

SMART
MACHINE TOOL

February 10, 2021



**NL 6000(C, M, S, SM, L, CL, LM,
XL, CXL, XLM)**

CNC Turning Center

Specifications

Machine Specifications (NL 6000/M)

[] option

DESCRIPTION	UNIT	NL 6000 [C]	NL 6000M
CAPACITY			
Swing over bed	mm (inch)	1,030 (40.55)	
Swing over the cross slide	mm (inch)	850 (33.46)	
Max. machining dia.	mm (inch)	960 (37.80)	900 (35.43)
Max. machining length	mm (inch)	1,550 (61.02)	1,500 (59.06)
Chuck size	inch	24 [user scope]	
Bar capacity	mm(inch)	165.5 (6.52) [-]	
SPINDLE			
Spindle speed	rpm	1,200 [1,000]	
Spindle motor	kW (Hp)	37/55 (50/73)	
Spindle nose	ASA	A1-15 [A1-20]	
Spindle torque	N.m (ft.lbs)	5,143 (3,793.3)	
Spindle through hole dia.	mm (inch)	181 (7.125) [275 (10.83)]	
Bearing dia. (front)	mm (inch)	240 (9.45) [340 (13.39)]	
Spindle drive type	-	2 speed gearbox – belt drive	
TRAVEL			
Axis travel (X / Z)	mm (inch)	475/1,600 (18.7/62.99)	
Axis rapid traverse (X / Z)	m/min (ipm)	16/20 (630/787)	
Feed motor (X / Z)	kW (Hp)	7/6 (9.4/8)	
BED, SLIDE & CARRIAGE			
Guide ways (X / Z)	-	Box way	
Bed type	-	45° slant bed	
Ballscrew dia. (X / Z)	mm (inch)	50/63 (1.97/2.48)	
Axis feed thrust (X / Z)	N (lbs)	58,663/73,511 (13,188/16,526)	
Repeatability (X / Z)	mm (inch)	±0.002 / ±0.003 (±0.00008 / ±0.00012)	
TURRET			
Number of tool stations	st.	12	
Curvic coupling	-	3 Piece hydraulic clamp / Servo index	
Coupling dia.	mm (inch)	320 (12.6)	
Clamping force	kN(lbs)	212.4 (47,747) at 60 bar	
OD tool size	mm (inch)	□32 (□1.25)	

Boring bar size	mm (inch)	80 (3)	
Indexing time	sec	0.25	0.35
Indexing accuracy	mm (inch)	± 0.01 (± 0.0004)	
Index repeatability	mm (inch)	± 0.005 (± 0.0002)	
Milling tool holder type	-	-	BMT85
Tool spindle speed	rpm	-	3,000
Tool motor power	kW(hp)	-	7.5/11/15 (10/14.8/20.1)
TAILSTOCK			
Tailstock travel	mm(inch)	1,450 (57.09)	
Quill diameter	mm(inch)	180 (7.09)	
Quill travel	mm(inch)	150 (5.91)	
Quill taper	-	MT#6 (Built-in)	
Max. quill thrust force	kN(lbs)	64 (14,388)	
COOLANT SYSTEM			
Coolant pump	bar(psi)	10 (140)	
Tank capacity	L(gal)	360 (95.1)	
System type	-	Removable / Independent	
HYDRAULIC, LUBRICATION			
Hydraulic tank capacity	L(gal)	60 (15.9)	
Hydraulic oil type	-	ISO VG32 or equivalent	
Lubrication tank capacity	L(gal)	3 (0.79)	
Lubrication oil type	-	ISO VG68 or equivalent	
MACHINE SIZE			
Max workpiece/part weight (in chuck only)	kgf(lbs)	377(831.14)	-
Max workpiece/part weight (with tailstock)	kgf(lbs)	2651(5844.45)	-
Required floor space	mm(inch)	5,191x2,379 (204.4x93.7)	
Weight	kg(lbs)	15,300 (33,371)	15,800 (34,833)
Power consumption	kVA	65	
Voltage	-	220V \pm 10%, 60 Hz, 3 phase	
CONTROLLER			
Controller model	-	Fanuc 0i-TF	
Display unit	inch	10.4" TFT LCD Color Monitor	

Machine Specifications (NL 6000S/SM)

[] option

DESCRIPTION	UNIT	NL 6000S	NL 6000SM
CAPACITY			
Swing over bed	mm (inch)	1,030 (40.55)	
Swing over the cross slide	mm (inch)	850 (33.46)	
Max. machining dia.	mm (inch)	960 (37.80)	900 (35.43)
Max. machining length	mm (inch)	750 (29.53)	700 (27.56)
Chuck size	inch	24	
Bar capacity	mm(inch)	165.5 (6.52)	
SPINDLE			
Spindle speed	rpm	1,200	
Spindle motor	kW (Hp)	37/55 (50/73)	
Spindle nose	ASA	A1-15	
Spindle torque	N.m (ft.lbs)	5,143 (3,793.3)	
Spindle through hole dia.	mm (inch)	181 (7.125)	
Bearing dia. (front)	mm (inch)	240 (9.45)	
Spindle drive type	-	2 speed gearbox – belt drive	
TRAVEL			
Axis travel (X / Z)	mm (inch)	475/800 (18.7/31.5)	
Axis rapid traverse (X / Z)	m/min (ipm)	16/20 (630/787)	
Feed motor (X / Z)	kW (Hp)	7/6 (9.4/8)	
BED, SLIDE & CARRIAGE			
Guide ways (X / Z)	-	Box way	
Bed type	-	45° slant bed	
Ballscrew dia. (X / Z)	mm (inch)	50/63 (1.97/2.48)	
Axis feed thrust (X / Z)	N (lbs)	58,663/73,511 (13,188/16,526)	
Repeatability (X / Z)	mm (inch)	±0.002 / ±0.003 (±0.00008 / ±0.00012)	
TURRET			
Number of tool stations	st.	12	
Curvic coupling	-	3 Piece hydraulic clamp / Servo index	
Coupling dia.	mm (inch)	320 (12.6)	
Clamping force	kN(lbs)	212.4 (47,747) at 60 bar	

OD tool size	mm (inch)	□32 (□1.25)	
Boring bar size	mm (inch)	80 (3)	
Indexing time	sec	0.25	0.35
Indexing accuracy	mm (inch)	±0.01 (±0.0004)	
Index repeatability	mm (inch)	±0.005 (±0.0002)	
Milling tool holder type	-	-	BMT85
Tool spindle speed	rpm	-	3,000
Tool motor power	kW(hp)	-	7.5/11/15 (10/14.8/20.1)
TAILSTOCK			
Tailstock travel	mm(inch)	Option	
Quill diameter	mm(inch)	Option	
Quill travel	mm(inch)	Option	
Quill taper	-	Option	
Max. quill thrust force	kN(lbs)	Option	
COOLANT SYSTEM			
Coolant pump	bar(psi)	10 (140)	
Tank capacity	L(gal)		
System type	-	Removable / Independent	
HYDRAULIC, LUBRICATION			
Hydraulic tank capacity	L(gal)	60 (15.9)	
Hydraulic oil type	-	ISO VG32 or equivalent	
Lubrication tank capacity	L(gal)	3 (0.79)	
Lubrication oil type	-	ISO VG68 or equivalent	
MACHINE SIZE			
Required floor space	mm(inch)	4,390x2,379 (172.8x93.7)	
Weight	kg(lbs)	11,500 (25,353)	12,000 (26,455)
Power consumption	kVA	65	
Voltage	-	220V±10%, 60 Hz, 3 phase	
CONTROLLER			
Controller model	-	Fanuc 0i-TF	
Display unit	inch	10.4" TFT LCD Color Monitor	

Machine Specifications (NL 6000L/LM)

[] option

DESCRIPTION	UNIT	NL 6000L [CL]	NL 6000LM
CAPACITY			
Swing over bed	mm (inch)	1,030 (40.55)	
Swing over the cross slide	mm (inch)	850 (33.46)	
Max. machining dia.	mm (inch)	960 (37.80)	900 (35.43)
Max. machining length	mm (inch)	2,250 (88.58)	2,200 (86.61)
Chuck size	inch	24 [user scope]	
Bar capacity	mm(inch)	165.5 (6.52) [-]	
SPINDLE			
Spindle speed	rpm	1,200 [1,000]	
Spindle motor	kW (Hp)	37/55 (50/73)	
Spindle nose	ASA	A1-15 [A1-20]	
Spindle torque	N.m (ft.lbs)	5,143 (3,793.3)	
Spindle through hole dia.	mm (inch)	181 (7.125) [275 (10.83)]	
Bearing dia. (front)	mm (inch)	240 (9.45) [340 (13.39)]	
Spindle drive type	-	2 speed gearbox – belt drive	
TRAVEL			
Axis travel (X / Z)	mm (inch)	475/2,300 (18.7/90.55)	
Axis rapid traverse (X / Z)	m/min (ipm)	16/16 (630/630)	
Feed motor (X / Z)	kW (Hp)	7/6 (9.4/8)	
BED, SLIDE & CARRIAGE			
Guide ways (X / Z)	-	Box way	
Bed type	-	45° slant bed	
Ballscrew dia. (X / Z)	mm (inch)	50/63 (1.97/2.48)	
Axis feed thrust (X / Z)	N (lbs)	58,663/73,511 (13,188/16,526)	
Repeatability (X / Z)	mm (inch)	±0.002 / ±0.003 (±0.00008 / ±0.00012)	
TURRET			
Number of tool stations	st.	12	
Curvic coupling	-	3 Piece hydraulic clamp / Servo index	
Coupling dia.	mm (inch)	320 (12.6)	
Clamping force	kN(lbs)	212.4 (47,747) at 60 bar	

