

## 2. LIST OF G CODES

G Code	Group	Functions	G Code	Group	Functions
G00○		Positioning	G26		
G01○		Linear interpolation	G27		
G02	1	Circular interpolation - Helical cutting (CW)	G28		
G03		Circular interpolation - Helical Cutting (CCW)	G29		
G04◎		2	Dwell	G30◎	16
G05			G31◎	17	Skip function
G06			G32		
G07			G34		
G08			G36		
G09◎	18	Exact stop	G37		
G10*		Cancel of G11	G38		
G11	3	Parallel and rotational shift of coordinate system	G39		
G12			G40*		Cutter radius compensation cancel
G13			G41	7	Cutter radius compensation, left
G14		Axis designation/cancel	G42		Cutter radius compensation, right
G15		Selection of work coordinate system (Modal)	G43*	8	Three dimensional
G16◎	4	Selection of work coordinate system (One-shot)	G44		Three dimensional compensation ON
G17○		Plane selection: XY	G45		
G18○	5	Plane selection: ZX	G46		
G19○		Plane selection: YZ	G47		
G20◎		Inch input confirmation	G49		
G21◎	15	Metric input confirmation	G50*		Enlargement and reduction of geometry cancel
G22○		Programmable stroke limit ON	G51	9	Enlargement and reduction of geometry ON
G23○	6	Programmable stroke limit cancel			
G24					
G25					

\* : Has already been set when power supply is turned on.

◎ : Effective in a specified block.

○ : May be set by an initial condition parameter.

G Code	Group	Functions
G52		
G53○		Tool length offset cancel
G54		Tool length offset, X-axis
G55		Tool length offset, Y-axis
G56○	10	Tool length offset, Z-axis
G57		Tool length offset, 4th-axis
G58		Tool length offset, 5th-axis
G59		Tool length offset, 6th-axis
G60	1	One-directional positioning
G61	14	Exact stop mode
G62	19	Programmable mirror image
G63		
G64*	14	Cutting mode
G65		
G66		
G67		
G68		Cancel of G69
G69		Setting of 3-D coordinate system conversion
G70		
G71		Designation of return level for M53
G72		
G73	11	Fixed cycle, High speed deep hole drilling cycle
G74		Fixed cycle, Reverse tapping
G75		
G76	11	Fixed cycle, Fine boring
G77		
G78		
G79		

G Code	Group	Functions
G80*		Fixed cycle, Model cancel
G81		Fixed cycle, Drill/spot boring
G82		Fixed cycle, Drill/counter boring
G83	11	Fixed cycle, Deep hole drilling cycle
G84		Fixed cycle, Tapping
G85		Fixed cycle, Boring function
G86		Fixed cycle, Boring
G87		Fixed cycle, Back boring
G88		
G89	11	Fixed cycle, Boring
G90○	12	Absolute dimensioning G67
G91○		Incremental dimensioning
G92	20	Setting of work coordinate system
G93		
G94○	13	Feed per min.
G95○		Feed per rev.
G96		
G97		
G98		
G99		

\* : Has already been set when power supply is turned on.

◎ : Effective in a specified block.

○ : May be set by an initial condition parameter.

\* Ignored when used as cutting data.

### 4. LIST OF M CODES

M Code	Group	Function	Against Axis Movement	Modal / One-shot	Remarks
M00	1	Program stop	After	one-shot	Spindle coolant Stops; selectable with parameter
M01	10	Optional stop	After	one-shot	
M02	18	End of program	After	one-shot	NC reset
M03	2	Spindle CW	At the same time	modal	
M04	14	Spindle CCW	At the same time	modal	
M05	14	Spindle stop	After	modal	
M06	3	Vertical spindle tool change	After	one-shot	
M07	8	Oil mist coolant ON	At the same time	modal	
M08	10	Coolant pump ON	At the same time	modal	
M09	24	Coolant system OFF (M07, 08, 12, 50, 51, 59 OFF)	After	modal	
M10	30	A-axis clamp	At the same time	modal	
M11		A-axis unclamp	At the same time	modal	
M12	22	Chip air blow ON	At the same time	modal	
M15	5	4th-axis-rotary index table CW	At the same time	modal	
M16		4th-axis-rotary index table CCW	At the same time	modal	
M17	7	Indexing head index CCW	At the same time	one-shot	Command effective for only M73-M76
M19	2	Spindle orientation (forward)	After	modal	
M20	31	B-axis clamp	After	modal	
M21		B-axis unclamp	After	modal	
M22	32	Y-axis clamp	After	modal	
M23		Y-axis unclamp	After	modal	
M24	33	Z-axis clamp	After	modal	
M25		Z-axis unclamp	After	modal	
M26	35	C-axis clamp	After	modal	
M27		C-axis unclamp	After	modal	
M30	18	End of tape	After	one-shot	NC reset
M32	38	Splash guard door close	At the same time	modal	
M33		Splash guard door open	At the same time	modal	

