

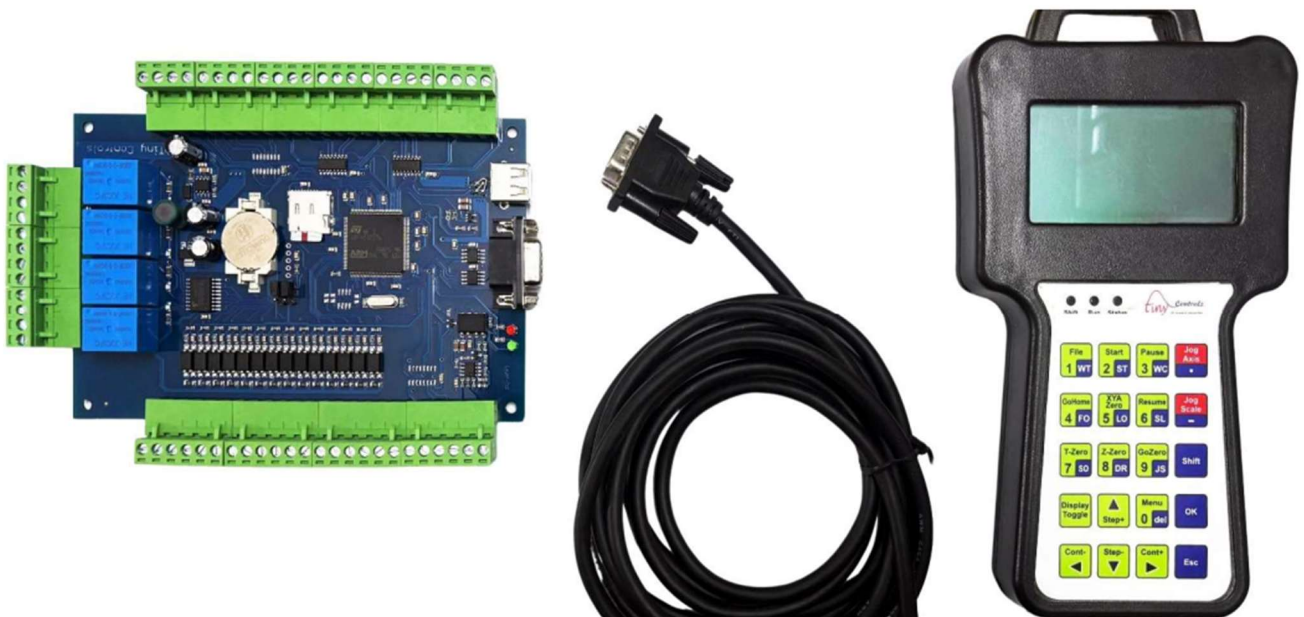
TINY CONTROLS PRIVATE LIMITED
Advanced CNC Systems

TNC-M24

Four Axis CNC Motion Controller

OPERATION MANUAL

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Chapter 1 — Safety Information

Read all safety warnings before installing or operating the TNC-M24. Failure to follow these instructions can result in death, serious injury, or damage to equipment.

1.1 Warning Levels

Level	Symbol	Meaning
DANGER	Red border	Indicates an imminently hazardous situation that will result in death or serious injury if not avoided.
WARNING	Orange border	Indicates a potentially hazardous situation that could result in death or serious injury if not avoided.
CAUTION	Yellow border	Indicates a potentially hazardous situation that may result in minor or moderate injury if not avoided.
NOTE	Blue border	Provides important information for correct operation. No injury risk.

1.2 Electrical Safety

DANGER

Always disconnect the 24 VDC power supply before making any wiring connections, performing maintenance, or opening the enclosure. Contact with live terminals can cause electrocution.

WARNING

Use a regulated 24 VDC / 0.5 A power supply only. Using an incorrect voltage will permanently damage the controller and may cause fire.

CAUTION

Ensure all cable shields and earth connections are correctly installed before powering on. Poor grounding causes erratic behaviour and electrical noise.

1.3 Mechanical Safety

DANGER

Keep hands, hair, and clothing away from all moving machine parts (spindle, axes) during operation. The TNC-M24 can command high-speed motion without warning.