OD tool size	mm (inch)	ø32 (ø1.25)	
Boring bar size	mm (inch)	80 (3)	
Indexing time	sec	0.25	0.35
Indexing accuracy	mm (inch)	±0.01 (±0.0004)	
Index repeatability	mm (inch)	±0.005 (±0.0002)	
Milling tool holder type	-	-	BMT85
Tool spindle speed	rpm	-	3,000
Tool motor power	kW(hp)	-	7.5/11/15 (10/14.8/20.1)
TAILSTOCK			
Tailstock travel	mm(inch)	2,150 (84.65)	
Quill diameter	mm(inch)	180 (7.09)	
Quill travel	mm(inch)	150 (5.91)	
Quill taper	-	MT#6 (Built-in)	
Max. quill thrust force	kN(lbs)	64 (14,388)	
COOLANT SYSTEM			
Coolant pump	bar(psi)	10 (140)	
Tank capacity	L(gal)	360 (95.1)	
System type	-	Removable / Independent	
HYDRAULIC, LUBRICATION			
Hydraulic tank capacity	L(gal)	60 (15.9)	
Hydraulic oil type	-	ISO VG32 or equivalent	
Lubrication tank capacity	L(gal)	3 (0.79)	
Lubrication oil type	-	ISO VG68 or equivalent	
MACHINE SIZE			
Required floor space	mm(inch)	6,004x2,389 (236.4x94.1)	
Weight	kg(lbs)	17,300 (38,140)	17,800 (39,242)
Power consumption	kVA	65	
Voltage	-	220V±10%, 60 Hz, 3 phase	
CONTROLLER			
Controller model	-	Fanuc 0i-TF	
Display unit	inch	10.4" TFT LCD Color Monitor	

Machine Specifications (NL 6000XL/XLM)

[] option

DESCRIPTION	UNIT	NL 6000XL [CXL]	NL 6000XLM
CAPACITY			
Swing over bed	mm (inch)	1,030 (40.55)	
Swing over the cross slide	mm (inch)	850 (33.46)	
Max. machining dia.	mm (inch)	960 (37.80)	900 (35.43)
Max. machining length	mm (inch)	3,250 (127.95)	3,200 (125.98)
Chuck size	inch	24 [user scope]	
Bar capacity	mm(inch)	165.5 (6.52) [-]	
SPINDLE			
Spindle speed	rpm	1,200 [1,000]	
Spindle motor	kW (Hp)	37/55 (50/73)	
Spindle nose	ASA	A1-15 [A1-20]	
Spindle torque	N.m (ft.lbs)	5,143 (3,793.3)	
Spindle through hole dia.	mm (inch)	181 (7.125) [275 (10.83)]	
Bearing dia. (front)	mm (inch)	240 (9.45) [340 (13.39)]	
Spindle drive type	-	2 speed gearbox – belt drive	
TRAVEL			
Axis travel (X / Z)	mm (inch)	475/3,300 (18.7/129.92)	
Axis rapid traverse (X / Z)	m/min (ipm)	16/10 (630/394)	
Feed motor (X / Z)	kW (Hp)	7/6 (9.4/8)	
BED, SLIDE & CARRIAGE			
Guide ways (X / Z)	-	Box way	
Bed type	-	45° slant bed	
Ballscrew dia. (X / Z)	mm (inch)	50/63 (1.97/2.48)	
Axis feed thrust (X / Z)	N (lbs)	58,663/61,261 (13,188/13,772)	
Repeatability (X / Z)	mm (inch)	±0.002 / ±0.003 (±0.00008 / ±0.00012)	
TURRET			
Number of tool stations	st.	12	
Curvic coupling	-	3 Piece hydraulic clamp / Servo index	
Coupling dia.	mm (inch)	320 (12.6)	
Clamping force	kN(lbs)	212.4 (47,747) at 60 bar	

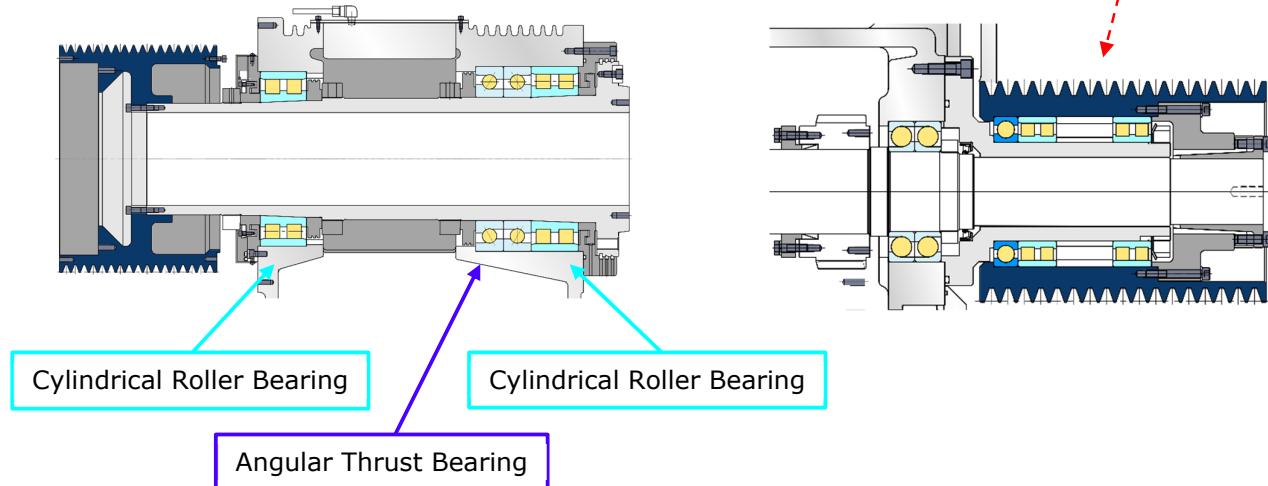
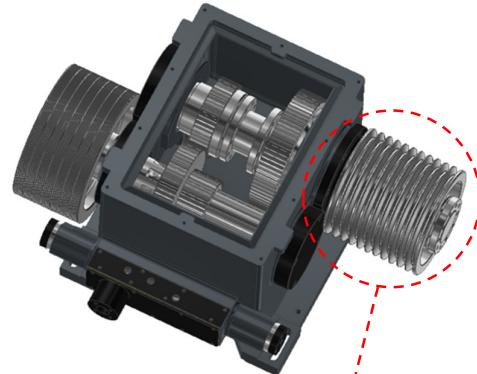
OD tool size	mm (inch)	ø32 (ø1.25)	
Boring bar size	mm (inch)	80 (3)	
Indexing time	sec	0.25	0.35
Indexing accuracy	mm (inch)	±0.01 (±0.0004)	
Index repeatability	mm (inch)	±0.005 (±0.0002)	
Milling tool holder type	-	-	BMT85
Tool spindle speed	rpm	-	3,000
Tool motor power	kW(hp)	-	7.5/11/15 (10/14.8/20.1)
TAILSTOCK			
Tailstock travel	mm(inch)	3,150 (124.02)	
Quill diameter	mm(inch)	180 (7.09)	
Quill travel	mm(inch)	150 (5.91)	
Quill taper	-	MT#6 (Built-in)	
Max. quill thrust force	kN(lbs)	64 (14,388)	
COOLANT SYSTEM			
Coolant pump	bar(psi)	10 (140)	
Tank capacity	L(gal)	575 (151.9)	
System type	-	Removable / Independent	
HYDRAULIC, LUBRICATION			
Hydraulic tank capacity	L(gal)	60 (15.9)	
Hydraulic oil type	-	ISO VG32 or equivalent	
Lubrication tank capacity	L(gal)	3 (0.79)	
Lubrication oil type	-	ISO VG68 or equivalent	
MACHINE SIZE			
Required floor space	mm(inch)	7,100x2,657 (279.5x104.6)	
Weight	kg(lbs)	19,800 (43,652)	20,300 (44,754)
Power consumption	kVA	65	
Voltage	-	220V±10%, 60 Hz, 3 phase	
CONTROLLER			
Controller model	-	Fanuc 0i-TF	
Display unit	inch	10.4" TFT LCD Color Monitor	

Spindle

Ultra precision and high rigidity P4 class spindle bearings.

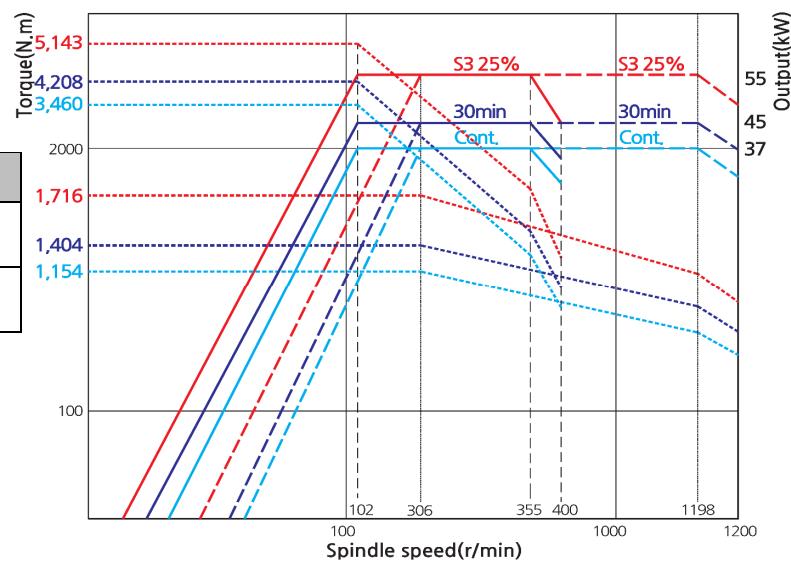
	UNIT	NL 6000 [C]
Chuck size	Inch	24" [user scope]
Spindle nose	ASA	A1-15 [A1-20]
Thru hole dia.	mm(inch)	Ø181(7.125) [275(10.83)]
Draw tube I.D.	mm(inch)	Ø166.5(6.56) [-]
Max speed	rpm	1,200 [1,000]

