

# CERTIFICATE OF INSPECTION

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**770M MILL**

**SERIAL NUMBER:**

**DATE OF MANUFACTURE:**

**MACHINERY CERTIFICATION**

Title	Seal or Signature	Date
Inspection Director		
Inspector		
Tormach QA Representative		

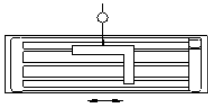
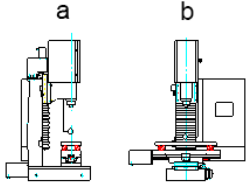
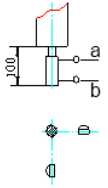
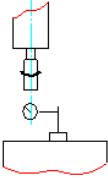
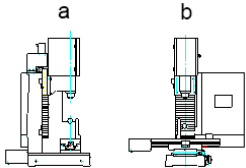
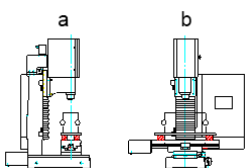
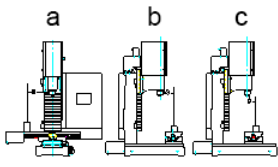
The above signatures certify this machine has passed all inspection requirements and is approved for delivery. See attached inspection documentation.

**MADE IN CHINA**

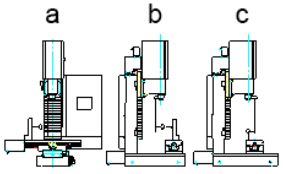
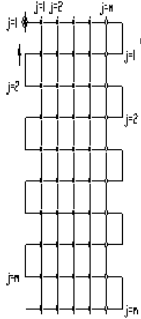
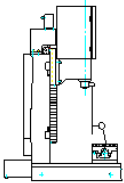
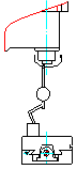
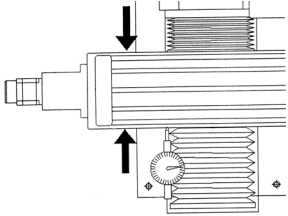
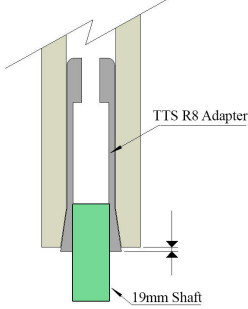


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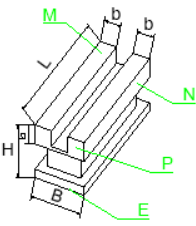
## QA 1: PRECISION INSPECTION

No.	Inspection Item	Tolerance (mm)	Actual (mm)
G1	 <p>Perpendicularity of X-Y motion</p>	0.04/200	
G2	 <p>Parallelism of axis motion to the table surface  <b>a:</b> With respect to Y-axis  <b>b:</b> With respect to X-axis</p>	<b>a:</b> Within measure length of 100: 0.04/100 <b>b:</b> Within random measure length of 200: 0.03/200 Within the total travel length: ≤400 0.04 >400 0.06	
G3	 <p>Spindle radial runout  <b>a:</b> &lt;10 mm below spindle face  <b>b:</b> 100 mm below spindle face</p>	<b>a:</b> 0.02 <b>b:</b> 0.03	
G4	 <p>Spindle float within cartridge with respect to Z motion</p>	0.015	
G5	 <p>Perpendicularity of spindle head to table surface  <b>a:</b> With respect to Y-axis  <b>b:</b> With respect to X-axis</p>	<b>a:</b> 0.035/150 <b>b:</b> 0.035/150	
G6	 <p>Perpendicularity of centerline of spindle to table surface  <b>a:</b> With respect to Y-axis  <b>b:</b> With respect to X-axis</p>	<b>a:</b> 0.04/200 <b>b:</b> 0.04/200	
G7	 <p>Lost motion of linear axes  <b>a:</b> X-axis  <b>b:</b> Y-axis  <b>c:</b> Z-axis</p>	<b>a:</b> 0.025 <b>b:</b> 0.025 <b>c:</b> 0.035	

