



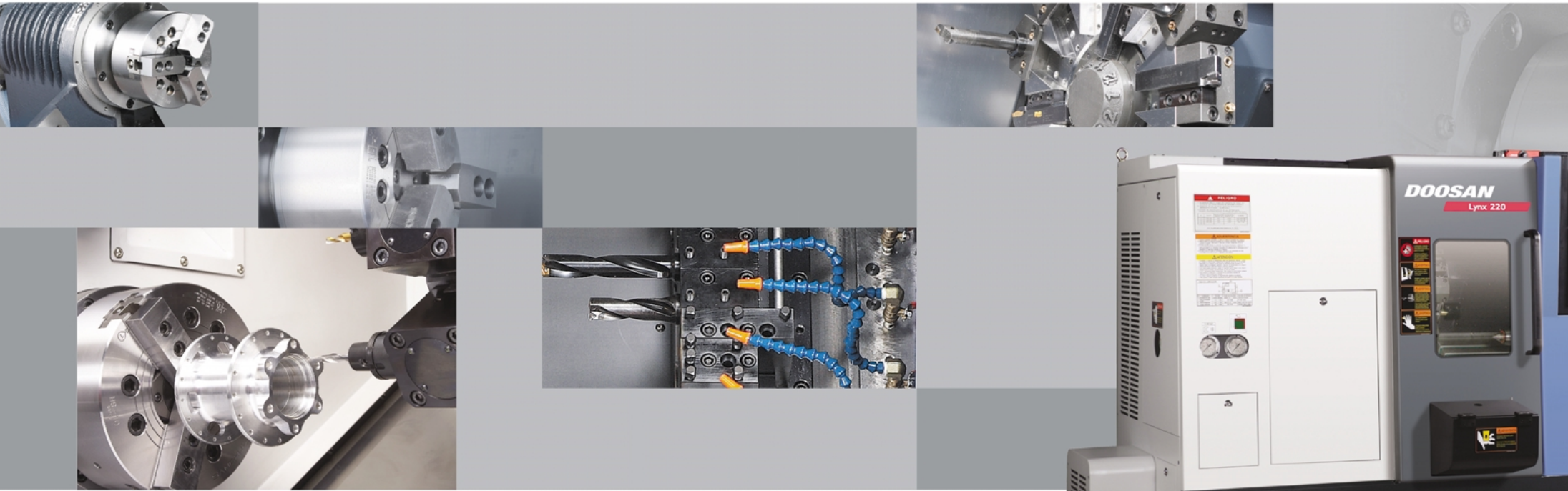
Doosan Infracore
Machine Tools

Lynx Series

High Productivity Turning Center



High Productivity Turning Center



The Lynx series is a accurate, high productivity turning center designed with ultra fast rapids and high-speed turret indexing providing greater value and cost performance.



High Productivity Turning Center

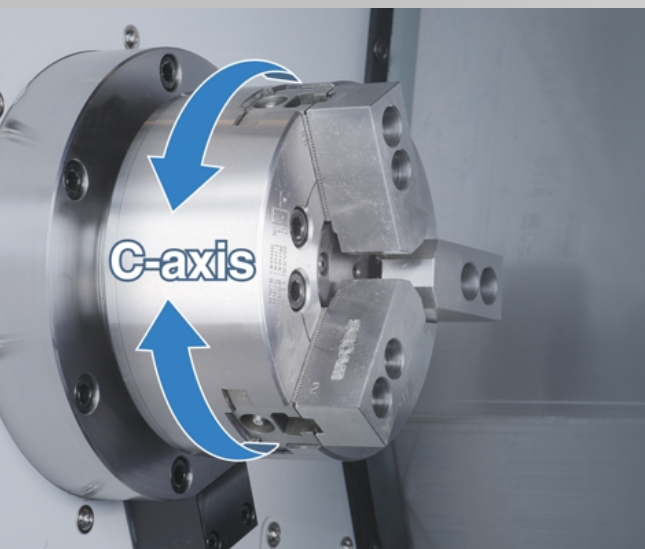
Lynx Series



Main Spindle Lynx series

The C-axis is positioned in degree increments of 0.001.

Through spindle synchronization with the X and Z axes, three dimensional contouring, complex and prismatic machining can be accomplished.



Max. spindle speed

Lynx 220A / B / C : **6000 / 5000 / 4000 r/min** Lynx 300 : **3500 r/min**

Max. turning dia. X length

Lynx 220A[LA] / G : **ø 320 x 322 [542] mm** (ø 12.6 x 12.7[21.3] inch)

Lynx 220B[LB] / 220C[LC] : **ø 320 x 305 [525] mm** (ø 12.6 x 12.0[20.7] inch)

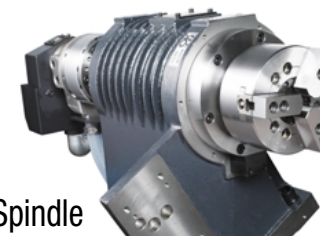
Lynx 220M[LM] : **ø 250 x 290 [510] mm** (ø 9.8 x 11.4[20.1] inch)

Lynx 300 : **ø 450 x 765 mm** (ø 17.7 x 30.1 inch)

Max. bar working dia.

Lynx 220A / B / C : **ø 45 / 51 / 65 mm** (ø 1.8 / 2.0 / 2.6 inch)

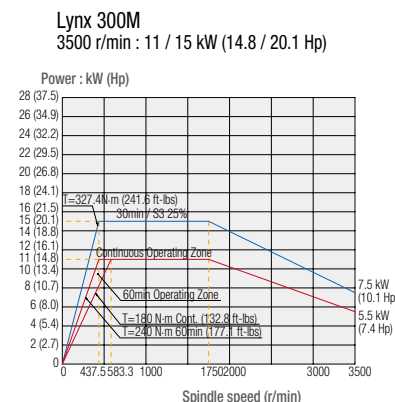
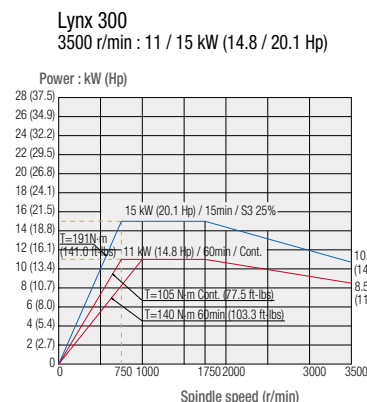
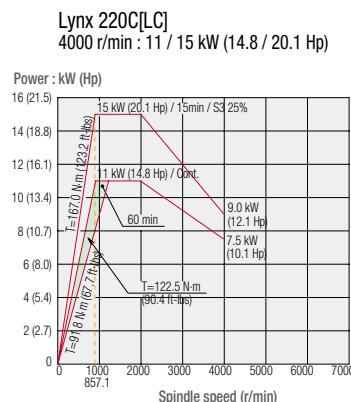
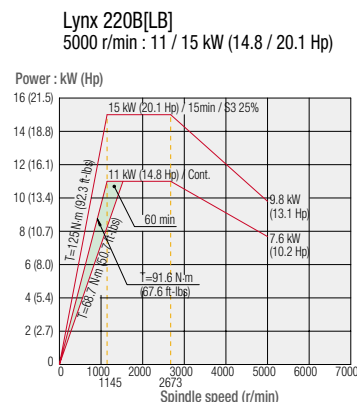
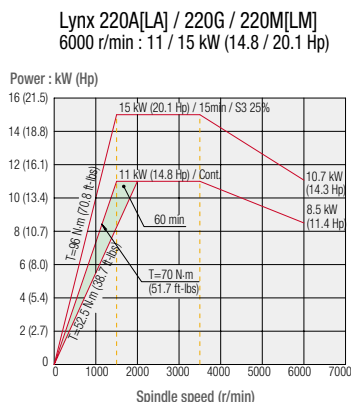
Lynx 300 : **ø 76 mm** (ø 3.0 inch)



Headstock and Spindle

The headstock and main spindle are manufactured in a temperature controlled environment then assembled and tested in our clean room. The heavy duty cartridge type spindle is supported by a triple row angular ball bearing in the front, with a row cylindrical roller bearing in the rear. This combination of bearings is very effective in refraining from thermal displacement of its front nose and improving high speed performance and its rotational precision.

Main spindle power-torque diagram



Turret Lynx series

Rigidity and efficiency provide increased machine performance.