Two-speed Gearbox



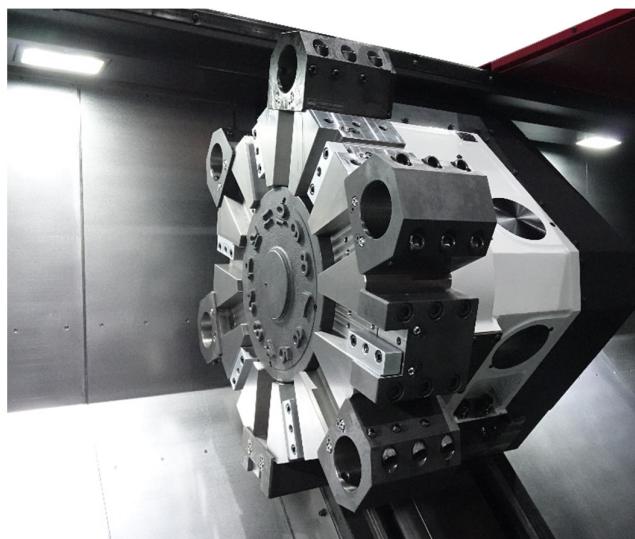
Spindle Power

Max output	kW(HP)	55(73)
Max torque	N.m(lbf.ft)	5,143(3,793)

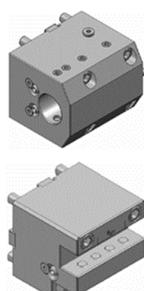


Standard Turret

12 Station rigid turret design with high accuracy indexing and rigid curvic coupling.



- No. of station: 12 EA
- Indexing time: 0.25 sec
- Coupling dia: Ø320 (12.6")
- Clamping force: 212.4kN



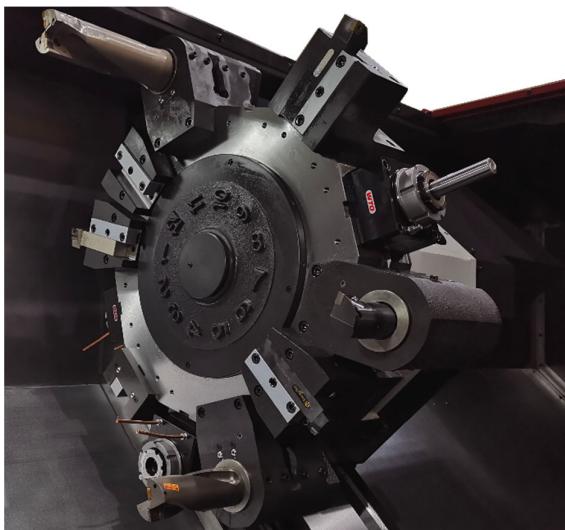
Boring holder

Ø80 (3")

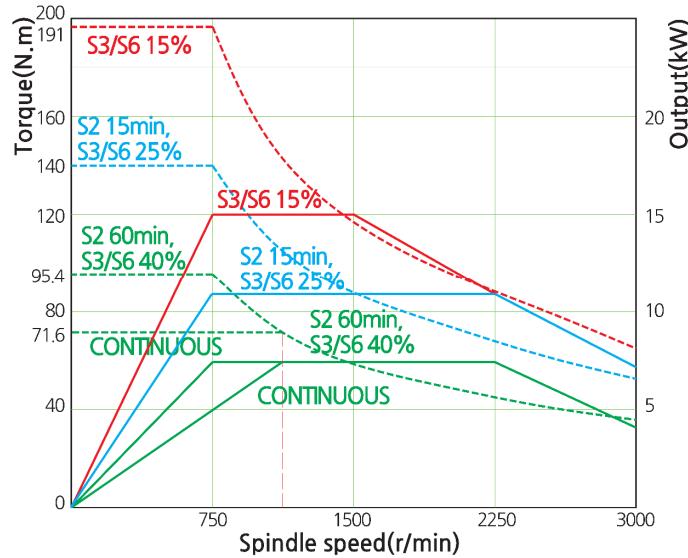
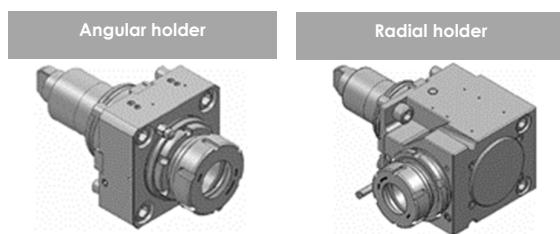
Bite holder

□32 (1.25")

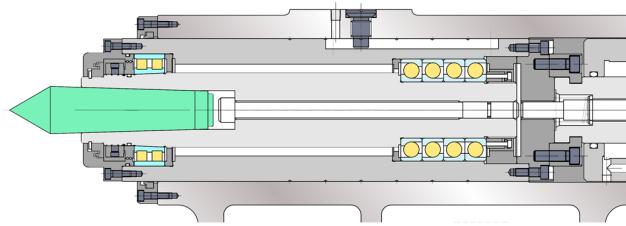
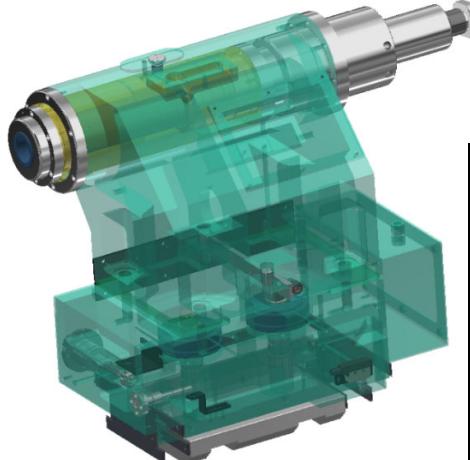
Mill Turret



- Mill tool holder type: BMT85
- No. of station: 12 EA
- Indexing time: 0.25 sec
- Coupling dia: Ø320 (12.6")
- Clamping force: 212.4kN
- Max tool motor power: 15 kW



Programmable Tailstock and Quill

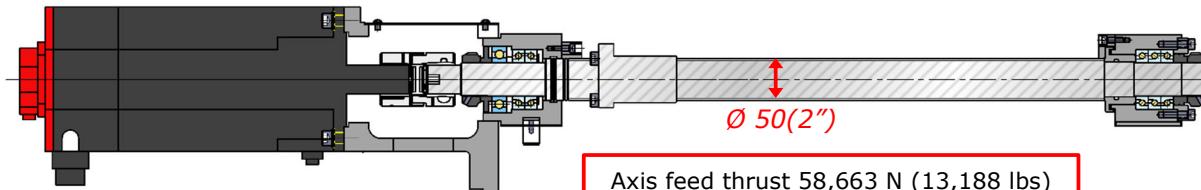


	Unit	NL 6000/M	NL 6000L/LM	NL 6000XL/XLM
Tailstock travel	mm(inch)	1,450(57.09)	2,150(84.65)	3,150(124.02)
Quill dia.	mm(inch)	$\varnothing 180(7.09)$	$\varnothing 180(7.09)$	$\varnothing 180(7.09)$
Quill travel	mm(inch)	150(5.91)	150(5.91)	150(5.91)
Taper	-	MT6(built-in)	MT6(built-in)	MT6(built-in)
Hydraulic clamp	kN(lbf)	271(60,923)	271(60,923)	271(60,923)
Hydraulic quill	kN(lbf)	64(14,388)	64(14,388)	64(14,388)

Ballscrew

High precision pre-tensioned and double anchored ball screws - thrust bearings class of P4.

X-axis



X servo motor: 7 kW (9.4 HP)

Z-axis



Z servo motor: 6 kW (8 HP)

Axis feed thrust

NL 6000/M/S/SM/L/LM: 73,511 N (16,526 lbs)
NL 6000XL/XLM: 61,261 N (13,772 lbs)

Control Specifications: Fanuc 0i-TF

CONTROLLED AXIS	Max. feed axes: 2(3) axis Feed axes: X/Z (Cs) Max. simultaneously controlled axis: 4 Least command increment: 0.001mm / 0.0001"
OPERATION FUNCTIONS	Pulse handle feed: X1, X10, X100 Feedrate per minute: G98 Feedrate per revolution: G99
INTERPOLATION FUNCTIONS	Linear interpolation: G01 Circular interpolation: G02, G03 Dwell: G04 Polar coordinate interpolation: G12.1, G13.1 Cylindrical interpolation: G07.1 Variable lead thread cutting: G34 Continuous threading Reference position return: G28 Reference position return check: G27
FEED FUNCTION	Rapid traverse rate override: F0, 25%, 50%, 100% Feedrate override: 0 ~ 200%
SPINDLE FUNCTION	Spindle orientation Rigid tapping
PROGRAM INPUT	Absolute/incremental programming Multiple repetitive canned cycle: G70 ~ G76 Canned cycles: G90, G92, G94 Inch/metric conversion: G20 / G21 Program restart
PROGRAM INPUT	Max. programmable dimension: ±999999.999mm/±99999.9999 M function: M3 digit Custom macro Canned cycle for drilling Direct drawing dimension programming Programmable data input: G10 Optional block skip Workpiece coordinate system: G52 ~ G59 Number of registerable programs: 400EA
SETTING AND DISPLAY	Alarm & Operator history display Run hour and parts count display Display spindle & servo overload Self-diagnosis function Extended part program editing Display screen: 10.4" color
DATA INPUT/OUTPUT	Memory card input/output USB memory input/output
EDITING OPERATION	Part program storage size: 512 Kbyte (1280m)