WARNING

Before running a new G-code program, always enable DryRun mode first (Shift + DR). This simulates motion without moving the axes, allowing you to verify the program is correct.

CAUTION

Set correct travel limits in Limit Settings before operating. Incorrect limits may cause the machine to crash into mechanical stops.

1.4 General Safety Rules

- Only trained and authorised personnel should install, configure, or operate this controller.
- Do not operate the controller in wet, humid, or explosive environments.
- Do not block ventilation openings. Maintain at least 50 mm clearance on all sides.
- Do not attempt to repair the controller yourself. Contact Tiny Controls for service.
- Keep the work area clean and well-lit. Cluttered workspaces increase accident risk.
- In an emergency, press Esc to cancel the current operation and halt motion.

Chapter 2 — Product Overview

The TNC-M24 is a four-axis offline CNC motion controller for stepper and servo systems. All operation is performed through the handheld MPG pendant — no separate computer or display panel is required during machining.

2.1 Key Features

- ARM processor for real-time G-code execution at up to 500 kHz per axis.
- 128×64 monochrome graphic display on the MPG pendant.
- 20-key pendant keypad with primary functions, Shift-activated alt-functions, and numeric input.
- One USB port for G-code file transfer and firmware updates.
- Internal SD card for unlimited G-code file storage.
- 5 V differential outputs for stepper or servo driver interface.
- Supports standard G and M codes (see Chapter 7 for the full list).
- Upgradeable via firmware download at www.tinycontrols.com.

2.2 Technical Specifications

Parameter	Specification
Digital Inputs	14 opto-coupled NPN N/O inputs, 24 VDC
Relay Outputs	4 relay outputs for high-power switching
Stepper/Servo Outputs	8 differential 5 V outputs (2 per axis: STEP + DIR)
Spindle Control	Isolated 0–10 V analog output (PWM / Step mode option available)
Processor	High-speed ARM
Display	128×64 monochrome display on MPG pendant
Keypad	20 keys (multi-purpose: primary, Shift alt-function, and numeric)
Power Supply	24 VDC, 0.5 A (single input)
USB Port	1 × USB-A
Storage	Internal SD card (unlimited G-code file size)
Software Version	1.01 (upgradeable)
Hardware Version	1.0
Dimensions	Refer to product datasheet
Weight	Refer to product datasheet

Chapter 3 — Installation and Wiring

⚠ DANGER

Disconnect all power sources before making any wiring connections. Verify the power supply is OFF before proceeding with any step in this chapter.

3.1 Unpacking and Inspection

1. Remove the TNC-M24 from its packaging and inspect for any shipping damage.
2. Verify the following items are included: TNC-M24 controller unit, MPG pendant with cable, power cable, this operation manual.
3. If any item is missing or damaged, contact Tiny Controls before proceeding.

3.2 Mounting the Controller

Mount the TNC-M24 in a clean, dry location away from vibration sources, coolant mist, and excessive heat. Ensure at least 50 mm of clearance on all sides for ventilation.

CAUTION

Do not mount the controller inside a sealed enclosure without adequate ventilation. Overheating will damage the unit.

3.3 Power Supply Connection

4. Use a regulated 24 VDC / 0.5 A power supply.
5. Connect the positive (+) terminal to the 24 V input on the controller.
6. Connect the negative (–) terminal to the GND input on the controller.
7. Do not power on the unit until all other wiring is complete.

⚠ WARNING

Double-check polarity before applying power. Reversed polarity will permanently damage the controller.

3.4 Motor (Stepper/Servo) Connections

The TNC-M24 provides 8 differential 5 V outputs (2 per axis: STEP and DIR) for controlling stepper or servo drives.

Signal	Description
STEP+/STEP–	Differential step pulse output for motor driver
DIR+/DIR–	Differential direction output for motor driver

NOTE

If an axis moves in the wrong direction, enable Dir Pin inversion for that axis in Settings > Axis Settings instead of swapping wires.

3.5 Digital Input Connections

The TNC-M24 has 14 opto-coupled NPN N/O inputs at 24 VDC. Connect limit switches, home sensors, and probe inputs to these inputs.