M Code	Group	Function	Against Axis Movement	Modal / One-shot	Remarks
M40	11	High/middle-high/middle-low/low range	At the same time	modal	Spindle gears are automatically determined by RPM command.
M41		High/middle-high/middle-low range	At the same time	modal	
M42		High/middle-high range	At the same time	modal	
M43		High range	At the same time	modal	
M44		AAC(F) next attachment clear	At the same time	one-shot	F : Floor type T : Table type
M45		AAC(F) change preparation	At the same time	one-shot	
M46		AAC(F) no next attachment	At the same time	one-shot	
M47		AAC(T) no next attachment	At the same time	one-shot	
M48	38	AAC(T) next attachment clear	At the same time	one-shot	
M49		AAC(T) change preparation	At the same time	one-shot	
M50	23	Through-the-tool coolant, low pressure ON	At the same time	modal	
M51		Through-the-tool coolant, high pressure ON	At the same time	modal	
M52	12	Return level in fixed cycle: upper limit	At the same time	one-shot	
M53	13	Return level in fixed cycle: upper limit	At the same time	modal	
M54		Return level in fixed cycle: point R level	At the same time	modal	
M57	34	W-axis clamp	After	modal	
M58		W-axis unclamp	After	modal	
M59	25	Chip air blow ON	At the same time	modal	
M60	4	Pallet change command	After	one-shot	
M62		Vertical spindle tool change preparation	After	modal	
M63	21	ATC no next tool	At the same time	one-shot	
M64		Next tool return cycle	At the same time	one-shot	
M65		ATC ready	At the same time	one-shot	
M66	14	Continuous tool change between the vertical and horizontal spindles (same tool)	At the same time	one-shot	
M67		Continuous tool change between the vertical and horizontal spindles (different tool)	At the same time	one-shot	
M68		Vertical spindle tool clamp	After	modal	
M69		Vertical spindle tool unclamp	After	modal	
M70	3	Manual tool change	After	one-shot	
M71	4	Manual attachment tool change	After	one-shot	
M72		Horizontal spindle tool change preparation	After	modal	

M Code	Group	Function	Against Axis Movement	Modal / One-shot	Remarks
M73	15	Swivel head, front position	After	one-shot	
M74		Swivel head, left position	After	one-shot	
M75		Swivel head, rear position	After	one-shot	
M76		Swivel head, right position	After	one-shot	
M77	3	Horizontal spindle tool change	After	one-shot	
M78		Horizontal spindle tool clamp	After	modal	
M79	2	Horizontal spindle tool unclamp	After	modal	
M81	27	Automatic W-axis positioning 1	After	one-shot	
M82		Automatic W-axis positioning 2	After	one-shot	
M83		Automatic W-axis positioning 3	After	one-shot	
M84		Automatic W-axis positioning 4	After	one-shot	
M85		Automatic W-axis positioning 5	After	one-shot	
M87	24	Oil mist/air blow ON	At the same time	one-shot	Effective for M90, 91 and 98
M88	30	Dust collector ON	At the same time	modal	
M89		Dust collector OFF	At the same time	modal	
M90	29	Vertical spindle oil mist cycle mode ON	At the same time	modal	
M91	5	Tap-drill hole chip air blow cycle mode ON	At the same time	modal	Turned OFF by M90
M98	7	Horizontal spindle oil mist cycle mode ON	At the same time	modal	
M101	4	Pallet positioning 1	After	one-shot	
M102		Pallet positioning 2	After	one-shot	
M103		Pallet positioning 3	After	one-shot	
M104		Pallet positioning 4	After	one-shot	
M105		Pallet positioning 5	After	one-shot	
M106		Pallet positioning 6	After	one-shot	
M107		Pallet positioning 7	After	one-shot	
M108		Pallet positioning 8	After	one-shot	
M109		Pallet positioning 9	After	one-shot	
M110		Pallet positioning 10	After	one-shot	
M111		Pallet positioning 11	After	one-shot	
M112		Pallet positioning 12	After	one-shot	
M115	6	5th-axis-rotary table CW	At the same time	modal	
M116		5th-axis-rotary table CCW	At the same time	modal	