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No.	Inspection Item	Tolerance (mm)	Actual (mm)
G8	 <p style="text-align: center;">Axis repeatability</p>	0.02	
G9	 <p style="text-align: center;">Positioning accuracy, to be completed with laser interferometer. One machine is selected for each production batch (or each 20 machines produced, whichever is fewer). If the selected machine does not meet specification, then all machines in production batch must be completely inspected. If the selected machine does meet specification, all other machines in the production batch will be reported as not selected (NS).</p>	0.03/200	
G10	 <p style="text-align: center;">Parallelism of center T-slot to X-motion</p>	At any measuring length of 200: 0.015/200	
G11	 <p style="text-align: center;">Flatness of spindle face</p>	0.02	
G12	 <p style="text-align: center;">Lateral displacement of work table to external load &lt; 300 N</p>	0.04	
G13	 <p style="text-align: center;">Projection of TTS R8 collet past spindle face when drawbar is tightened around 19.05 mm shaft</p>	0.8 minimum 1.4 maximum	

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No.	Inspection Item	Tolerance (mm)	Actual (mm)
P1	 <p>Milling accuracy:</p> <p><b>a:</b> Flatness of surface M</p> <p><b>b:</b> Parallelism of surface M to surface E</p> <p><b>c:</b> Perpendicularity of surface P to surface M, and surface N to surface P</p> <p>One machine is selected for each production batch (or each 20 machines produced, whichever is fewer). If the selected machine does not meet specification, then all machines in production batch must be completely inspected. If the selected machine does meet specification, all other machines in the production batch will be reported as not selected (NS).</p>	<p><b>a:</b> 0.04/150</p> <p><b>b:</b> 0.06</p> <p><b>c:</b> 0.06/50</p>	

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## QA 2: FUNCTION/APPEARANCE

No.	Test Name	Description	Completed
T1	Spindle Speed	Validate minimum and maximum speeds.	
T2	Spindle Direction	Clockwise and counterclockwise are correct.	
T3	Spindle Motor Drive Program	<ul style="list-style-type: none"> <li>Verify 00.011 (Machine Name) is <b>770</b></li> <li>Verify 00.012 (Parameter Version) is <b>2.02</b></li> <li>Verify 00.015 (Control Firmware Version) is <b>1.05.03</b></li> <li>Verify 00.016 (Power Firmware Version) is <b>1.05.01</b></li> <li>Verify 00.017 (User Program Version) is <b>7701</b></li> </ul>	
T4	Spindle Door Switch	Spindle drive contactor opens when the spindle access door is opened.	
T5	Coolant Outlet	Coolant outlet operates under control of PathPilot test controller.	
T6	Safety Decals	PN 38265 Mill Safety Decals installed: <ul style="list-style-type: none"> <li>General</li> <li>Spindle</li> <li>Electrical</li> <li>Z-axis brake</li> </ul>	
T7	Information Decals	PN 38257 770M Information Decals installed.	
T8	Accessory Power	<ul style="list-style-type: none"> <li>XS1 accessory power outlets operate.</li> <li>ATC power connector (XS10) voltage and polarity verified.</li> </ul>	
T9	Auxiliary Power	XS3 auxiliary power outlets operate.	
T10	Accessory Inputs	Accessory input 1 and accessory input 2 operate correctly.	
T11	X Limits	<ul style="list-style-type: none"> <li>X limit switch operates.</li> <li>Limit switch flags are adjusted for <b>355.6 mm</b> of travel.</li> <li>Machine table overhangs saddle by a maximum of <b>370 mm</b> at the X+ limit.</li> </ul>	
T12	Y Limits	<ul style="list-style-type: none"> <li>Y limit switch operates.</li> <li>Limit switch flags are adjusted for <b>190.5 mm</b> of travel.</li> </ul>	
T13	Z Limits	Z limit switch operates.	
T14	Belt Position Change	Belt position can be changed without binding or collision.	
T15	Smooth Operation	X, Y, Z, and spindle operate without unusual noise or vibration.	