Index time (1-station index)

0.15 s

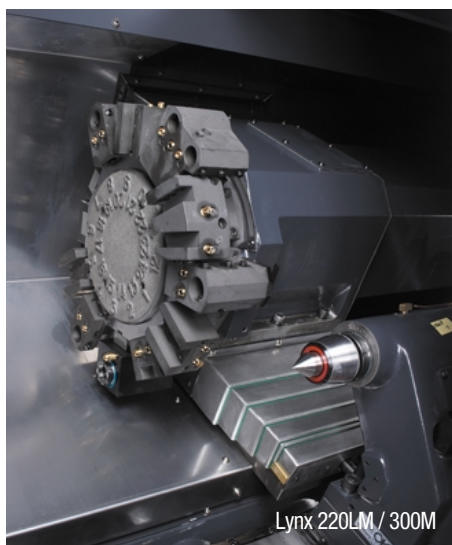
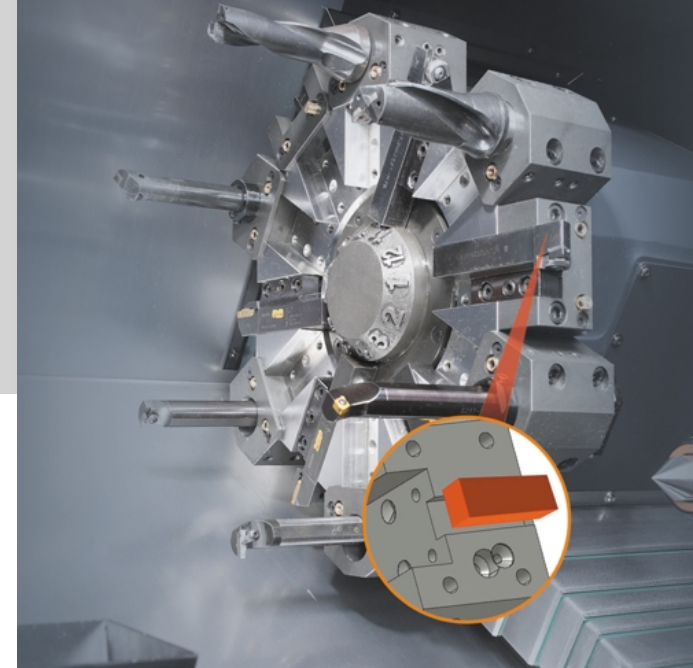
No. of tool stations

Lynx 220 / 300 / 300M[LM] **12** stations

Lynx 220M[LM] **24** stations

The Lynx 220 / 300 / 300M[LM] : 12st, Lynx 220M[LM] : 24 st heavy duty turret features a large 210mm diameter curvic coupling and 39 kN of hydraulic clamp force. The heavy duty design provides unsurpassed rigidity for heavy stock removal, fine surface finishes, long boring bar overhang ratios, and extended tool life.

Turret indexing is non-stop-bi-directional, with a 0.15 second station to station index time. Turning tools are securely attached to the turret by wedge clamps.



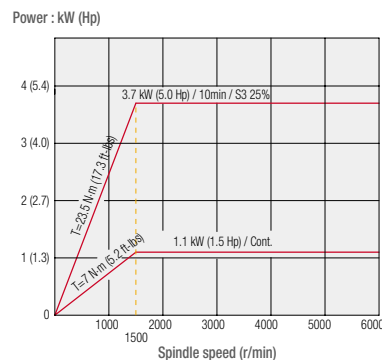
Lynx 220LM / 300M

BMT Turret

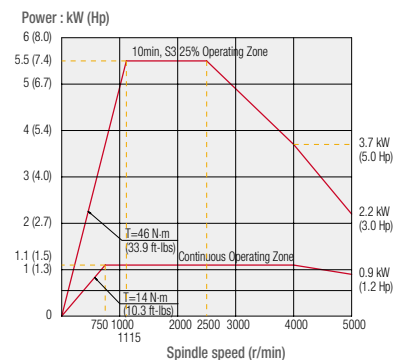
BMT turret makes it possible to complete complicated parts requiring many tools in just one set-up. Reliable servo driven turret reduces the total cycle time required to machine parts.

Rotary tool spindle Power-Torque diagram

Lynx 220LM (BMT45P)

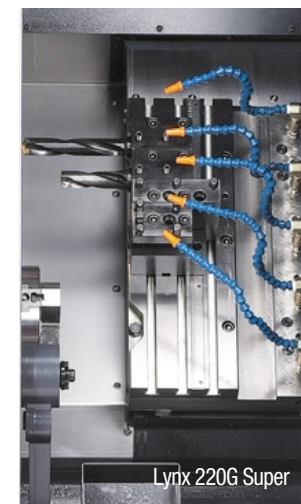


Lynx 300M (BMT55P)



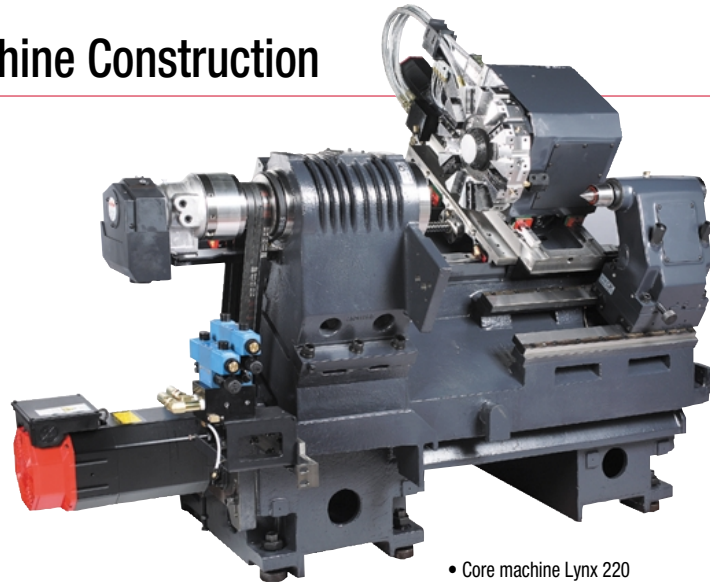
Gang Tooled Tooling

Comparison with general turret indexing, Gang tooled tooling allows high speed tool selection and quick tool changeability to reduce the required cycle process.



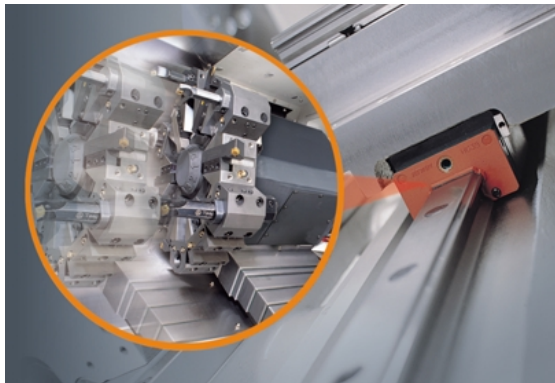
Lynx 220G Super

Machine Construction



• Core machine Lynx 220

Rapid Traverse



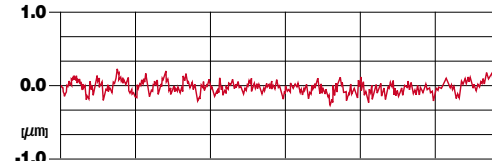
Each axis is powered by a maintenance free digital AC servo motor. These high torque drive motors are connected to the ball screws without intermediate gears for quiet and responsive slide movement with virtually no backlash.

	X-axis	Z-axis
Lynx 220	30 m/min (1181 ipm)	36 m/min (1417 ipm)
Lynx 300	24 m/min (945 ipm)	30 m/min (1181 ipm)

Roughness

0.07 μm (Ra)

P-R-W-Profile Levelled Filter ISO 11562(M1)
Lc/Ls=300 Lc=0.800mm



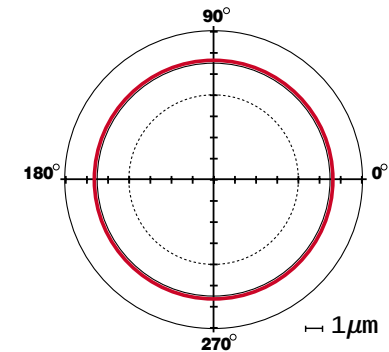
Assessment length 4.80mm Vt=0.50 mm/s

- Material : Brass
- Cutting Feed : 0.025 mm/rev
- Cutting Depth : 0.025 mm
- Cutting Speed : 300 m/min (11811.0 ipm)
- Tool : Diamond (Nose R0.1)

This is actual cutting result. It might be not available under certain circumstances

Roundness

0.30 μm



Productivity

Machining times can be reduced.

- Productivity gains can be achieved through Lynx series.

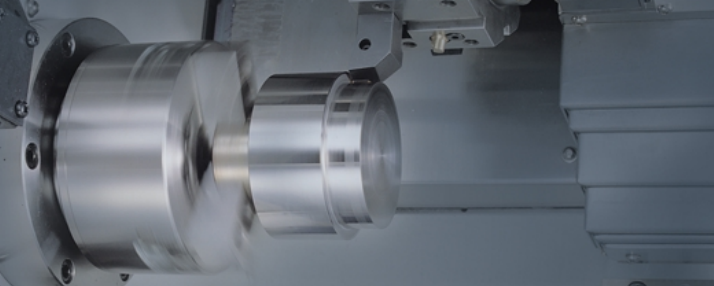


Material : Carbon steel, SM45C
Size : $\varnothing 62 \times 66\text{mm}$ ($\varnothing 2.4 \times 2.6$ inch)

Process	Cutting time	Cutting speed	Feed rate
	s	m/min (ipm)	m/rev
U-drilling ($\varnothing 30$ mm)	18.1	120 (4724.4)	0.2
O.D. cutting (Rough)	9.2	200 (7874.0)	0.45
O.D. cutting (Finish)	18.2	250 (9842.5)	0.2
O.D. grooving1 (4 mm)	3.5	140 (5511.8)	0.2
O.D. grooving2 (8 mm)	5.8	140 (5511.8)	0.17
O.D. threading (M45 x P1.5)	10.4	201 (7913.4)	1.5
Cut-off cutting (4 mm)	15.1	120 (4724.4)	0.1

Cutting time table shown above is the results from real test cutting. The results can be different on cutting condition and strategy.

