
3. Manual Tool Setter Measurement
4. Cs axis Contour Capability
5. Main Transformer
6. Safety Door Interlocker
7. Sub Spindel Parts Catcher and bouncing equipment
8. Prevent Crash Install of Each Axis (Safety Equipment)
9. Bar Feeder
10. Parts Cut off Detector
11. Servo Turret

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FORCE ONE



MOVE AHEAD WITH FORCE ONE

Twin Spindle / Twin Turret

FCL-15TT

FCL-20TT

FCL-25TT

Twin Spindle / Single Turret

FCL-15TS

FCL-20TS

FCL-30TS



FCL-TS SERIES

FCL-15TS

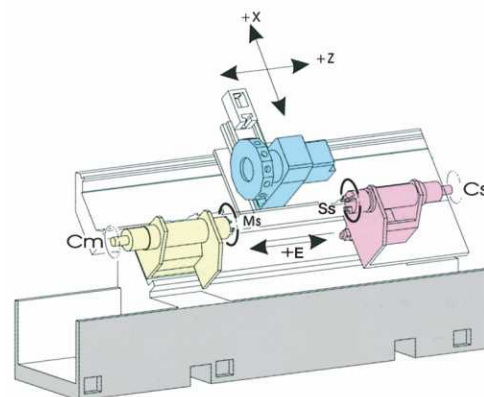
- Swing over bed ϕ 600 mm.
- Max. turning diameter ϕ 245 mm.
- Working length 260 mm.

FCL-20TS

- Swing over bed ϕ 650 mm.
- Max. turning diameter ϕ 490 mm.
- Working length 500 mm.

FCL-30TS

- Swing over bed ϕ 650 mm.
- Max. turning diameter ϕ 470 mm.
- Working length 470 mm.



TWIN SPINDLE SINGLE TURRET

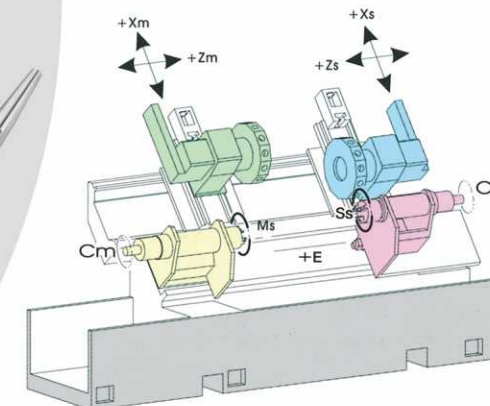
Ms : Main Spindle
Ss : Sub-spindle
Cm : C axis / Main spindle
Cs : C axis / Sub spindle

FCL-TT SERIES



TWIN SPINDLE TWIN TURRET

Ms : Main Spindle
Ss : Sub-spindle
Cm : C axis / Main spindle
Cs : C axis / Sub spindle



FCL-15TT

- Swing over bed ϕ 620 mm.
- Max. turning diameter ϕ 440 mm.
- Working length 310 mm.

FCL-20TT

- Swing over bed ϕ 620 mm.
- Max. turning diameter ϕ 440 mm.
- Working length 290 mm.

FCL-25TT

- Swing over bed ϕ 620 mm.
- Max. turning diameter ϕ 440 mm.
- Working length 270 mm.