- Limit switches — connect to the designated limit input pins for each axis.
- Home sensors — connect to home input pins for each axis.
- E-stop — connect a normally closed (NC) E-stop button to the E-stop input.

⚠ WARNING

Always connect an emergency stop button. Do not operate the machine without a functional E-stop circuit.

3.6 Spindle Control Connection

Connect the spindle drive analog input to the isolated 0–10 V spindle output. Alternatively, configure PWM or Step mode in I/O Settings > Spindle Settings.

- 0–10 V mode — connect AO+ and AO– to the spindle drive speed input.
- PWM mode — connect the PWM output pin to the spindle drive PWM input.
- Step mode — connect STEP and DIR outputs to the spindle drive step/dir input.

3.7 MPG Pendant Connection

Plug the MPG pendant cable into the pendant connector on the controller. The pendant is the primary interface for all operation — all keys and the display are located on the pendant.

3.8 First Power-On Check

8. Confirm all wiring connections are secure and correct.
9. Turn on the 24 VDC power supply.
10. The pendant display will illuminate and show the main status screen.
11. Verify no error messages appear. If errors are shown, refer to Chapter 8 (Troubleshooting).
12. Proceed to Chapter 4 for the first-use setup walkthrough.

Chapter 4 — Quick Start Guide

Follow these steps to go from power-on to running your first G-code program.

⚠ WARNING

Complete Chapter 3 (Installation and Wiring) before following this Quick Start guide. Do not run G-code until all wiring is verified.

Step 1 — Power on the controller

13. Turn on the 24 VDC power supply.
14. Wait for the pendant display to show the main status screen.
15. Confirm no alarm messages are displayed.

Step 2 — Configure axis settings (first time only)

16. Press 0 (Menu) on the pendant keypad to open the Settings menu.
17. Navigate to Axis Settings using the Step+/Step– keys, then press OK.
18. Set Steps Per mm for each axis to match your motor and drive configuration.
19. Set Max Feedrate and Max Acceleration for each axis.
20. Press OK to save, then press Esc to exit.

Step 3 — Home the machine

21. Press 4 (GoHome) on the pendant keypad.
22. The machine moves each axis to its home sensor and establishes the reference position.
23. Wait for homing to complete before proceeding.

CAUTION

Ensure the machine has a clear path to reach the home sensors before pressing GoHome. Remove any obstacles from the machine travel path.

Step 4 — Load a G-code file

24. Copy your G-code file (.NC or .GCode) to a USB drive.
25. Insert the USB drive into the USB port on the controller.
26. Press 1 (File) on the pendant keypad.
27. Use Step+/Step– to navigate to your file, then press OK to copy it to internal storage.

Step 5 — Set work zero (WCS)

28. Jog each axis to the desired work zero position using the Cont– and Cont+ keys (or Step+/Step– for fine movement).
29. Press 5 (XYA Zero) to zero X, Y, and A in the active WCS.
30. Press 8 (Z-Zero) to zero the Z axis in the active WCS.

Step 6 — Run a DryRun first

31. Press Shift, then DR (key 8) to enable DryRun mode. The display will confirm DryRun is active.

32. Press 2 (Start). The controller simulates the program without moving the axes.
33. Verify the program runs without errors.
34. Press Shift + DR again to disable DryRun mode.

Step 7 — Run the program

35. Press 2 (Start) to begin G-code execution.
36. Monitor position and status on the pendant display.
37. Press 3 (Pause) to temporarily halt. Press 6 (Resume) to continue.
38. Press Esc to cancel the program and halt all motion.

Chapter 5 — Pendant Interface

The TNC-M24 is controlled entirely through the MPG pendant. All keys, the display, and the status LEDs are located on the pendant.

5.1 Display

The 128×64 monochrome display on the pendant provides real-time machine status. Press Display Toggle to switch between two information screens:

- Screen 1 — Axis positions for the selected axis in the active WCS (G54–G59), active scale, and machine state.
- Screen 2 — Additional status information including feed rate, spindle speed, and active G/M code state.

5.2 Status LEDs

LED	Meaning
Shift (blue)	Lit when Shift is active. Alt-functions are available on all keys while Shift is on.
Run (green)	Lit while a G-code program is executing.
Status	Indicates controller status (refer to Section 8.2 for alarm states).