Total cutting time **80.3 s**
in heavy cutting conditions

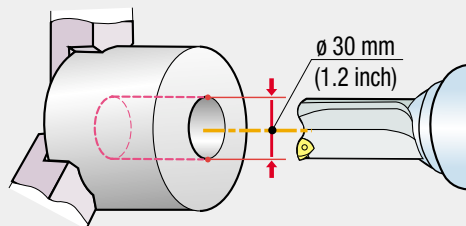


Machine Capacity

Heavy Duty Cutting

Making full use of the high output motor, heavy-duty O.D. cutting is powerful and precise even with large workpieces.

Center Drilling



Chip removal rate

320 cm³/min
(19.5 m³/inch)

Cutting depth

4 mm
(0.16 inch)

Carbon steel, SM45C

Cutting speed

200 m/min (7874.0 ipm)

Feedrate

0.4 mm/rev (0.0 ipr)

* This is actual cutting result. It might be not available under certain circumstances.

Chip removal rate

168 cm³/min (10.25 m³/inch)

Carbon steel, SM45C

Cutting speed

80 m/min (3149 ipm)

Feedrate

0.28 mm/rev (0.011 ipr)

Tailstock

Tailstock

Widely spaced guideways and heavy-duty design of the tailstock body ensure ample rigidity. The tailstock body is positioned by traction bar, which engages with the carriage. The traction bar movement and hydraulic body clamping are manual.

Tailstock specification		Lynx 220ser	Lynx 300ser**
Tailstock travel	mm (inch)	550 (21.7), {330 (13.0)}	775 (30.5)
Tailstock quill diameter	mm (inch)	65 (2.6)	80 (3.1)
Taper hole of tailstock quill		MT4 <Live center>	
Tailstock quill travel	mm (inch)	80 (3.1)	120 (4.7)

** : Only Lynx 300 series can provide programmable tailstock as an optional feature. { } : option



Note) Tail Stock

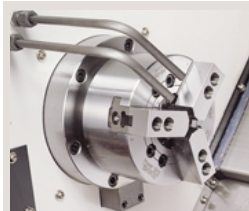
std. Lynx 220LA / LB / LC / LM, Lynx 300 / 300M

opt. Lynx 220A / B / C

N.A. Lynx 220G & Lynx 220M

std. Standard **opt.** Optional **N.A.** Not Available

Optional Equipment



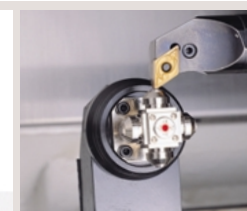
Chuck air (or coolant) blower



Collet chuck



Signal tower



Tool pre-setter



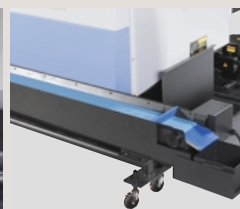
Work measurement



Oil skimmer



Part catcher



Part conveyor



Chip conveyor

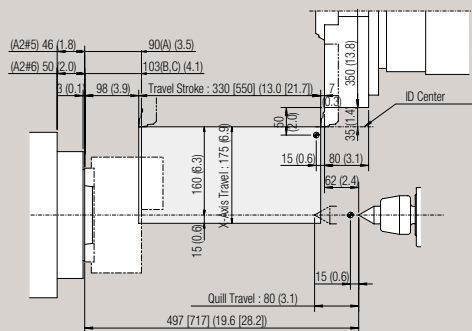
Note) Lynx 220G super does not allow Tool pre-setter application

Working Range

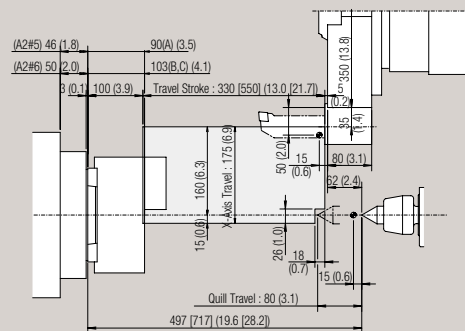
Unit : mm (inch)

Lynx 220A / B / C series

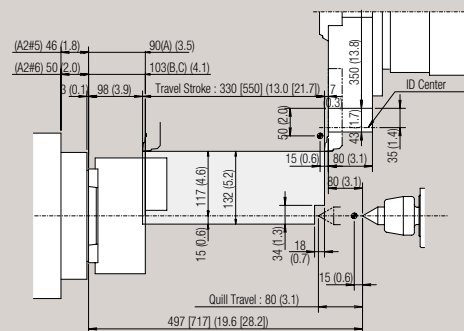
OD Tool Holder



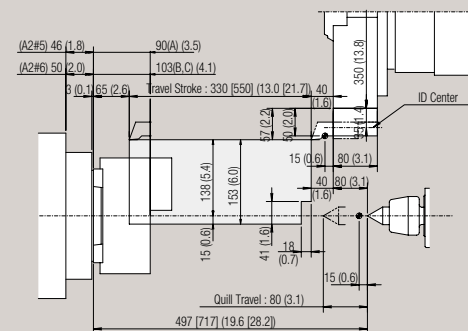
ID Tool Holder



Extended OD Tool Holder

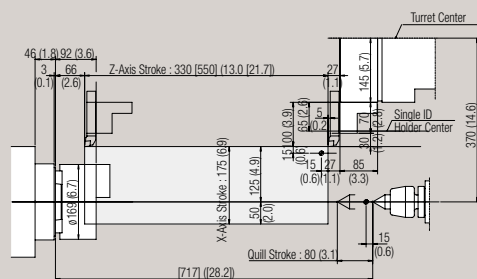


Face Tool Holder

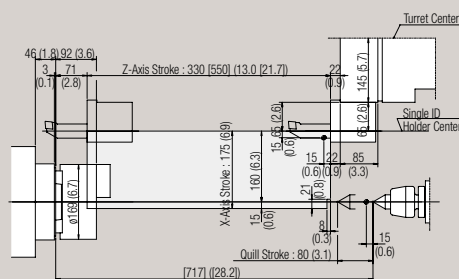


Lynx 220M[LM]

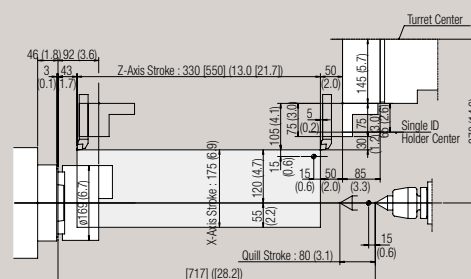
Single OD Tool Holder



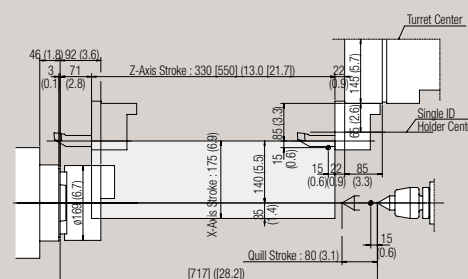
Single ID Tool Holder



Double OD Holder



Double ID Tool Holder



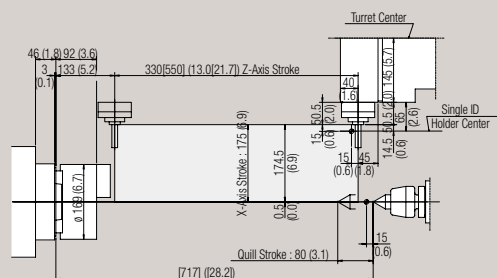
[] : Long bed

Working Range

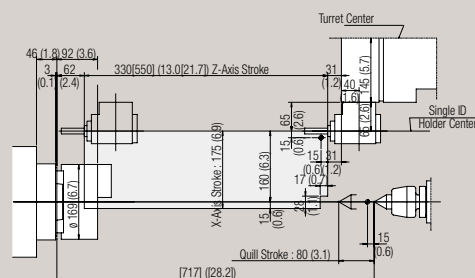
Unit : mm (inch)

Lynx 220M[LM]