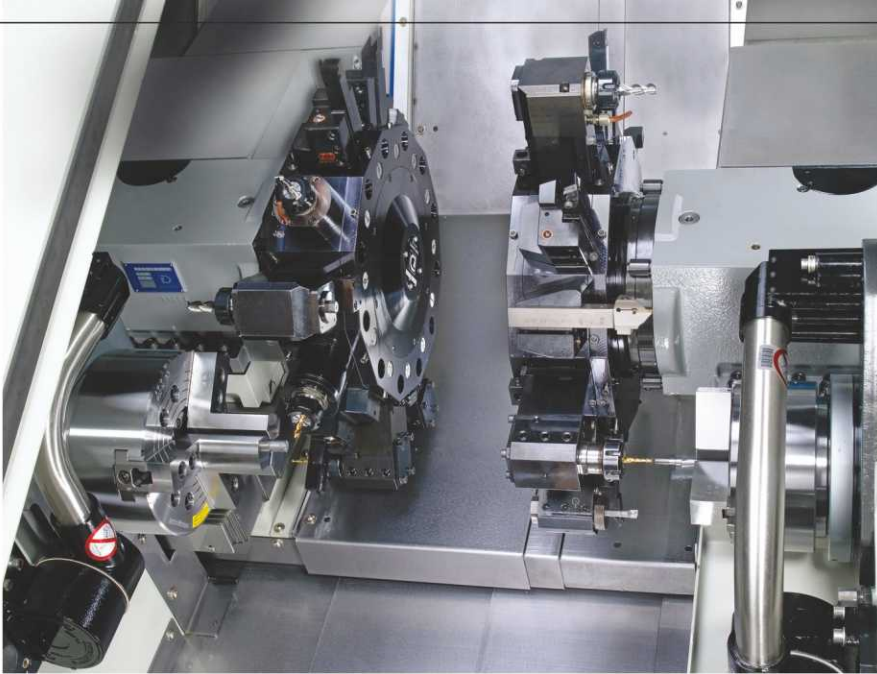
RUGGEDLY AND PRECISELY CONSTRUCTED THROUGHOUT

- The major machine parts, such as the base, saddle, headstock, slide and sub spindle are made of Meehanite cast iron and tempered to relieve stress thereby ensuring lifetime accuracy.
- High performance servo motors are directly coupled to the pre-tensioned ball screws.
- Box guideways on the E axis. Linear guideways on the X and Z axes.
- 45 degrees slant bed construction features efficient chip removal and firm support.



TWIN SPINDLE TWIN TURRET

- The combination of the main spindle and sub-spindle enables the entire workpiece to be machined at one time.
- Twin turrets consists of two 12-position servo turrets.



TWIN SPINDLE / SINGLE TURRET

- The combination of the main spindle and sub-spindle enable the entire workpiece to be machined at one time.
- A single 12-position hydraulic turret. (LS-240)



C-AXIS (OPTIONAL)

- Employs Diplomatic SMBR-16 radial, VDI30, 12-position power turret with Fanuc servo motor. (Rotating tool holder and tools not included.)
- High indexing resolution of 0.001 for precision contour / index control.
- Hydraulic disk brake locking provides maximum stability during milling and contouring.



TD AXIS WITH TURRET (Diplomatic)

- TD-axis & turret with a servo motor turret. The unit allows front and back machining with fast tool change.
- The turret disk and TD axis are driven by a motor.



