

# G / M CODES DESCRIPTION

for control system  
**PIERCE LCD**



G-code	Parameters	Description	Note
<b>G0</b>	X, Y, Z	<p>HIGH SPEED</p> <p>The code executes a non-cutting movement, at a rapid feedrate (maximum feedrate), to a specific co-ordinate position (X, Y, Z) in the working area (operating under absolute coordinate movement) or when a certain distance from a previously stated position (under incremental coordinate movement) is programmed.</p>	1)
<b>G1</b>	X, Y, Z	<p>CUTTING SPEED</p> <p>The code executes a cutting movement following a straight line, at a set feedrate. The axis co-ordinate (X, Y, Z) moves following a G1 command can be programmed as either absolute values or incremental values.</p>	1)
<b>G2</b>	X, Y, Z, I, J	<p>The G2 code executes a cutting movement following a counterclockwise circular path, at a set feedrate.</p> <p>When programming arcs using absolute values, the X, Y, Z values describe the end point of the arc, in relation to the datum position of the workpiece.</p> <p>When programming arcs using incremental values, the X, Y, Z values relate to the distance moved along the X and Y axes, from the start point of the arc to the end point of the arc.</p> <p>(I, J are center point coordinates of arc)</p>	1)
<b>G3</b>	X, Y, Z, I, J	<p>The G3 code executes a cutting movement following a clockwise circular path, at a set feedrate.</p> <p>When programming arcs using absolute values, the X, Y, Z values describe the end point of the arc, in relation to the datum position of the workpiece.</p> <p>When programming arcs using incremental values, the X, Y, Z values relate to the distance moved along the X and Y axes, from the start point of the arc to the end point of the arc.</p> <p>(I, J are center point coordinates of arc)</p>	1)
<b>G40</b>		<p>KERF OFF</p> <p>The code is used to cancel compensation.</p>	
<b>G41</b>		<p>KERF OUTER - LEFT (for outer contour)</p> <p>The code turn torch radius compensation on the left hand side of the programmed path.</p>	
<b>G42</b>		<p>KERF OUTER - RIGHT (for outer contour)</p> <p>The code turn torch radius compensation on the right hand side of the programmed path.</p>	
<b>G43</b>		<p>KERF INNER - LEFT (for inner contour)</p> <p>The code turn torch radius compensation on the left hand side of the programmed path.</p>	
<b>G44</b>		<p>KERF INNER - RIGHT (for inner contour)</p> <p>The code turn torch radius compensation on the right hand side of the programmed path.</p>	

M-code	Parameters	Description	Note
<b>M0</b>		PROGRAM STOP	
<b>M2</b>		PROGRAM END	
<b>M3</b>		CUT OFF	
<b>M4</b>	D-1	CUT ON D-1: Pierce Delay = 0s (for piercing the points)	
<b>M7</b>		MARKER #1 OFF	
<b>M8</b>		MARKER #1 ON	
<b>M9</b>		MARKER #2 OFF	
<b>M10</b>		MARKER #2 ON	
<b>M14</b>		TORCH HEIGHT CONTROL (THC) DISABLE	
<b>M15</b>		TORCH HEIGHT CONTROL (THC) ENABLE	
<b>M16</b>		MARKER #1 TOP - tool goes to the top position	
<b>M17</b>		MARKER #1 DOWN - tool goes down to the plate	
<b>M18</b>		MARKER #2 TOP - tool goes to the top position	
<b>M19</b>		MARKER #2 DOWN - tool goes down to the plate	
<b>M29</b>	T1 T2 T3 T4	<p>REPORTS</p> <p>Command displays reports of changes the cutting process.</p> <p>T1 - report of manually switching plasma unit to cutting process T2 - report of manually switching plasma unit to marking process</p> <p>T3 (Cx)        - report of manually change settings for Oxyfuel torches                   - Cx: number of active torches (e.g.: M29 T3 C3 = number of active torches is 3)</p> <p>T4 (Rx Dz)    - report of manually change settings for Oxyfuel torches                   - Rx: position distance between Oxyfuel torches                   - Dz: distance in millimeters between Oxyfuel torches (e.g.: M29 T4 R2 D-200 = distance between torch no. 2 and torch no. 3 is 200mm)</p> <p>R1 = distance between torch no. 1 and torch no. 2 R2 = distance between torch no. 2 and torch no. 3</p>	