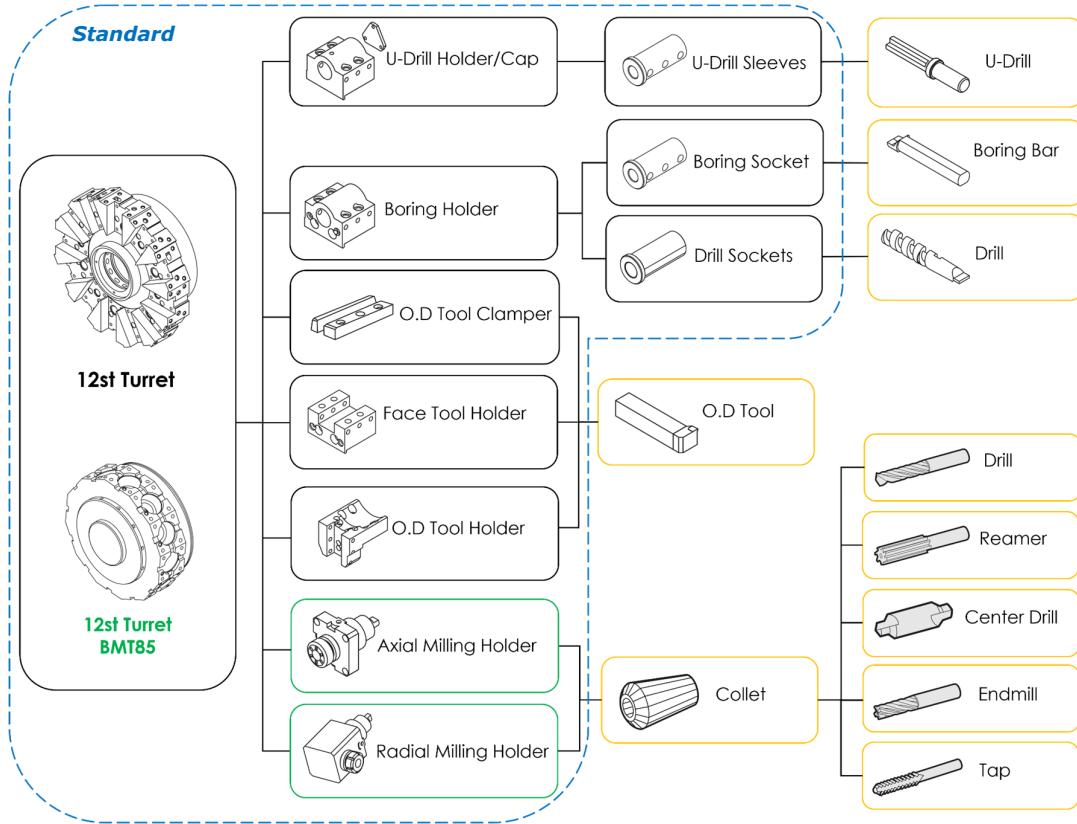
Option Control Function

- Arbitrary speed threading
- Retraction for rigid tapping
- Manual guide i



- 10.4" color monitor
- Semi-permanent A/S LED lamping
- Waterproof button
- Big button size
- Replaceable button cap
- Light indicator at 100% driving status

Standard Tooling Package



NL 6000/S/L/XL

Turning holder (1.25")

O.D holder: 1 pc.
Facing holder: 1 pc.

Boring holder (3")

I.D holder(single): 3 pc.
U-drill holder(cap): 2 pc.

Boring Socket

$\varnothing 16(5/8")$: 1 pc.
 $\varnothing 20(3/4")$: 1 pc.
 $\varnothing 25(1")$: 1 pc.
 $\varnothing 32(1 1/4")$: 1 pc.
 $\varnothing 40 (1 1/2")$: 1 pc.
 $\varnothing 50 (2")$: 1 pc.
 $\varnothing 60 (2 1/2")$: 1 pc.

Drill socket

MT2: 1 pc.
MT3: 1 pc.
MT4: 1 pc.
MT5: 1 pc.

NL 6000M/SM/LM/XLM

Turning holder (1.25")

O.D holder: 4 pc.
Facing holder: 1 pc.

Boring holder (3")

I.D holder(single): 2 pc.
U-drill holder(cap): 1 pc.

Driven holder

Axial milling holder: 1 pc.
Radial milling holder: 1 pc.

Boring Socket

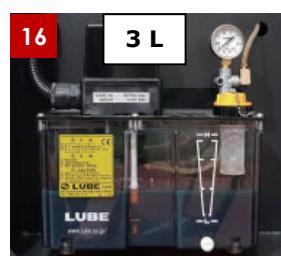
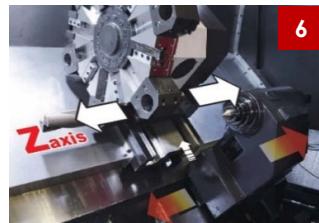
$\varnothing 16(5/8")$: 1 pc.
 $\varnothing 20(3/4")$: 1 pc.
 $\varnothing 25(1")$: 1 pc.
 $\varnothing 32(1 1/4")$: 1 pc.
 $\varnothing 40 (1 1/2")$: 1 pc.
 $\varnothing 50 (2")$: 1 pc.
 $\varnothing 60 (2 1/2")$: 1 pc.

Drill socket

MT2: 1 pc.
MT3: 1 pc.
MT4: 1 pc.
MT5: 1 pc.

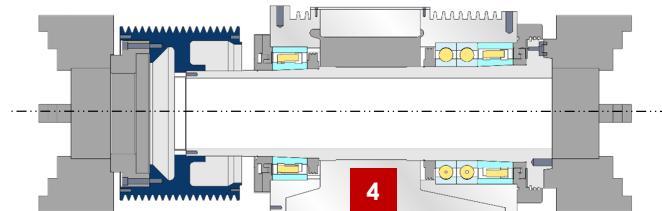
Standard Equipment & Accessories

1. 24" hydraulic hollow chuck
 2. Chuck clamp foot switch
 3. Chuck clamp confirmation
 4. Soft jaw 3 set
 5. Hard jaw 1 set
 6. Programmable tailstock and quill^(*)
 7. Tailstock taper MT#6^(*)
 8. Tailstock in-out foot switch^(*)
 9. Bar feeder interface preparation
 10. Tri-color operation status light tower
 11. LED work light
 12. Manual and part list
 13. Door interlock
 14. Tool/work box
 15. Leveling blocks
 16. Metered lubrication system 3 L (0.79 gal)
 17. Coolant tank
 18. Coolant pump 10 bar (140 psi)
 19. Hydraulic power unit 60 L (15.9 gal)
 20. Tool presetter
 21. Oil skimmer
 22. Manual guide i
 23. Z-Axis HP Upgrade with 2,650 lbs. Continuous Thrust^(**)
- (*except NL 6000S/SM
(**)except NL 6000/750/1000)



Option Equipment & Accessories

1. Dual pressure chucking
2. Chuck pressure switch
3. Special chuck
4. Dual chuck
5. Steady rest
6. Long boring bar
7. Coolant chiller
8. Chuck coolant
9. Shower coolant
10. Coolant gun
11. Side chip conveyor
12. Air gun
13. Air blower system
14. Auto door with edge sensor

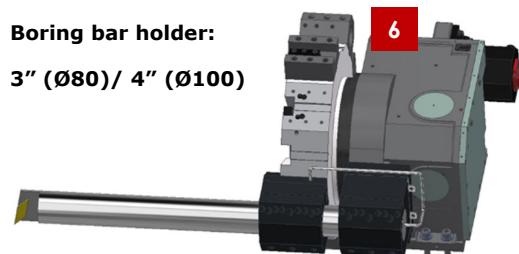


Model	CHUCK THRU HOLE		FRONT CHUCK		REAR CHUCK (MANUAL)
	AIR (A)	MANUAL (B)	AIR	MANUAL	
NL 6000/M/ S/SM/L/LM/ XL/XLM	Ø191 (7.52")	Ø190 (7.48")	18" (PAC-47191)	18" (FTC-460)	18" (FTC-460)
NL 6000C	Ø275 (10.83")	Ø275 (10.83")	24" (PAC-60275)	24" (FTC-610B)	24" (FTC-610B)



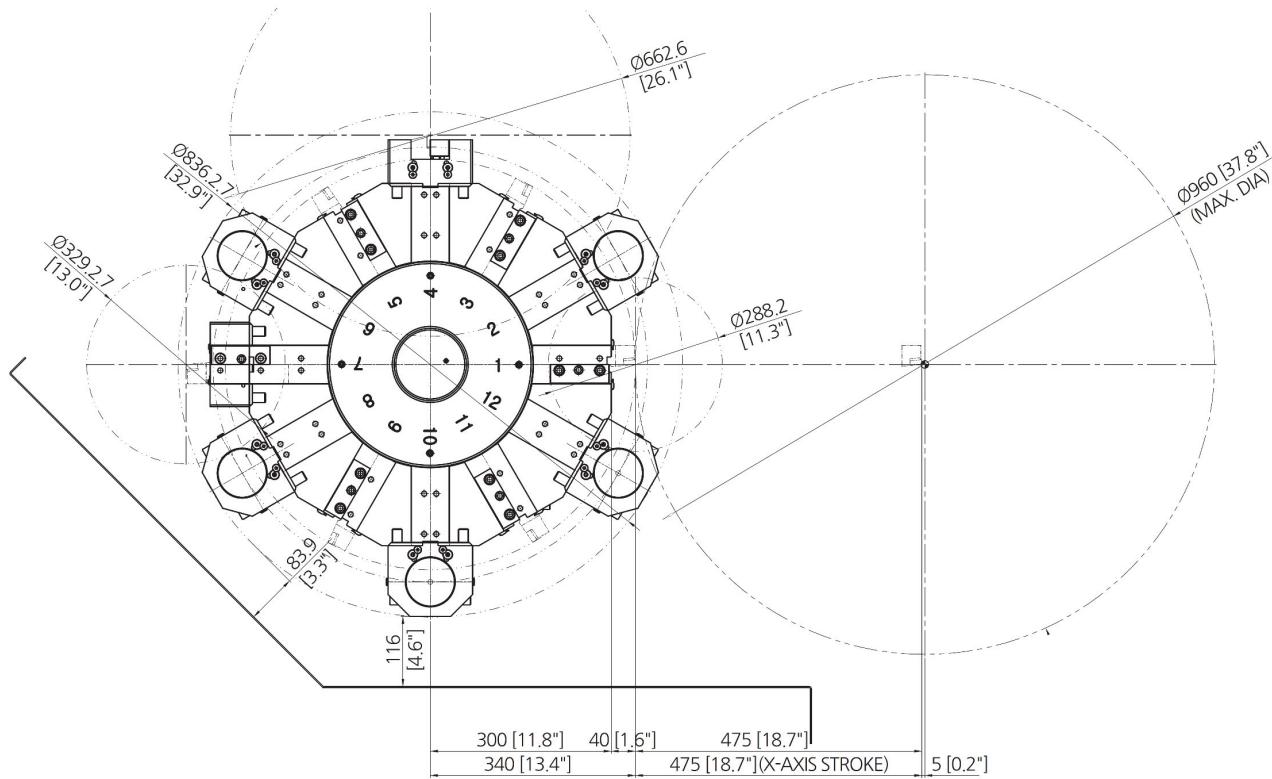
SMW-AUTOBLOK		
MODEL	MIN DIA	MAX DIA
SLU-X 5.1	Ø85 (3.35")	Ø352 (13.86")
K 6	Ø135 (5.31")	Ø464 (18.27")