M Code	Group	Function	Against Axis Movement	Modal / One-shot	Remarks
M118		Spindle orientation (reverse)	After	modal	
M119		Spindle orientation (forward/reverse)	After	modal	
M120		Work shower ON	At the same time	modal	
M130	9	Spindle rotation condition for cutting feed OFF	At the same time	modal	Cutting feed OFF (G01,G02, G03) allowed without spindle rotation
M131		Spindle rotation condition for cutting feed ON	At the same time	modal	Cutting feed (G01, G02, G03) not allowed without spindle rotation
M132	37	Single block ineffective	At the same time	modal	
M133		Single block effective	At the same time	modal	
M134	16	Spindle speed override ineffective	At the same time	modal	
M135		Spindle speed override effective	At the same time	modal	
M136	17	Feedrate override ineffective	At the same time	modal	
M137		Feedrate override effective	At the same time	modal	
M140	39	Slide hold ineffective	At the same time	modal	
M141		Slide hold effective	At the same time	modal	
M142		Spindle overload detection ineffective	At the same time	modal	
M143		Spindle overload detection effective	At the same time	modal	
M144	19	Touch sensor advance	After	modal	
M145		Touch sensor retract	After	modal	
M150	28	Coolant group specification-vertical spindle	At the same time	modal	
M151		Coolant group specification-horizontal spindle	At the same time	modal	
M152		Coolant group specification-3rd group	At the same time	modal	
M153		Coolant group specification-4th group	At the same time	modal	
M154	20	Sensor air blow OFF	After	modal	
M155		Sensor air blow ON	At the same time	modal	
M157		AAC (2 st.) no next tool	After	one-shot	
M158		AAC (2 st.) next tool clear	After	one-shot	
M159		AAC (2 st.) tool change preparation	After	one-shot	
M160	4	PPC pallet loading	After	one-shot	
M161		PPC pallet unloading	After	one-shot	

M Code	Group	Function	Against Axis Movement	Modal / One-shot	Remarks
M163		Long tool-no next tool	At the same time	one-shot	
M165		Long tool-tool change preparation	At the same time	one-shot	Safety cover specification of next tool
M166		ATC active tool return mode specification	At the same time	one-shot	
M170	3	AAC (F) attachment change	After	one-shot	F : Floor type
M171		AAC (T) attachment change	After	one-shot	T : Table type
M172		Long tool-tool change command	After	one-shot	
M173		AAC (2 st.)-attachment change command	After	one-shot	Column type
M176		Dust collection mode - air blow	At the same time	one-shot	
M177	3	Angular attachment tool change	After	one-shot	AT-ATC
M178	4	Dust collection mode-ON	At the same time	modal	
M179		Dust collection mode-OFF	At the same time	modal	
M181	38	External M signal	At the same time	one-shot	When bit 1 of machine user parameter (bit No. 3 is set at "1", an external M signal is output after the completion of axis movement.
M182		External M signal	At the same time	one-shot	
M183		External M signal	At the same time	one-shot	
M184		External M signal	At the same time	one-shot	
M185		External M signal	At the same time	one-shot	
M186		External M signal	At the same time	one-shot	
M187		External M signal	At the same time	one-shot	
M188		External M signal	At the same time	one-shot	
M190		Automatic W-axis positioning 1	After	one-shot	For automatic W-axis positioning 10 points specification
M191		Automatic W-axis positioning 2	After	one-shot	
M192		Automatic W-axis positioning 3	After	one-shot	
M193		Automatic W-axis positioning 4	After	one-shot	
M194		Automatic W-axis positioning 5	After	one-shot	
M195		Automatic W-axis positioning 6	After	one-shot	
M196		Automatic W-axis positioning 7	After	one-shot	
M197		Automatic W-axis positioning 8	After	one-shot	
M198		Automatic W-axis positioning 9	After	one-shot	
M199		Automatic W-axis positioning 10	After	one-shot	