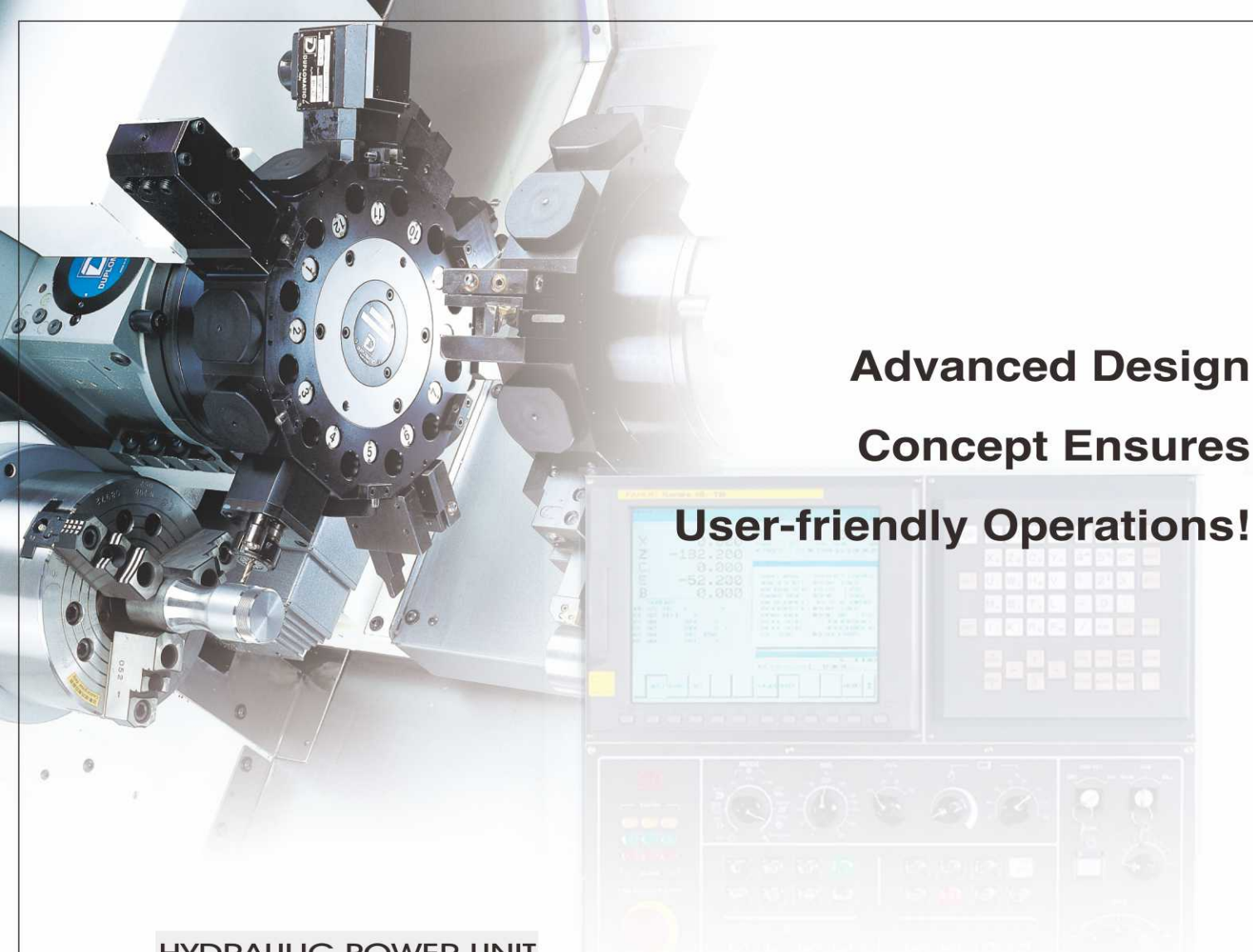
FAST TURRET INDEXING

- The 12-position turret features bi-directional random tool selection.
- Fast indexing time of 0.6 seconds.
- The turret accommodates 20 x 20 mm. O.D. tooling and 32 mm. I.D. tooling.



PRECISION SPINDLE

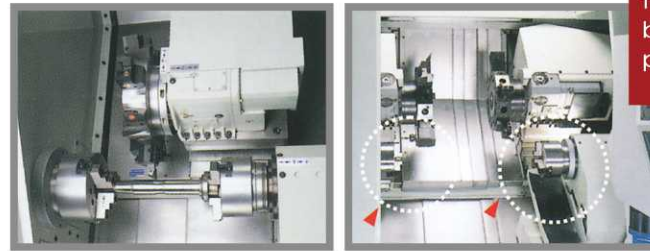
- The cartridge type is conveniently removed allowing for convenient servicing.
- The spindle runs on class P4 precision bearings providing high axial thrust capability and superior radial stability. This ensures high precision during heavy duty turning.



Advanced Design Concept Ensures User-friendly Operations!

SYNCHRONIZED MACHINING ON TWO SPINDLES

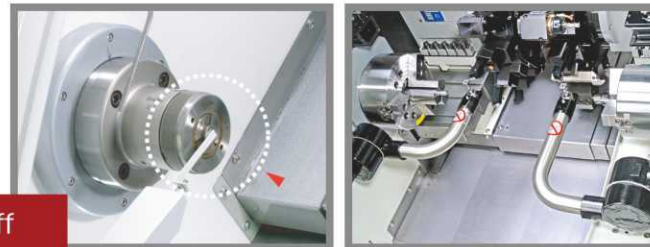
The main spindle and the sub-spindle run synchronizely permitting workpiece machining at one time.