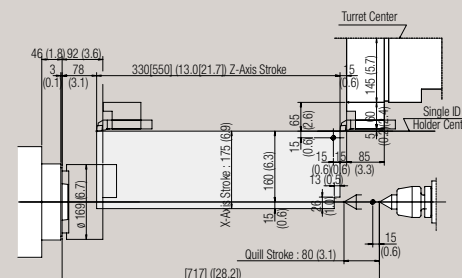
Straight Rev. Tool Holder



Angular Rev. Tool Head

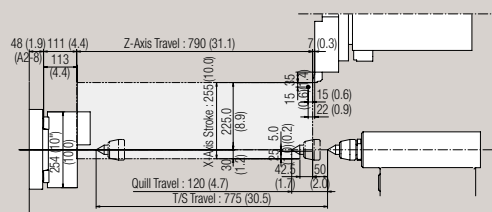


Face Tool Holder

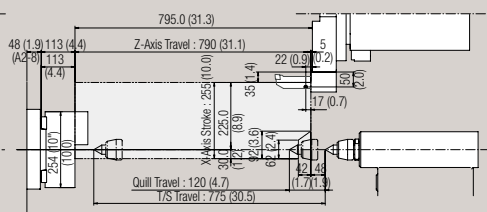


Lynx 300

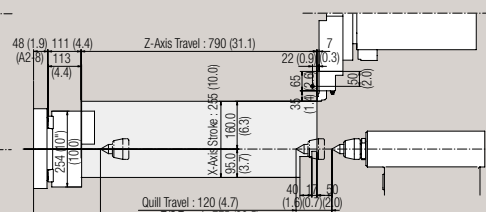
OD Tool Holder



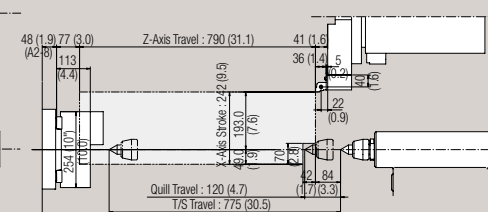
ID Tool Holder



Extended Tool Holder



Face Tool Holder

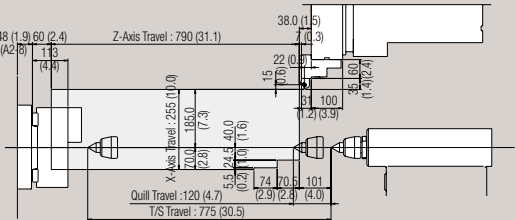


[] : Long bed

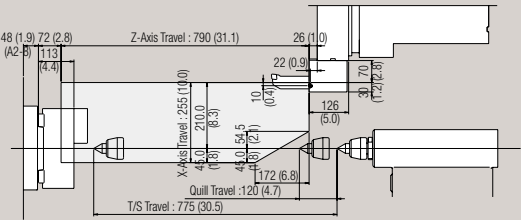
Working Range

Unit : mm (inch)

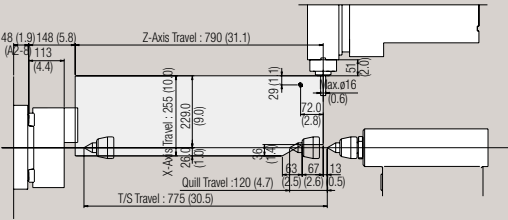
Lynx 300M
OD Tool Holder



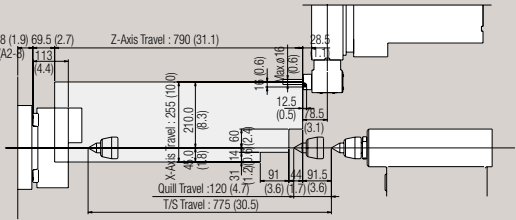
ID Tool Holder



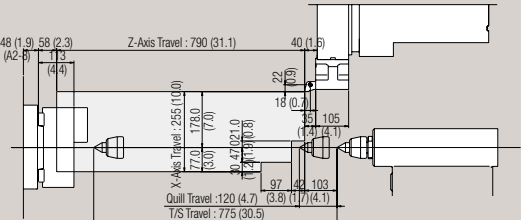
Straight Milling Tool Holder



Angular Milling Tool Holder



Face Tool Holder

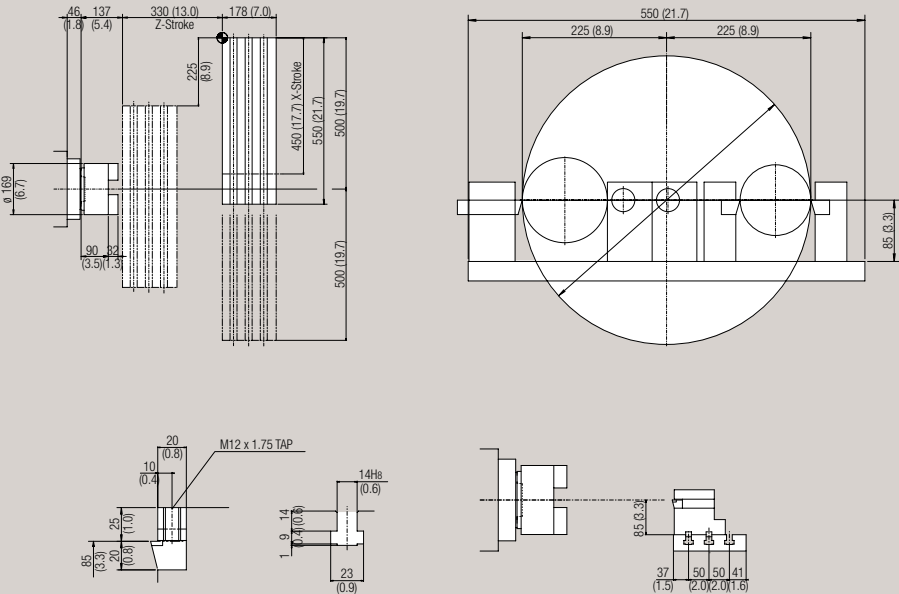


[] : Long bed

Working Range

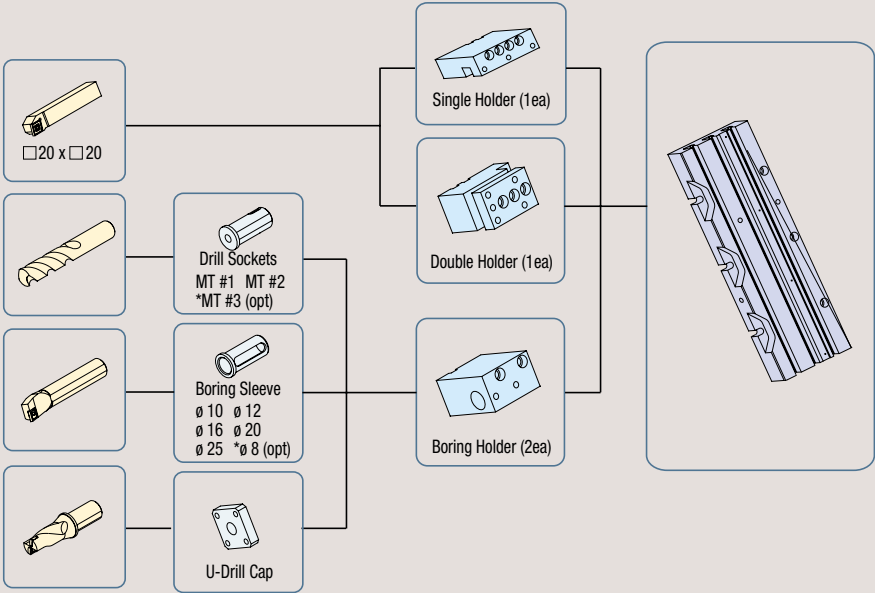
Unit : mm (inch)