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No.	Test Name	Description	Completed																									
T16	24-Hour Test	24-hour run test has been completed.																										
T17	Gib Adjusting Screws	<ul style="list-style-type: none"> <li>Adjusting screws are recessed into gib counterbores.</li> <li>Gib screw adjustment is marked with paint once adjusted.</li> </ul>																										
T18	T-Slot of Work Table	Width of T-slot.																										
T19	Test resistance from 100/N and 101 on the mains cable to the machine ground Test continuity of mains cable ground to the machine ground points.	If the test result is zero, the machine must be repaired. If there is no continuity, the machine must be repaired.																										
T20	Machine Fuses	Verify the installation of the following fuses: <table border="1" data-bbox="767 712 1286 1261"> <thead> <tr> <th data-bbox="767 712 1031 763">XFM1 Transformer</th> <th data-bbox="1031 712 1075 763">F1</th> <th data-bbox="1075 712 1286 763">5A, Slow Blow</th> </tr> </thead> <tbody> <tr> <td data-bbox="767 763 1031 815" rowspan="8">BUS1 DC-BUS Board</td> <td data-bbox="1031 763 1075 815">F1</td> <td data-bbox="1075 763 1286 815">8A</td> </tr> <tr> <td data-bbox="1031 815 1075 866">F2</td> <td data-bbox="1075 815 1286 866">8A</td> </tr> <tr> <td data-bbox="1031 866 1075 918">F3</td> <td data-bbox="1075 866 1286 918">8A</td> </tr> <tr> <td data-bbox="1031 918 1075 969">F4</td> <td data-bbox="1075 918 1286 969">8A</td> </tr> <tr> <td data-bbox="1031 969 1075 1021">F5</td> <td data-bbox="1075 969 1286 1021">Empty</td> </tr> <tr> <td data-bbox="1031 1021 1075 1072">F6</td> <td data-bbox="1075 1021 1286 1072">10A, Slow Blow</td> </tr> <tr> <td data-bbox="1031 1072 1075 1124">F7</td> <td data-bbox="1075 1072 1286 1124">Empty</td> </tr> <tr> <td data-bbox="1031 1124 1075 1176">F8</td> <td data-bbox="1075 1124 1286 1176">5A</td> </tr> <tr> <td data-bbox="767 1176 1031 1227" rowspan="2">ECM1 Control Board</td> <td data-bbox="1031 1176 1075 1227">F1</td> <td data-bbox="1075 1176 1286 1227">3A, Slow Blow</td> </tr> <tr> <td data-bbox="1031 1227 1075 1261">F2</td> <td data-bbox="1075 1227 1286 1261">Empty</td> </tr> </tbody> </table>	XFM1 Transformer	F1	5A, Slow Blow	BUS1 DC-BUS Board	F1	8A	F2	8A	F3	8A	F4	8A	F5	Empty	F6	10A, Slow Blow	F7	Empty	F8	5A	ECM1 Control Board	F1	3A, Slow Blow	F2	Empty	
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T21	Machine Fit and Finish	Machine fit and finish meets Tormach's standards.																										

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## QA 3: PACKING LIST

No.	Name	Quantity	PN
1	Drawbar, R8 (7/16-20), 305 mm	1	38793
2	Allen Wrenches (3 mm, 4 mm, 5 mm, 6 mm, 8 mm, 10 mm)	1 set	—
3	Double Open End Wrenches (13/16, 18/21)	1 set	—
4	Phillips Screwdriver	1	—
5	Key for Cabinet	1 set	—
6	Drawbar Thrust Washer	1	31330
7	TTS Collet	1	35356
8	770M/770MX Cable Kit, Machine	1	38379
9	Fuse, 5A, 5 × 20mm, Glass Slow-Blow	2	38693
10	NEMA 5-15P Electrical Plug	1	39626

These items are in the tool bag on the right side of the shipping pallet.