5.3 Primary Key Functions (Shift OFF)

Key	Primary Function	Description
1 File	Load G-code file	Select a program file from USB and copy it to internal storage.
2 Start	Start program	Begins G-code execution from the start of the loaded file.
3 Pause	Pause program	Pauses the running program. Press 6 (Resume) to continue.
4 GoHome	Home all axes	Initiates the homing sequence using home sensors (if enabled).
5 XYA Zero	Zero X, Y, A in WCS	Sets X, Y, and the selected 4th axis to zero in the active WCS.
6 Resume	Resume program	Resumes a paused program from where it was paused.
7 T-Zero	Auto tool zero	Zeros the tool using the tool zero sensor.
8 Z-Zero	Zero Z in WCS	Sets the Z axis to zero in the active WCS.
9 GoZero	Go to WCS zero	Moves all axes to the active WCS zero position.
0 Menu	Open settings menu	Opens the Settings menu for configuration.

Jog Axis (red)	Cycle axis selection	Cycles through X, Y, Z, A to select the axis for jogging.
Jog Scale (red)	Set jog increment	Sets jog increment: 1, 10, 100, or 1000 µm per step.
Display Toggle	Switch display screen	Toggles between the two information screens on the pendant display.
Step+ / Step–	Single-step jog	Jogs the selected axis one increment in the positive or negative direction.
Cont+ / Cont–	Continuous jog	Jogs the selected axis continuously while the key is held.
Shift (blue)	Activate alt-functions	Hold or press to activate Shift. Alt-functions are shown in blue on the keypad.
OK	Confirm / save	Confirms a selection or saves a setting in the menu.
Esc	Cancel / exit	Cancels the current operation, exits a menu, or halts motion.

5.4 Alt-Key Functions (Shift ON)

Press Shift first to activate alt-functions. The Shift LED lights up to confirm Shift is active.

Key + Shift	Alt-Function	Description
1 (WT)	WCS/MCS Toggle	Toggles the display between the active Work Coordinate System and Machine Coordinates.
2 (ST)	Spindle Toggle	Toggles the spindle on and off.
3 (WC)	WCS Selection	Cycles through Work Coordinate Systems G54 to G59.
4 (FO)	Feed Override	Adjusts the feed rate override percentage for G1–G3 moves.
5 (LO)	Limit Override	Temporarily overrides soft or hard limit stops. Use with caution.
6 (SL)	Start from Line	Starts G-code execution from a specified line number.
7 (SO)	Spindle Speed Override	Adjusts the spindle speed override percentage.
8 (DR)	DryRun	Enables or disables DryRun mode (simulates program without moving axes).
9 (JS)	Jog Offline Mode	Enables jog control independent of a running program.
0 (del)	Delete	Deletes a selected file or entry.

NOTE

Limit Override (Shift + LO) disables travel limit protection. Use only when necessary to recover from a limit alarm, and re-enable limits immediately after.

Chapter 6 — Settings Menu

Press 0 (Menu) on the pendant to open the Settings menu. The controller must be in an idle state (not running a program) before opening Settings.

6.1 Navigating the Settings Menu

39. Press 0 (Menu) to open the Settings menu.
40. Use Step+ and Step– to scroll through categories and parameters.
41. Press OK to enter a category or select a parameter for editing.
42. For numeric parameters: use the numeric keys to enter a value, then press OK to save.
43. For toggle parameters (e.g., Enable/Disable, High/Low): use Cont– and Cont+ to change the value.
44. Press Esc to return to the previous menu or exit without saving.

CAUTION

Changes to Steps Per mm, Max Feedrate, or Max Acceleration take effect immediately. Test any changes in DryRun mode before running a program.

6.2 General Settings

Parameter	Description
Junction Tolerance	Maximum deviation from the programmed path when optimising cornering speed. Default: 0.010 mm.
Arc Tolerance	Maximum deviation for arc (G2/G3) approximation. Default: 0.002 mm.
STEP Pulse Width	Duration of the step pulse sent to motor drives. Default: 1 µs. Increase if the motor drive requires a longer pulse.
LCD Brightness	Adjusts the pendant display backlight brightness (0–100%).