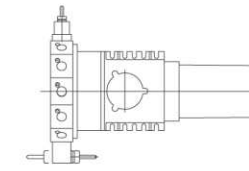
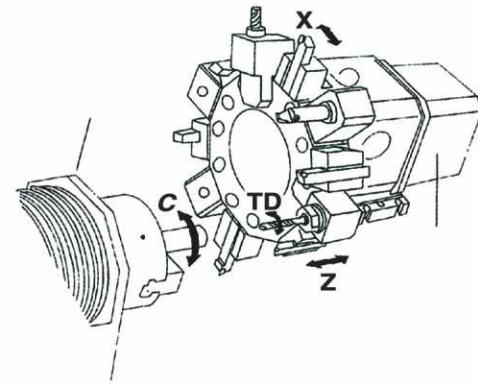
One cycle can finish front side & back machining / parts catcher

MAIN SPINDLE TOOL SETTER AND SUB-SPINDLE TOOL SETTER

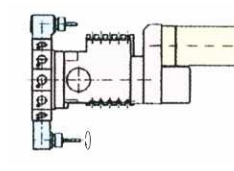
Designed for reducing tool set-up time, the tool setter automatically detects tool wear condition.



Parts Cut-off
Detector



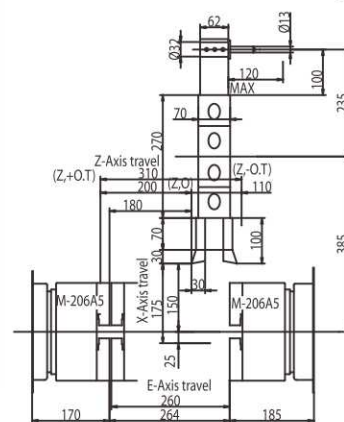
Radial VDI Turret Front and
Back Machining
(Hydraulic Turret for TS Series)
(Servo Turret for TT Series)



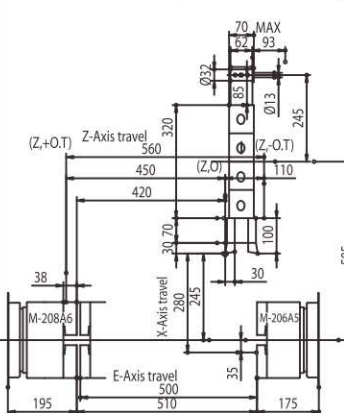
Radial Driven Tool System
VDI Servo Turret
Front and Back Machining
(Opt. for TS.TT Series)

FCL-15TS

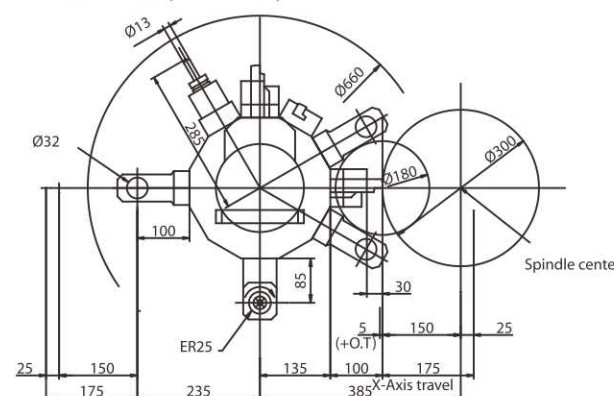
V.D.I. Turret W/C-Axis Moving Range



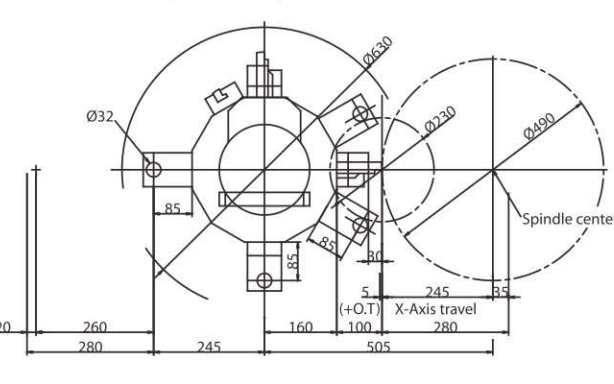
V.D.I. Turret W/C-Axis Moving Range



Relation Between Tool and
Work Dia.(V.D.I Tool)