Lynx 220G Super



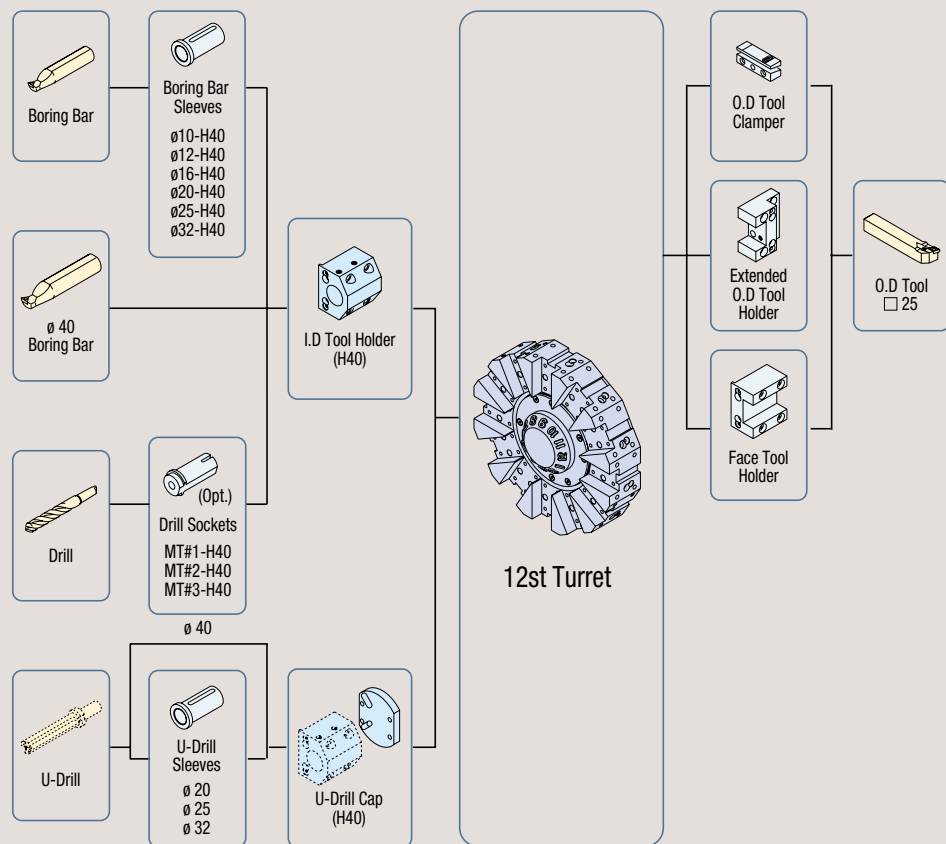
Tooling System

Lynx 220G Super

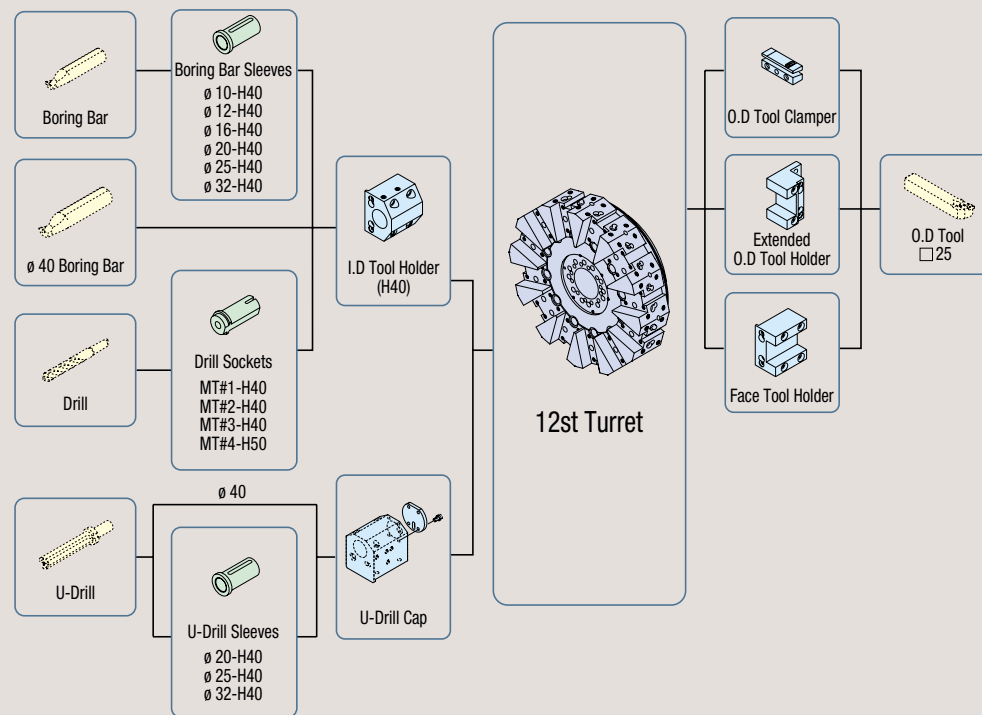


Tooling System

Lynx 220A / B / C[LA / LB / LC] series

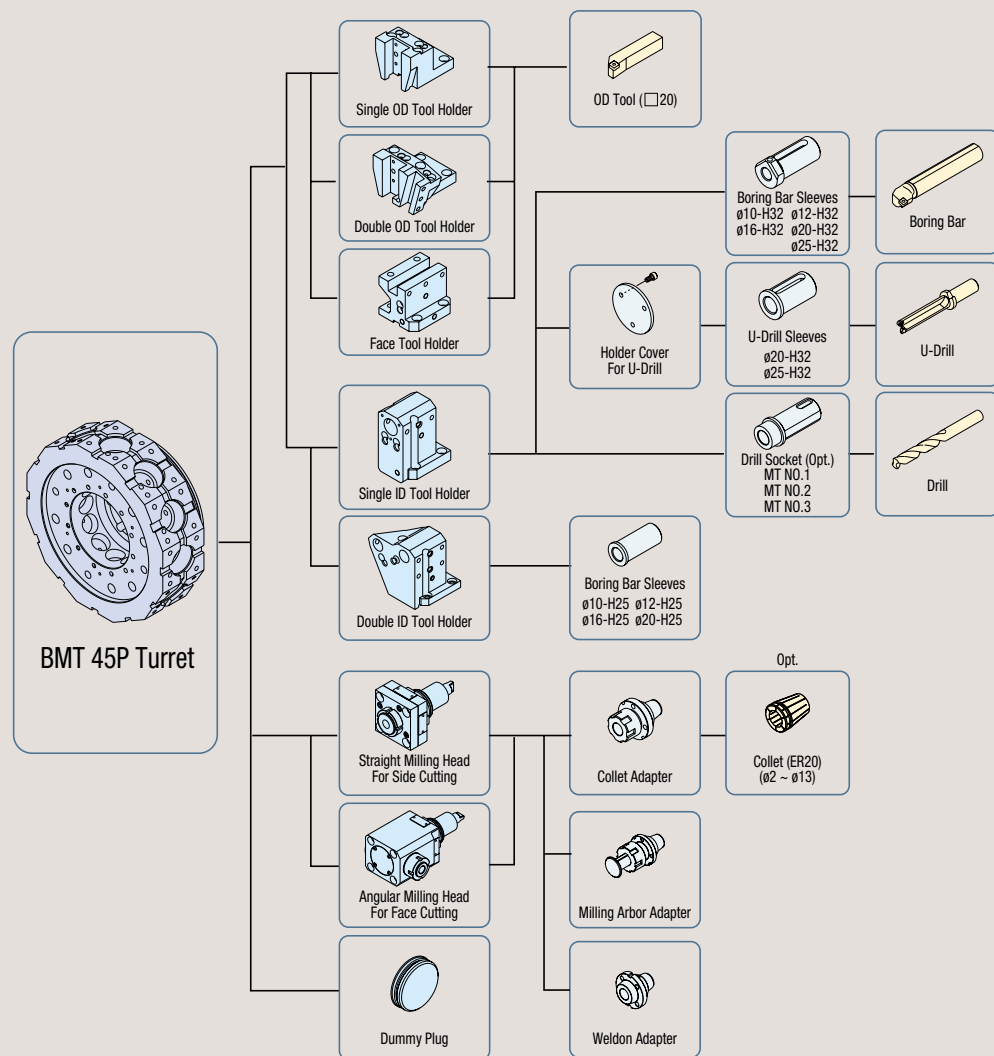


Lynx 300

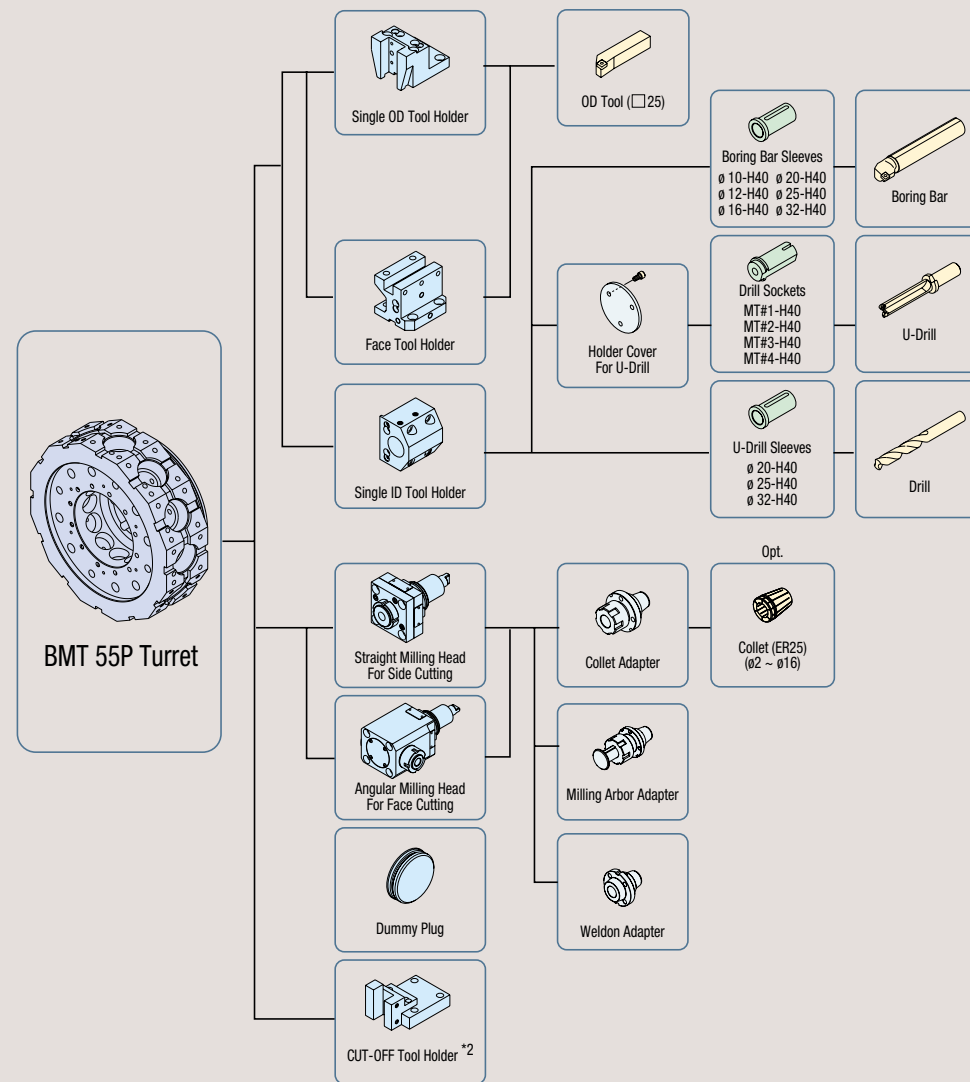


Tooling System

Lynx 220M[LM]