Boring bar holder:
3" (Ø80) / 4" (Ø100)

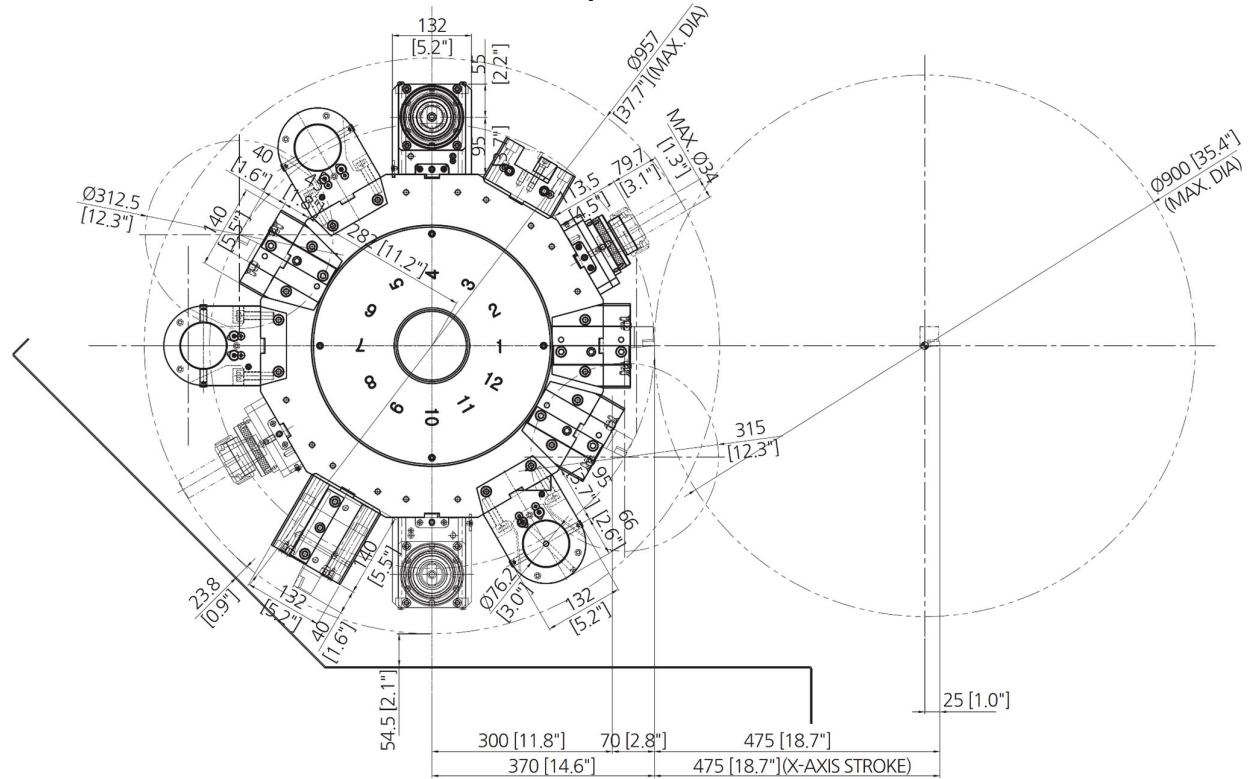


Interference

NL 6000/S/L/XL Standard Turret

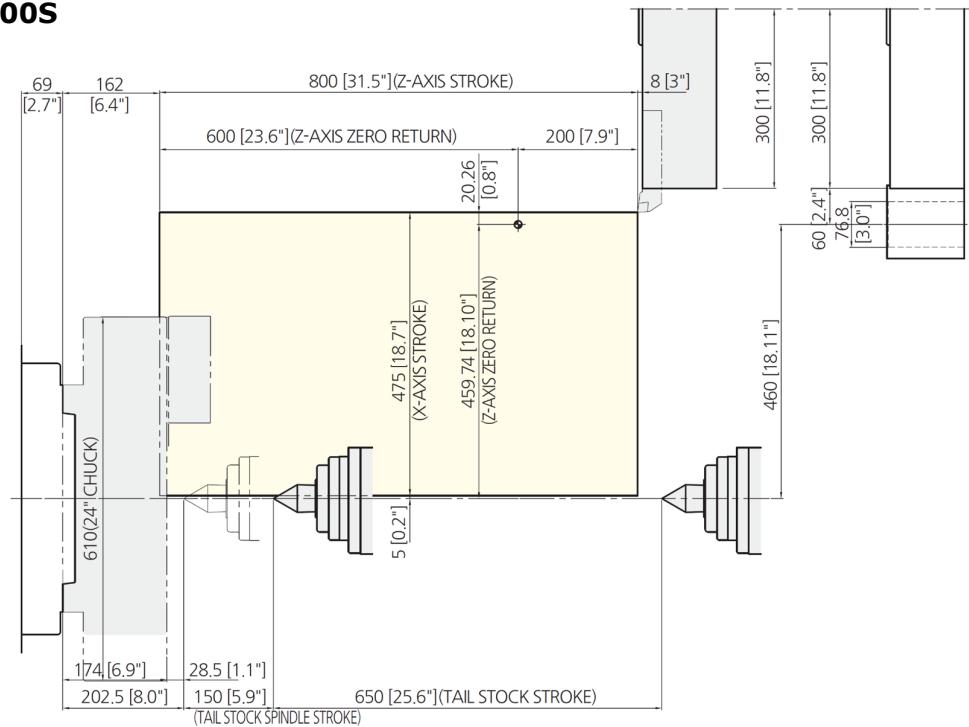


NL 6000M/LM Mill Turret

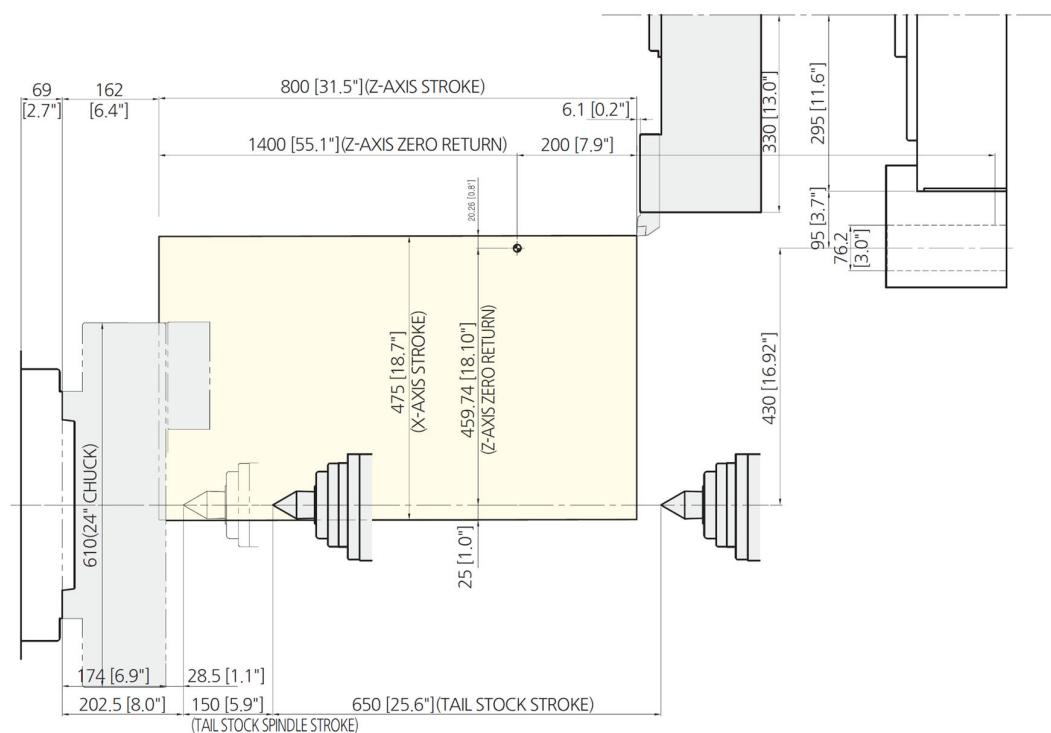


Work Range