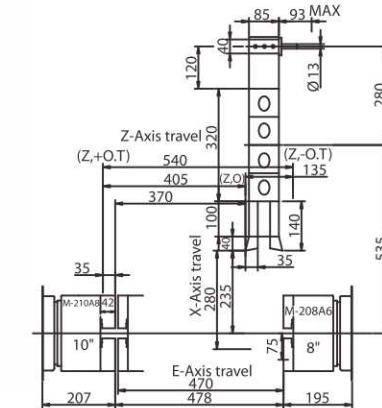
Relation Between Tool and
Work Dia.(V.D.I Tool)



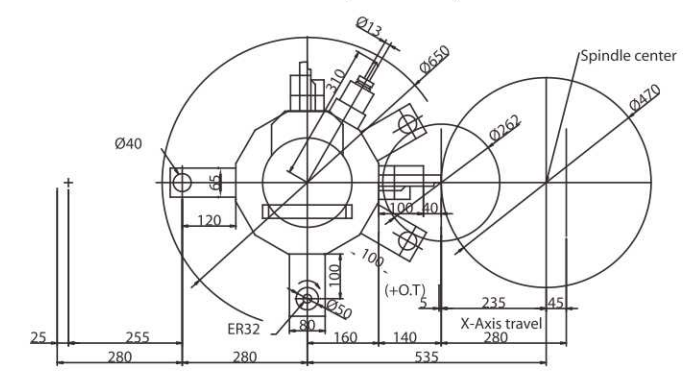
FCL-20TS

FCL-30TS

V.D.I. Turret W/C-Axis Moving Range

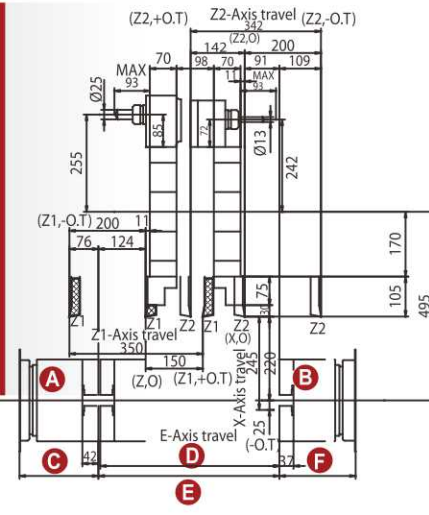


Relation Between Tool and
Work Dia.(V.D.I Tool)



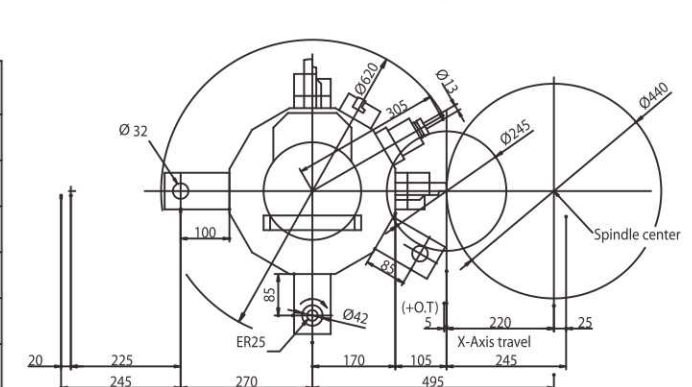
FCL-TT SERIES

V.D.I. Turret W/C-Axis Moving Range



MODEL ITEM	15TT	20TT	25TT
A	M-206AS	M-208A6	M-210A6
B	M-206AS	M-206AS	M-208A6
C	170	185	207
D	520	505	470
E	526	511	475
F	186	186	200

Relation Between Tool and
Work Dia.(V.D.I Tool)



HYDRAULIC POWER UNIT

- The hydraulic power unit employs high quality components for long service life and stable motions.
- The unit delivers high pressure to the turret, CS Brake and 3-jaw chuck.



HIGH PRESSURE COOLANT PUMP



ELECTRICAL CABINET



FANUC CNC