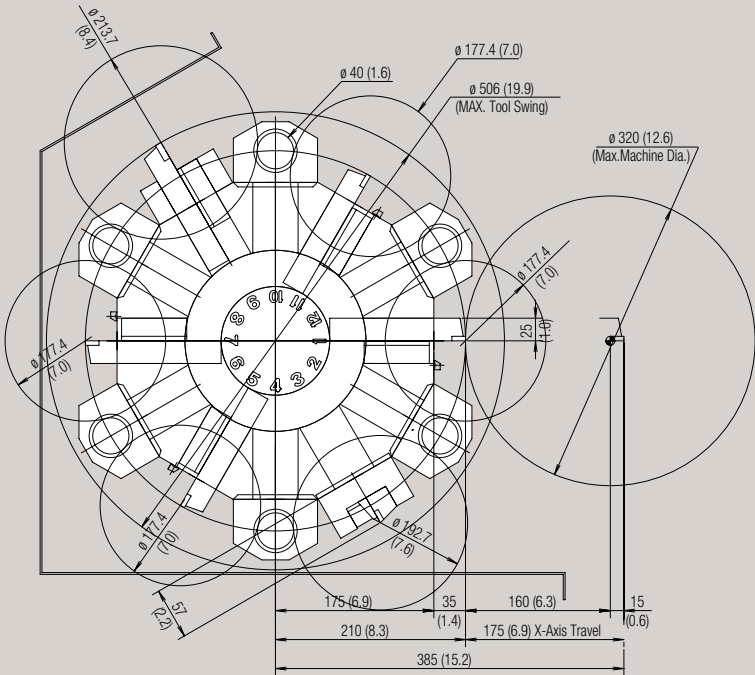
Lynx 300M



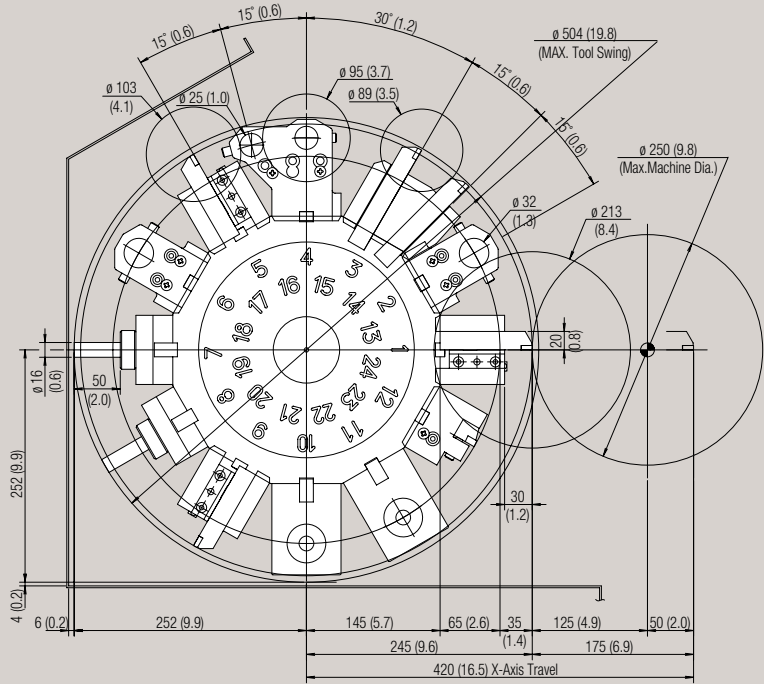
Tool Interference Diagram

Unit : mm (inch)

Lynx 220A / B / C series



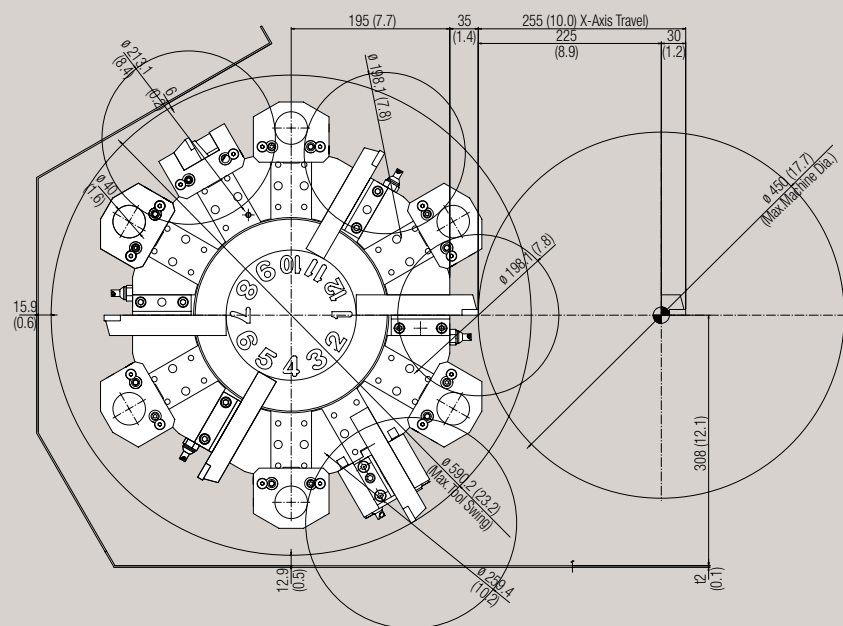
Lynx 220LM



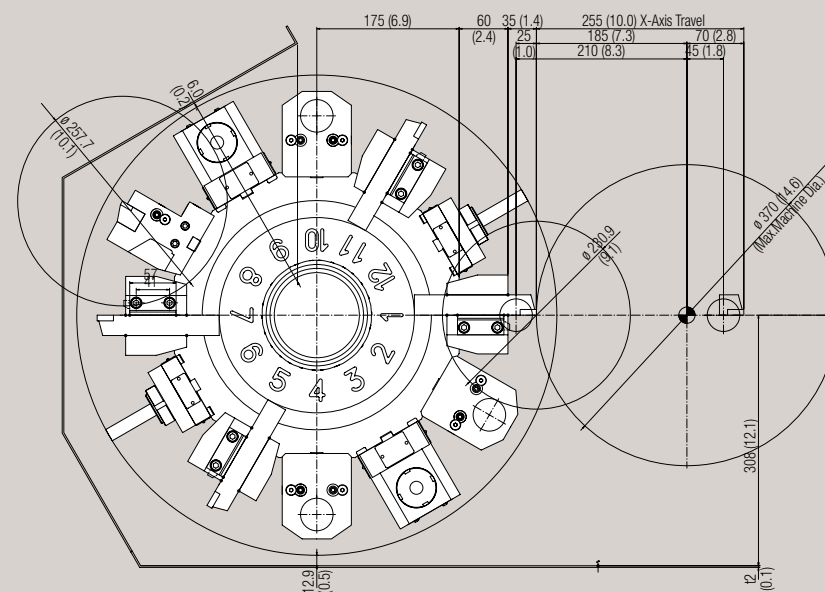
Tool Interference Diagram

Unit : mm (inch)

Lynx 300



Lynx 300M

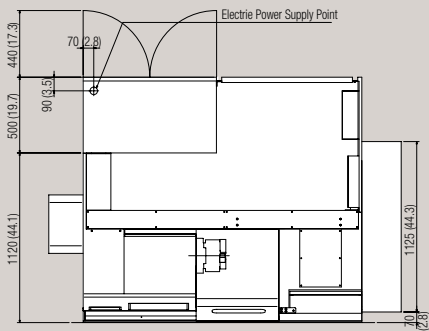


External Dimensions

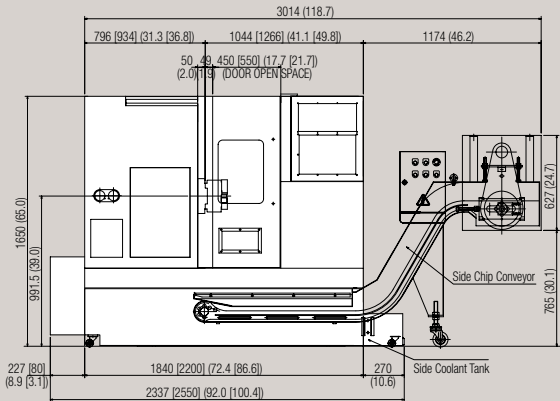
Unit : mm (inch)

Lynx 220A / B / C[LA / LB / LC] series

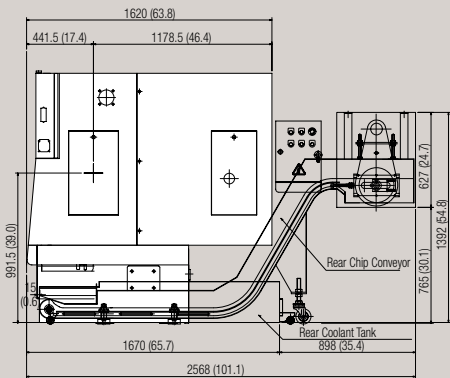
Top View



Front View

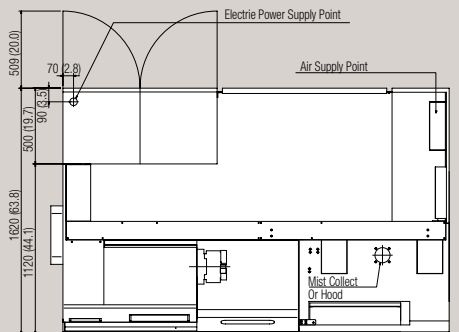


Side View

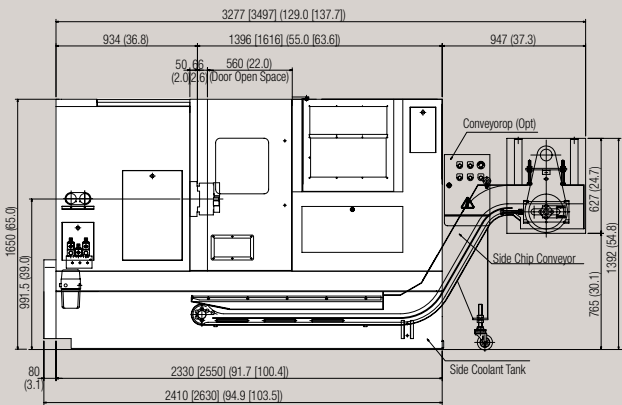


Lynx 220M[LM]