NL 6000S

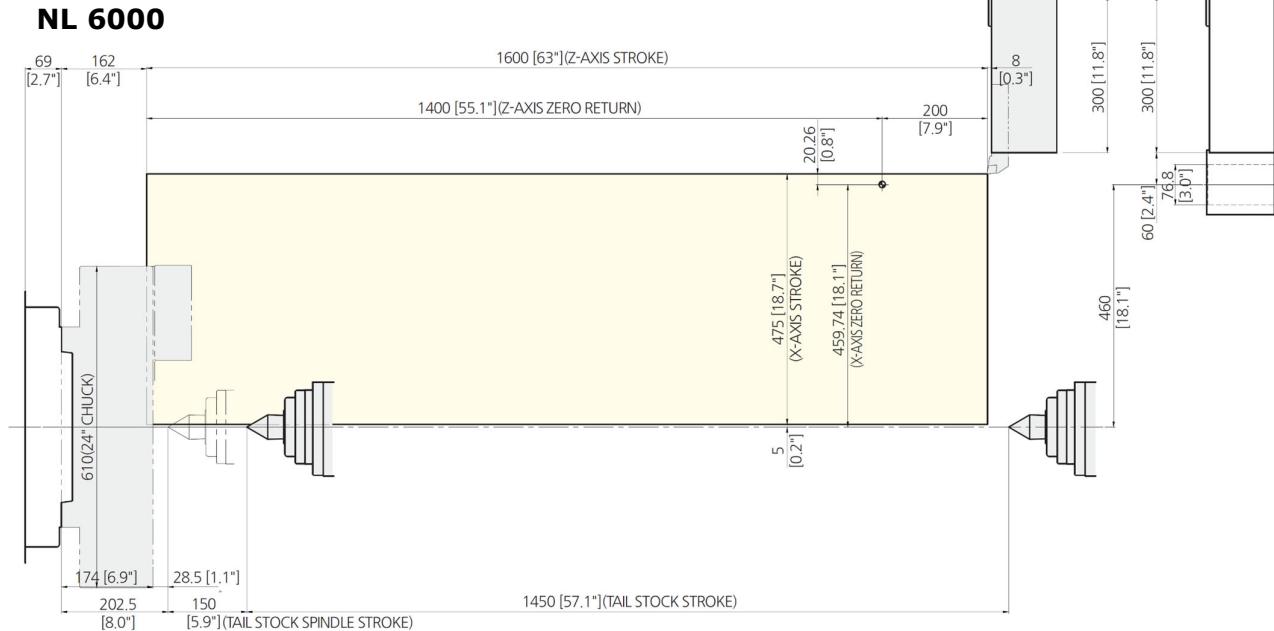


NL 6000SM

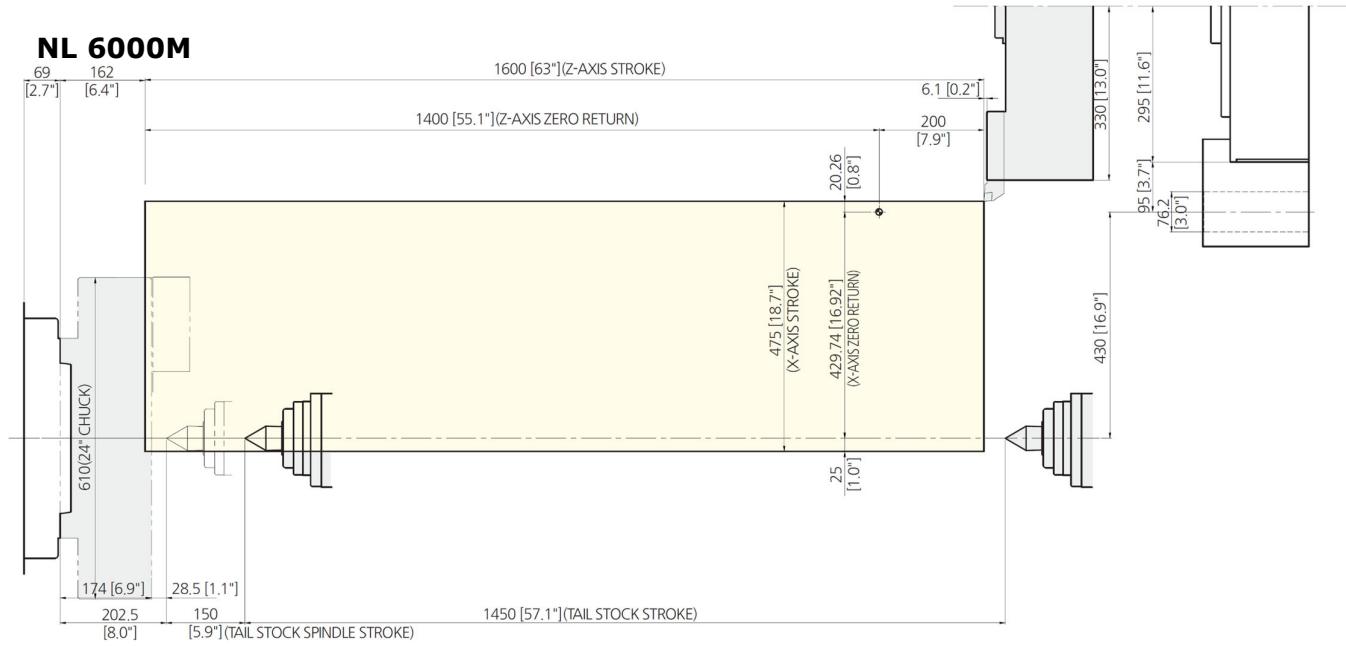


Work Range

NL 6000

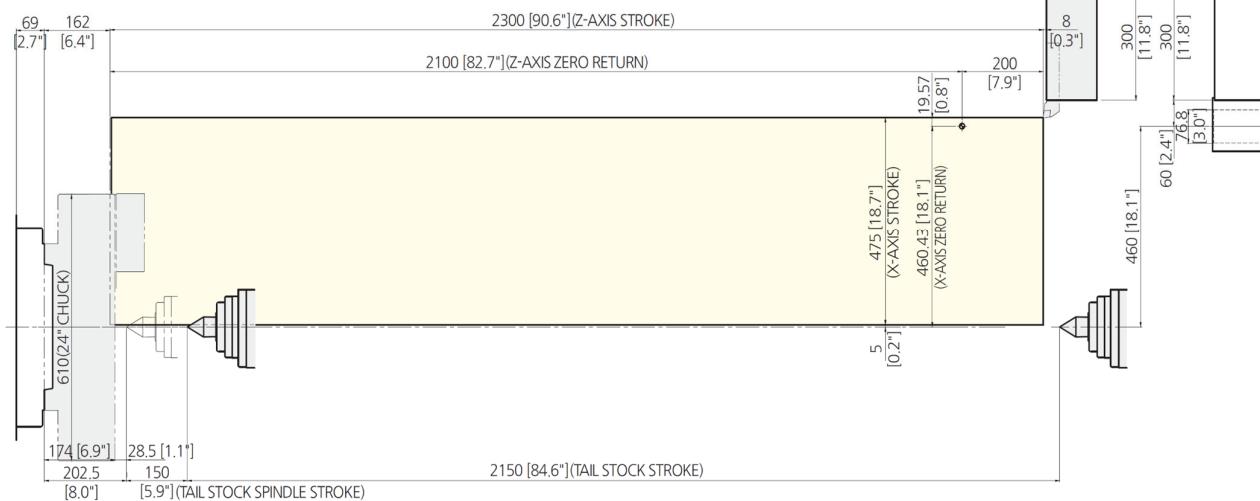


NL 6000M

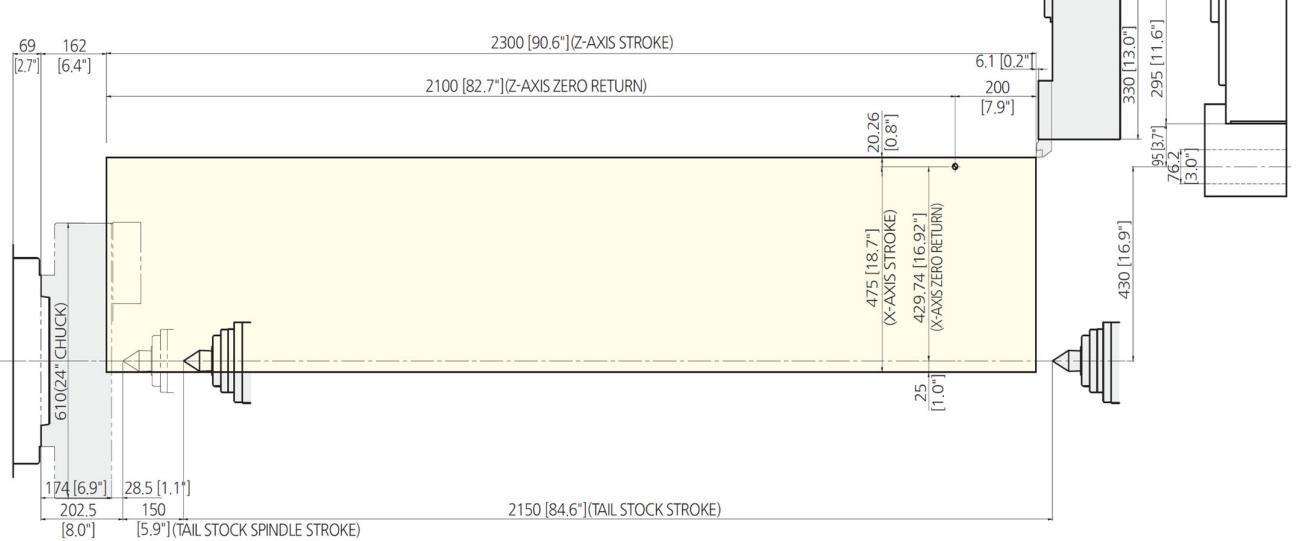


Work Range

NL 6000L