M-code	Parameters	Description	Note
<b>M70</b>		MARKER OFFSET OFF (for all offsets)	
<b>M71</b>		MARKER OFFSET #1 ON	2)
<b>M72</b>		MARKER OFFSET #2 ON	2)
<b>M73</b>		MARKER OFFSET #3 ON	2)
<b>M74</b>		MARKER OFFSET #4 ON	2)
<b>M75</b>		MARKER OFFSET #5 ON	2)
<b>M76</b>		MARKER OFFSET #6 ON	2)
<b>M77</b>		MARKER OFFSET #7 ON	2)
<b>M78</b>		MARKER OFFSET #8 ON	2)
<b>M95</b>	Txx	PART NUMBER  Txx - Parts order in NC program (e.g.: M95 T1)	
<b>M101</b>		CUT MODE - switches the plasma unit to the cutting mode	3)
<b>M102</b>		MARKING MODE - switches the plasma unit to the marking mode	3)
<b>M110</b>	S, T, I, C, B	PLASMA CODE Sets the plasma unit to the desired cutting technology:  S    Cutting technology T    Plate thickness I    Type of material C    Cutting current B    Gas combination	3)
<b>M111</b>	T, U, V	PARAMETER CODE T100 Tube diameter T101 Length of square profile T102 Height of square profile T103 Corner radius of square profile  U    0 = units: mm, 1 = units: inches V    Parameter "T" value	
<b>M200</b>		M_SWITCH SYSTEM TO PROCESS PLASMA The code sets the system to plasma process.	

M-code	Parameters	Description	Note
<b>M201</b>		M_SWITCH SYSTEM TO PROCESS OXYCUT The code sets the system to oxycut process.	
<b>M245</b>		AUX OUTPUT 1 ON (typically filtration unit)	
<b>M246</b>		AUX OUTPUT 1 OFF (typically filtration unit)	
<b>M247</b>		AUX OUTPUT 2 ON	
<b>M248</b>		AUX OUTPUT 2 OFF	
<b>M249</b>		AUX OUTPUT 3 ON	
<b>M250</b>		AUX OUTPUT 3 OFF	
<b>M251</b>		AUX OUTPUT 4 ON	
<b>M252</b>		AUX OUTPUT 4 OFF	
<b>M301</b>	Txx	M_TOUCH PLATE (AHC)  Reference Points for Advanced Height Control (AHC) - after plate height detection, torch will go to the crossing height - in machine control system must be set up THC type = mm  Txx - Reference Points order in cut process. (e.g.: M301 T1)	THC type:  MM
<b>M302</b>	T1 T2 T3	M_DETECT POINT (GHC)  Reference Points (T1, T2, T3) for Geometric Height Control (GHC) - after plate height detection, torch will go to the crossing height - in machine control system must be set up THC type = mm  Machine control system will calculates the plane tilting of the plate using the detected points. Torch Height Control above the material of all the cut shape parts is performed by moving in this plane.	THC type:  MM
<b>M311</b>	Txx	M_SET DETECT HEIGHT (AHC)  Torch will go to the cut height relative to the measured Reference Point (M301 Txx) and disables Torch Height Control above the material. - in machine control system must be setup THC type = mm  Txx - Reference Points order in cut process. (e.g.: M311 T1)	THC type:  MM

M-code	Parameters	Description	Note
<b>M1100</b>		Advanced Plasma Off	
<b>M1113</b>	Txx	<p>M_GET VOLTAGE AND THC ON (AHC)</p> <p>Voltage measurement of plasma arc at the Reference Point (M301 Txx) and enables Torch Height Control above the material.</p> <p>- in machine control system must be setup THC type = mm</p> <p>Txx - Reference Points order in cut process. (e.g.: M1113 T1)</p>	<p>THC type:</p> <p>MM</p>
<b>M1114</b>		<p>TORCH HEIGHT CONTROL (THC) DISABLE</p> <p>Used to control THC during the cutting process.</p> <p>(without stopping the machine)</p>	
<b>M1115</b>		<p>TORCH HEIGHT CONTROL (THC) ENABLE</p> <p>Used to control THC during the cutting process.</p> <p>(without stopping the machine)</p>	

Code	Parameters	Description	Note
<b>F</b>	P1 P2	<p>PROGRAMMED FEEDRATE</p> <p>Input specific speed for following cutting process.</p> <p>(e.g.: F1200 = following segment will be cut with speed 1200 mm/min.)</p> <p>P1: cutting speed sets in the control system (e.g.: F P1)</p> <p>P2: marking speed sets in the control system (e.g.: F P2)</p>	
<b>FP</b>		<p>PERCENTAGE FEEDRATE</p> <p>Percentage adjustment by operator specified speed, or programmed speed for the following cutting process.</p> <p>(e.g.: FP0.75 = following segment will be cut with speed decrease to 75% previous speed.)</p>	

Notes:

- 1) PIERCE control system operates with incremental coordinate.
- 2) Offset between torch and tool.
- 3) Marking or cutting process is activated by M4 code and deactivated by M3 code.
- 3a) If plasma unit has Automatic Gas Console (AGC) then control system will send all parameters to the gas console via the communication cable.
- 3b) If plasma unit has Manual Gas Console (MGC) then control system only set digital input of plasma unit to switch the cutting / marking mode. Operator must set all parameters on plasma unit.