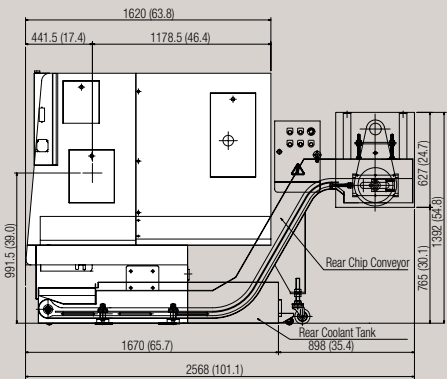
Top View



Front View



Side View

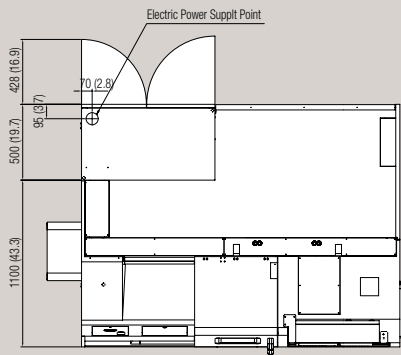


External Dimensions

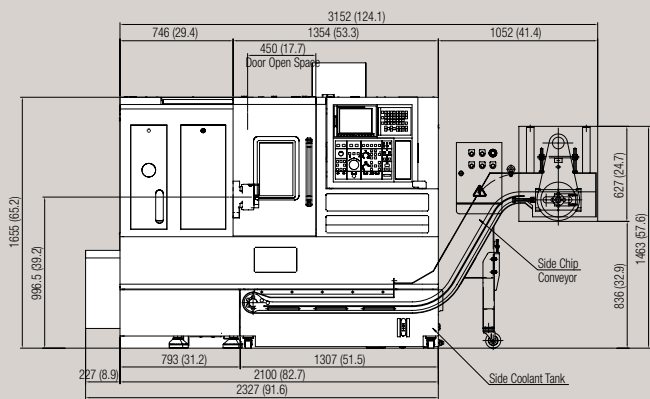
Unit : mm (inch)

Lynx 220G super

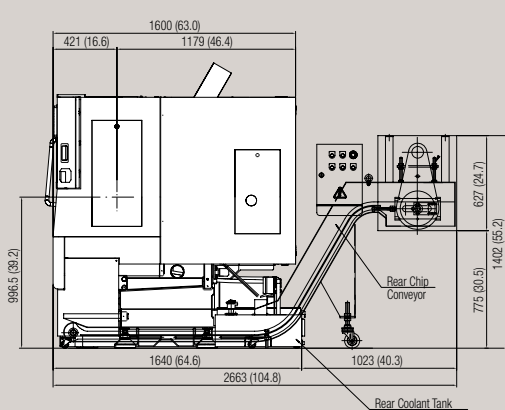
Top View



Front View

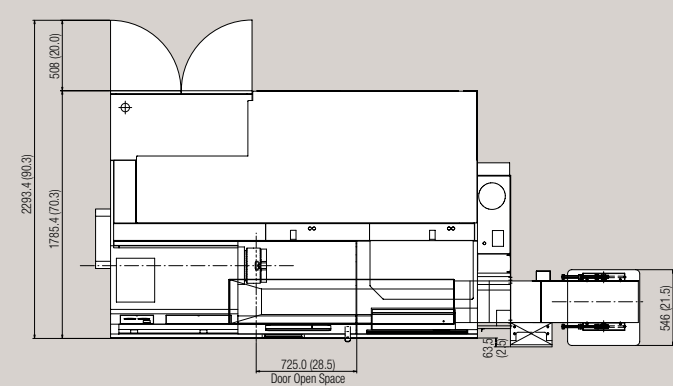


Side View

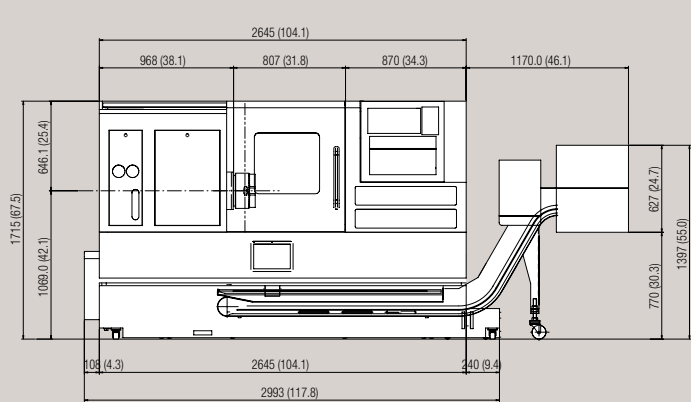


Lynx 300 / 300M

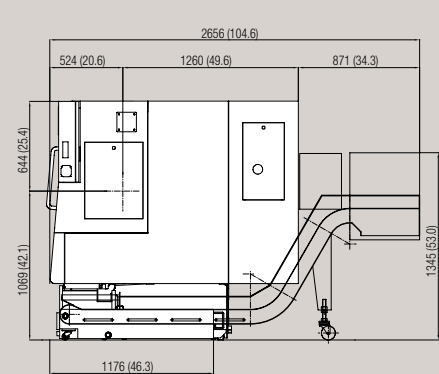
Top View



Front View



Side View



Machine Specifications

Features				Lynx 220A[LA]	Lynx 220B[LB]	Lynx 220C[LC]	Lynx 220M[LM]	Lynx 220G Super	Lynx 300	Lynx 300M	
Capacity	Swing over bed	mm (inch)	510 (20.1)					590 (23.2)	651 (25.6)		
	Swing over saddle	mm (inch)	290 (11.4)					170 (6.7)	461 (18.2)		
	Recom. turning diameter	mm (inch)	170 (6.7)	210 (8.3)			170 (6.7)		254 (10)		
	Max. turning diameter	mm (inch)	320 (12.6)				250 (9.8)	-	450 (17.7)	370 (14.6)	
	Max. turning length	mm (inch)	322 [542] (12.7 [21.3])	305 [525] (12.0 [20.7])			290 [510] (11.4 [20.1])	322 (12.7)	765 (30.1)	712 (28.0)	
	Bar working diameter	mm (inch)	45 (1.8)	51 (2.0)	65 (2.6)	51 (2.0)	45 (1.8)	76 (3.0)			
Carriage	Travel distance	X-axis mm (inch)	175 (6.9)					450 (17.7)	255 [225+30] (10.0 [8.6+1.4])	255 [185+70] (10.0 [7.3+2.7])	
		Z-axis mm (inch)	330 [550] (13.0 [21.7])				550 (21.7)	330 (13.0)	790 (31.1)		
Main Spindle	Spindle speed	r/min	6000	5000	4000	6000			3500		
	Spindle nose	ASA	A2 #5	A2 #6			A2 #5			A2#8	
	Spindle bearing diameter (Front)	mm (inch)	90 (3.5)	100 (3.9)	110 (4.3)	90 (3.5)			120 (4.7)		
	Spindle bore diameter	mm (inch)	53 (2.1)	61 (2.4)	76 (3.0)	53 (2.1)	61 (2.4)	86 (3.4)			
	Cs spindle index angle	deg	-				360 (in 0.001 deg. increment)	-			0.001
Tool Post	No. of tool station		12st				BMT45P, 24st	-	12st		
	OD tool height	mm (inch)	25 x 25 (1.0 x 1.0)				20 x 20 (0.8 x 0.8)		25 (1.0)		
	Boring bar diameter	mm (inch)	ø 40 (ø 1.6)				ø32 (ø1.3)*2/ø25 (ø1.0)*3	ø 32 (ø 1.3)	ø 40 (ø 1.6)		
	Indexing time (1st swivel)	s	0.15					-	0.15		
	Rotary tool spindle speed	r/min	-				6000	-			5000
Feedrate	Rapid traverse	X-axis m/min (ipm)	30 (1181)						24 (945)		
		Z-axis m/min (ipm)	36 (1417)						30 (1181)		
	Max. cutting feedrate	X-axis mm/rev (ipr)	500 (19.7)								
		Z-axis mm/rev (ipr)	500 (19.7)								
Tail Stock *1	Quill diameter	mm (inch)	[65] ([2.6])					-	80 (3.2)		
	Quill bore taper	MT#	[MT#4]					-	MT4 (LIVE)		
	Quill travel	mm (inch)	[80] ([3.1])					-	120 (4.7)		
Motor	Main spindle motor	kW (Hp)	15 / 11 (20.1 / 14.8)								
	Servo motor	X-axis kW (Hp)	1.8 (2.4)								
		Z-axis kW (Hp)	1.8 (2.4)								
	Rotary tool spindle motor	kW (Hp)	-				3.7 (4.96)	-			5.5 (7.4)
	Coolant pump	kW (Hp)	0.4 (0.5)								
Power Source	Electric power supply (Rated capacity)	kVA	25.6						30.5	32.6	
Machine Size	Machine	height mm (inch)	1655 (65.2)				1655 (65.2)	1990 (78.3)	1715 (67.5)		
	Machine size	length mm (inch)	2325 [2560] (91.5 [100.8])				2410[2630] (94.9[103.5])	2325 (91.5)	2993 (117.8)		
		width mm (inch)	1600 (63.0)						1785 (70.3)		
	Machine weight	kg (lb)	2900 [3100] (6393.3 [6834.2])				3700[4000] (8157.0[8818.4])	2600 (5731.9)	4000 (8818.4)	4050 (8928.7)	

• Design and specifications are subject to change without notice.