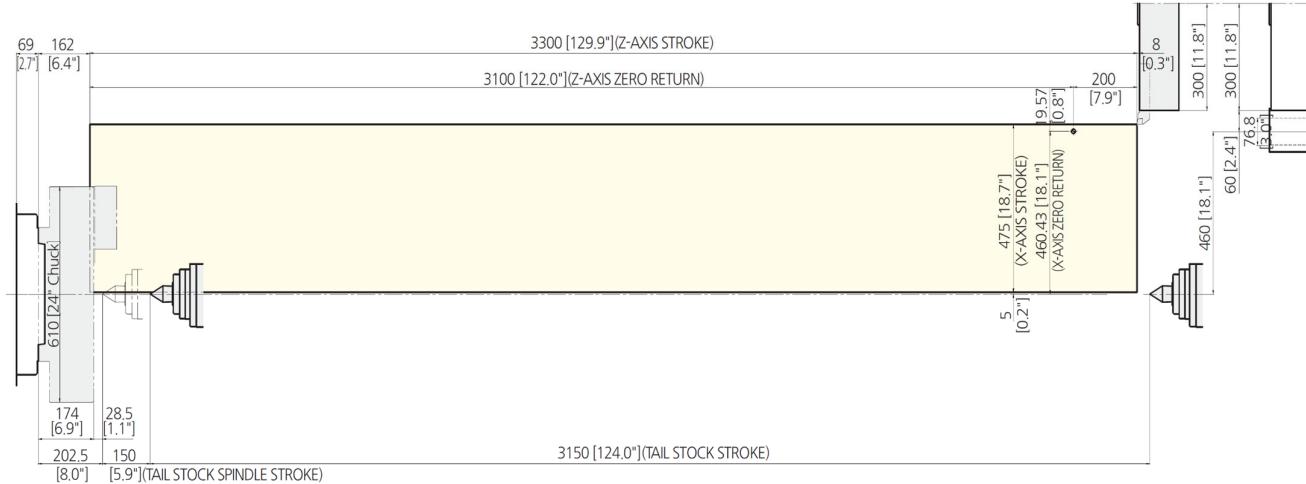


NL 6000LM

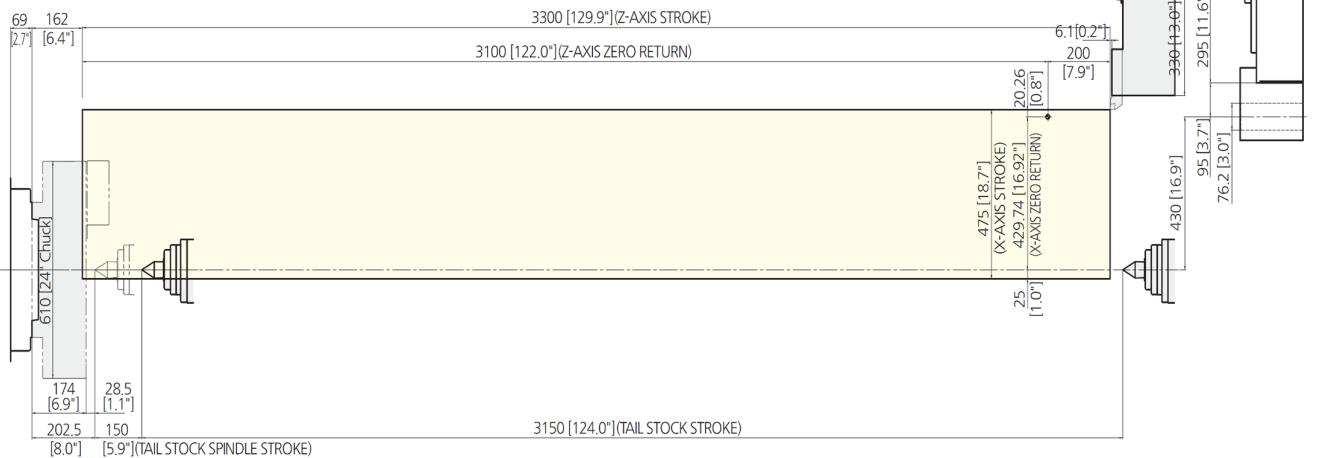


Work Range

NL 6000XL



NL 6000XLM

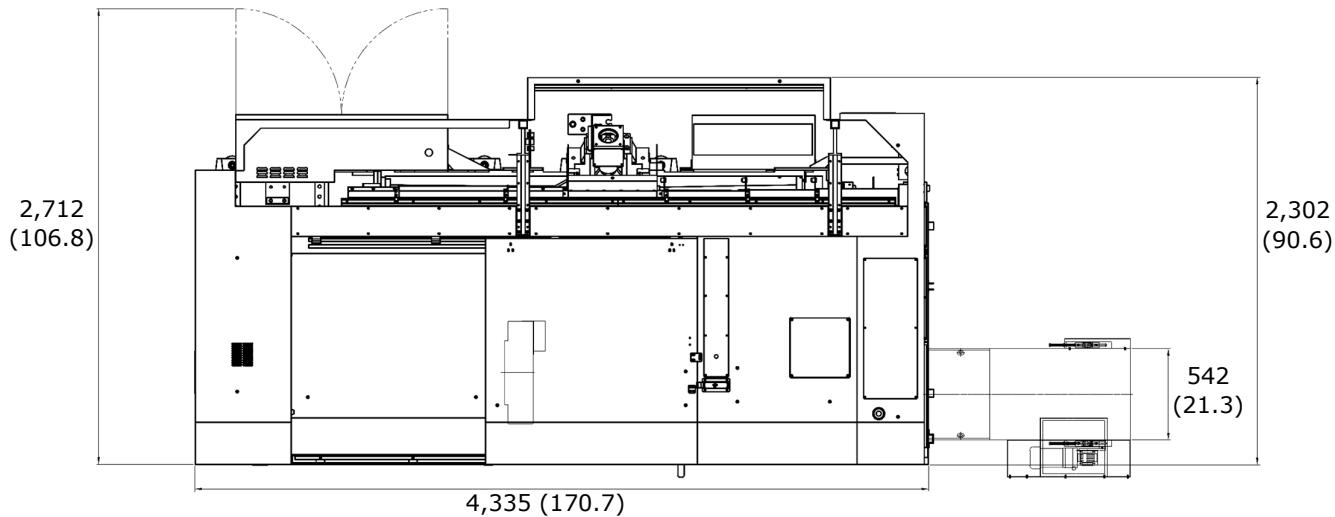


Machine Dimentions

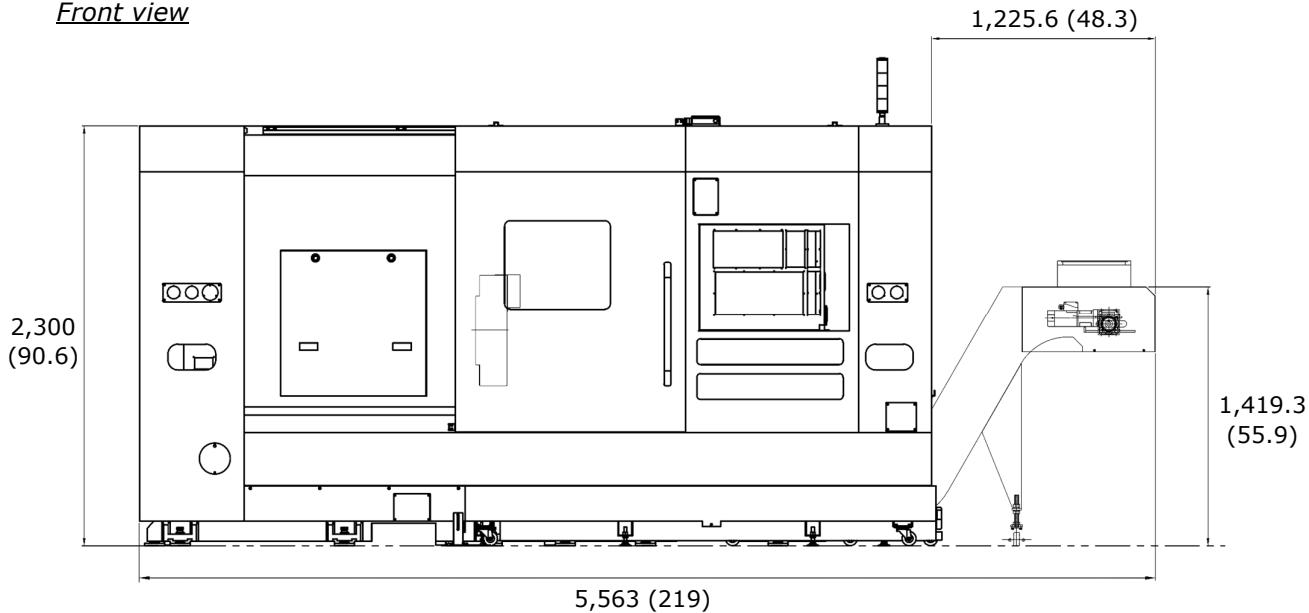
Unit : mm (inch)

NL 6000S/SM

Top view



Front view

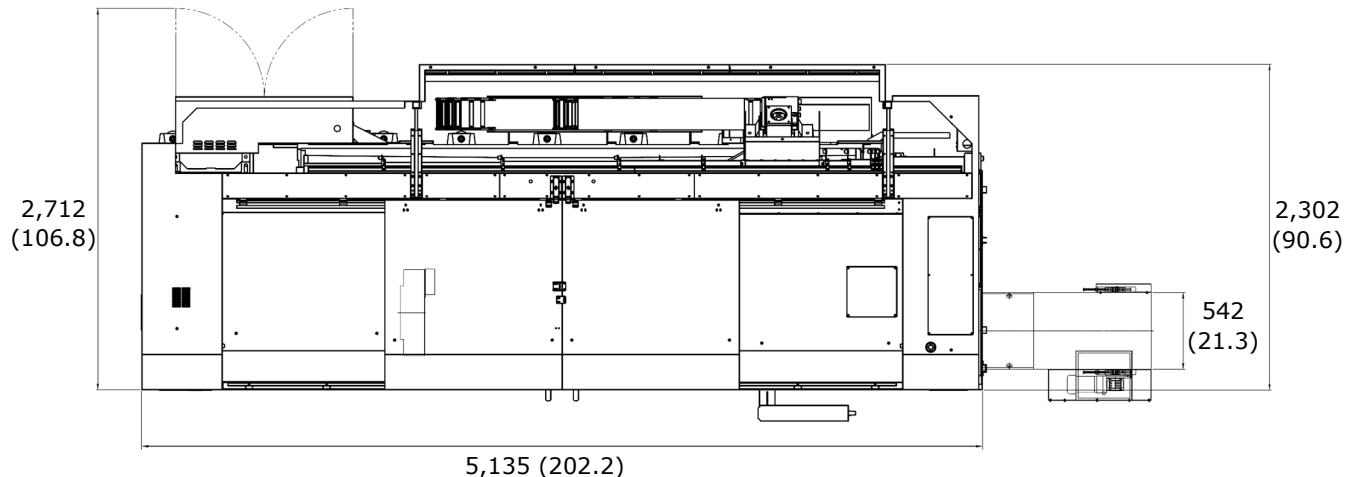


Machine Dimensions

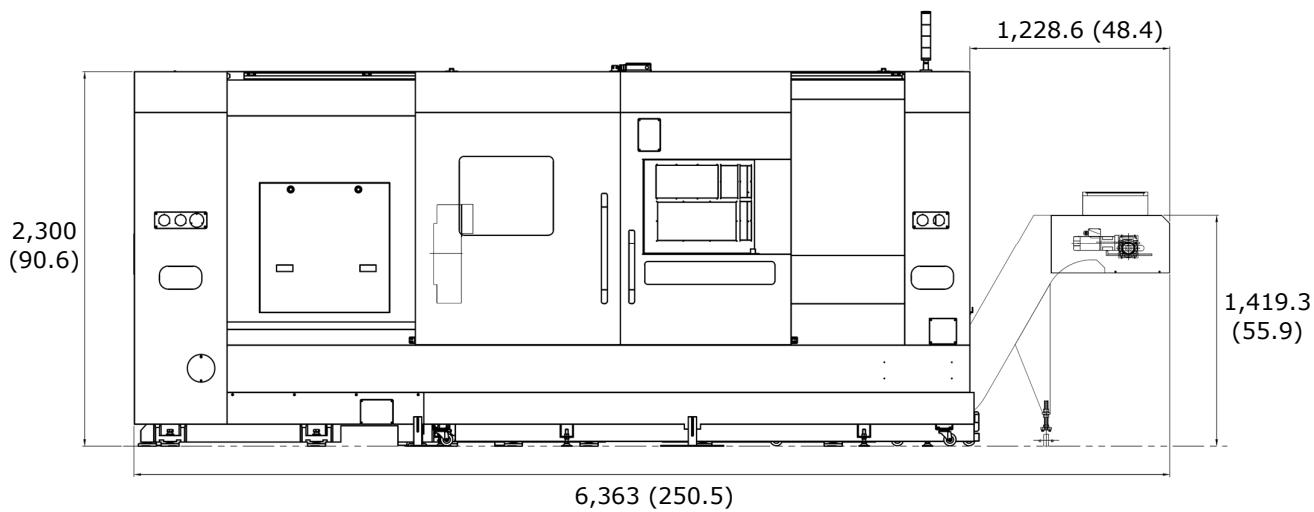
Unit : mm (inch)

NL 6000/M

Top view



Front view

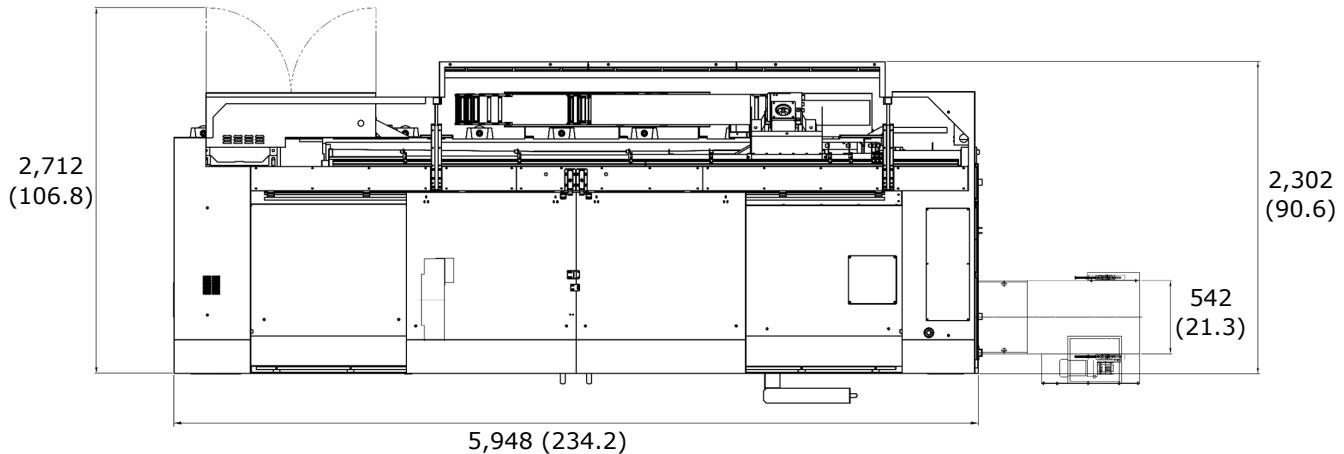


Machine Dimentions

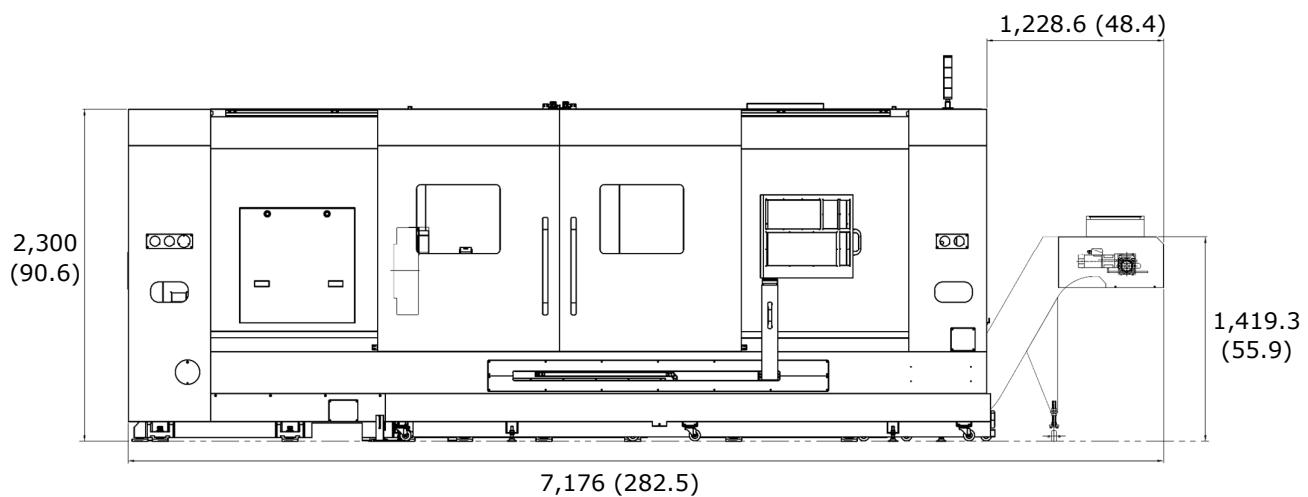
Unit : mm (inch)

NL 6000L/LM

Top view



Front view

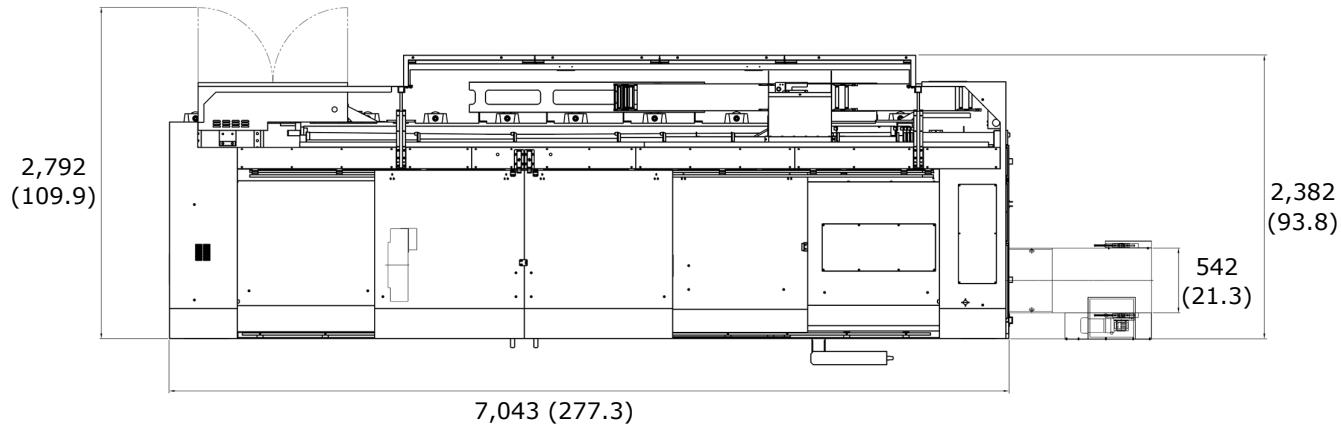


Machine Dimentions

Unit : mm (inch)

NL 6000XL/XLM

Top view



Front view