• Doosan is not responsible for difference between the information in the catalogue and the actual machine.

Note : *1 : Tail stock is optional on short bed models, Lynx 220A / B / C & Tail stock is not available on Lynx 220G super

*2 : On single ID tool holder *3 : On double ID tool holder

Standard Feature

- Coolant supply equipment
- Foot switch
- Front door interlock
- Full enclosure chip and coolant shield
- Hand tool kit (including small tool for operations)
- Hydraulic chuck and actuating cylinder (tool holders & boring sleeves)
- Hydraulic power unit
- Levelling jack screw and plates
- Lubrication equipment
- Soft jaws
- Standard tooling kit
- Tail stock Lynx 220LA / LB / LC / LM, Lynx 300 / M
- Work light

Optional Feature

- Additional tool holders & sleeves
- Air blast for chuck jaw cleaning
- Air gun
- Automatic door
- Automatic measuring system (in process touch probe)
- Automatic power off
- Automatic work loading
- Bar feeder interface
- Chip conveyor
- Chip bucket
- Hardened & ground jaws
- Oil skimmer
- Parts catcher (Lynx 220 : ø 65 x L140 , Lynx 300 : ø 75 x L170)
- Pressure switch for chucking pressure check
- Proximity switches for chuck clamp detection
- Proximity switches for tail stock quill position detection*1
- Signal tower (yellow, red, green)
- Special chucks
- Tool pre-setter (hydraulic type)*2
- Tool pre-setter (manual type)*2

*1 : This is available as option when tail stock is applied to the machine.

*2 : This is not available on Lynx 220G super

NC Unit Specifications DOOSAN Fanuc i series

AXES CONTROL

- Controlled axes	X, Z (Lynx 220 / 300) X, Z, C (Lynx 220M / LM / 300M)
- Cs contouring control *	
- Simultaneous controlled axes	4 axes
- Axis control by PMC	
- Backlash compensation for each rapid traverse and cutting feed	
- Chamfering on / off	
- Emergency stop	
- Follow-up	
- HRV2 control	
- Inch / Metric conversion	
- Increment system 1/10	0.0001 / 0.00001 mm/inch
- Interlock	All axes / each axis
- Least input command	0.001 / 0.0001 mm/inch
- Machine lock	All axes / each axis
- Mirror image	
- Overtravel	
- Position switch	
- Servo off	
- Stored stroke check 1	
- Stored stroke check 2, 3	
- Torque control	
- Unexpected disturbance torque detection function	
- Stroke limit check before move	

OPERATION

- Automatic operation (memory)	
- Buffer register	
- DNC operation (Reader / puncher interface is required)	
- Dry run	
- Handle incremental feed	X1, X10, X100
- Manual Handle interruption	
- JOG feed	
- Manual handle feed	1 unit
- Manual intervention and return	
- Manual pulse generator	1 ea
- Manual reference position return	
- MDI operation	
- Program number search	
- Program restart	
- Sequence number search	
- Single block	
- Wrong operation prevention	
- Reference position shift	
- Reference position setting without dog	

INTERPOLATION FUNCTIONS

- Nano interpolation	
- 1st. reference position return	Manual, G28
- 2nd. reference position return	G30
- 3rd/4th. reference position return	G30
- Circular interpolation	G02
- Continuous threading	
- Dwell (per sec)	G04
- High speed skip	
- Linear interpolation	G01

- Multiple threading	
- Positioning	G00
- Reference position return check	G27
- Thread cutting / Synchronous cutting	
- Thread cutting retract	
- Torque limit skip	
- Variable lead threading	

FEED FUNCTION

- Automatic acceleration / deceleration	
- Cutting feedrate clamp	
- Feed per minute	
- Feed per revolution	
- Feedrate override (10% unit)	0 - 200 %
- Jog feed override (10% unit)	0 - 2000 mm/min
- Manual per revolution feed	
- Override cancel	
- Rapid traverse override	F0, 25, 100 %
- Rapid traverse rate	
- Tangential speed constant control	

AUXILIARY / SPINDLE SPEED FUNCTION

- Spindle orientation	
- Actual spindle speed output	
- Auxiliary function lock	
- Constant surface speed control	
- High speed M/S/T interface	
- M - code function	M3 digits
- Rigid tapping	
- S - code function	S4 / S5 digits
- Spindle serial output	S4 / S5 digits
- Spindle speed override	0 - 150 %
- Spindle Output switching	

PROGRAM INPUT

- Absolute / incremental programming	
- Addition of custom macro common variables	
- Automatic coordinate system setting	
- Canned cycle for drilling / Turning	
- Canned cycle	
- Circular interpolation by R programming	
- Control in / out	
- Coordinate system setting	G50
- Coordinate system shift	
- Custom macro	
- Decimal point programming	
- Pocket calculator type decimal point programming	
- Diameter / radius programming (X axis)	
- Direct drawing dimension programming	
- Direct of coordinate system shift	
- G code system A / B / C	
- Input unit 10 time multiply	
- Label skip	
- Manual absolute on and off	
- Maximum program dimension	± 9 digit
- Multiple repetitive canned cycle	G70 - G76

- Multiple repetitive canned cycle II	
- Optional block skip	1 piece
- Parity check	
- Pattern data input	
- Plane selection	G17, G18, G19
- Program number	04 digit
- Program stop / end (M00, M01 / M02, M30)	
- Programmable data input	G10
- Sequence number	N5 digit
- SUB program call	10 folds nested
- Tape code : ISO / EIA auto recognition	EIA RS422 / ISO840
- Tape format for FANUC Series10/11	
- Work coordinate system	G52 - G59
- Interruption type custom macro	
- Work coordinate system preset	

TOOL FUNCTION / TOOL COMPENSATION

- Automatic tool offset	
- Direct input of offset value measured	
- Direct input of offset value measured B	
- T - code function	T2 + 2 digits
- Tool geometry / wear compensation	
- Tool life management	
- Extended tool life management	
- Tool nose radius compensation	
- Tool offset	G43, G44, G49
- Tool offset 7 digits	
- Tool offset pairs	64 pairs
- Tool offset value counter input	

EDITING OPERATION

- Back ground editing	
- Extended part program editing	
- Memory card edit & operation	
- Number of registered programs	400 ea
- Part program editing	
- Part program storage length	1280 (512kB) m
- Play back	
- Program protect	

SETTING AND DISPLAY

- Actual cutting feedrate display	
- Alarm display	
- Alarm history display	
- Current position display	
- Directory display and punch for each group	
- Directory display of floppy cassette	
- Display of spindle speed and T code at all screens	
- External message display	
- Help function	
- Multi - language display	
- Operation history display	
- Parameter setting and display	
- Program name display	31 characters
- Run hours / parts count display	
- Self-diagnosis function	

- Servo setting screen	
- Spindle setting screen	
- Status display	
- Operating monitor screen	
- Soft operator's panel	
- Tool path graphic display	

DATA INPUT / OUTPUT

- External data input	
- External key input	
- External program input	
- External program number search	
- External work number search	
- Memory card input / output	
- Reader / puncher interface	CH1 interface
- RS232C interface	
- Automatic data backup	

OTHERS

- Cycle start and lamp	
- Display unit	8.4" Color LCD
- Feed hold and lamp	
- NC and servo ready	
- PCMCIA port in the front of LCD display unit	
- PMC systemOID	
- Reset / rewind	

OPERATION GUIDANCE FUNCTION

- Manual Guide Oi	
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INTERFACE FUNCTION

- Ethernet function	Embedded ethernet
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OPTIONAL SPECIFICATIONS

- Controlled axes expansion (total)	Max.4 axes
- Simultaneous controlled axes expansion (total)	Max.4 axes

FEED FUNCTION

- Advanced preview control	
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INTERFACE FUNCTION

- Fast ethernet / Data server	
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OPERATION

- Manual handle feed	2 units
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OTHERS

- 10.4" Color TFT LCD (Only Lynx 300 / 300M)	
- Ez guide I (only with 10.4" color TFT LCD option)	

ROBOT INTERFACE

- Robot interface with PMC I/O module (Hardware between PMC I/O modules)	
- Robot interface with PROFIBUS-DP	

Note : * : Lynx 220M / LM / 300M

Lynx Series

High Productivity Turning Center



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