6.3 Axis Settings

The following parameters are available for each axis (X, Y, Z, and the 4th axis). Set each axis individually.

Parameter	Description
Drive Enable	Enables or disables the motor drive output for this axis.
Step Pin	Sets the active polarity of the STEP output (High or Low). Match to your motor driver's requirement.
Dir Pin	Sets the active polarity of the DIR output (High or Low). Change if the axis moves in the wrong direction.
Flip Jog Key	Reverses the jog key direction for this axis. Enable if jogging feels inverted.
Steps Per mm	Number of motor steps per mm of travel. Must match your motor and drive configuration.

Max Feedrate	Maximum allowed feed rate for this axis, in mm/s.
Max Acceleration	Maximum acceleration for this axis, in mm/s ² .

NOTE

The 4th axis Steps Per mm parameter should be set in steps/degree for rotary configurations.

6.4 I/O Settings

Spindle Settings

Parameter	Description
SPINDLE	Spindle control mode: Disabled, 0–10 V, PWM, or Step/Dir.
Step Pin	Active polarity of the STEP output when in Step mode (High or Low).
Dir Pin	Active polarity of the DIR output when in Step mode (High or Low).
MIN RPM	Spindle speed corresponding to the minimum output (0 V / 0% PWM / 0 steps).
MAX RPM	Spindle speed corresponding to the maximum output (10 V / 100% PWM / max steps).
SPINDLE ON DELAY	Delay after M3/M4 command before motion resumes. Allows spindle to reach speed. Default: 2 s.
PWM FREQ	PWM carrier frequency (PWM mode only). Default: 1000 Hz.

Homing Settings

Parameter	Description
Home Feedrate	Speed for the initial approach to the home sensor. Default: 2000 mm/min.
Home Seekrate	Speed for the fine-seek homing pass. Default: 500 mm/min.
Pulloff	Distance to back away from the home sensor after detection. Default: 5 mm.
Z Safe Height	Z axis height to move to before homing X and Y, to avoid collisions. Default: 50 mm.
Home Debounce	Debounce time for home switches to filter electrical noise. Default: 10 ms.

Sensor Settings

Configure the active polarity for each home and limit sensor. Options are: Disable, High (sensor active when input is HIGH), or Low (sensor active when input is LOW).

Parameter	Description
X-Home / Y-Home / Z-Home / A-Home	Home sensor polarity for each axis. Set to match your sensor's output logic.
X-Limit / Y-Limit / Z-Limit / A-Limit	Limit sensor polarity for each axis. Set to match your sensor's output logic.

Limit Settings

Parameter	Description
X-sLimit / Y-sLimit / Z-sLimit / A-sLimit	Enables or disables software travel limits for each axis. Requires homing before use.
X-Travel / Y-Travel / Z-Travel / A-Travel	Sets the positive travel limit (in mm) for each axis. Used when soft limits are enabled.

6.5 Tool Settings

Tool Zero (TZ) Settings

Parameter	Description
Sensor Height (mm)	Physical height of the tool zero sensor plate. Enter the exact thickness in mm.
BackOff Distance (mm)	Distance to retract after the tool contacts the sensor. Default: 2 mm.

Tool Offset Tables

The TNC-M24 supports up to 7 tool offsets (Tools 0–6).

- Auto Read Offset — Automatically measures and stores tool offsets using the tool zero sensor.
- Manual Edit Offsets — Manually enter tool offset values in mm for each tool slot (Tool0 through Tool6).

6.6 Reset Settings

CAUTION

Reset operations cannot be undone. Ensure you have a record of your current settings before performing any reset.

Option	Effect
Reset Coordinates Only	Clears all work coordinate offsets. Axis settings are not affected.
Reset All Settings	Restores all parameters to factory defaults.
Reset Coordinates and Settings	Clears all coordinate offsets and restores all parameters to factory defaults.

6.7 Diagnostics

The Diagnostics menu allows you to test inputs, outputs, and individual axes before running a program. Use this menu to verify sensor wiring, motor connections, and relay outputs.

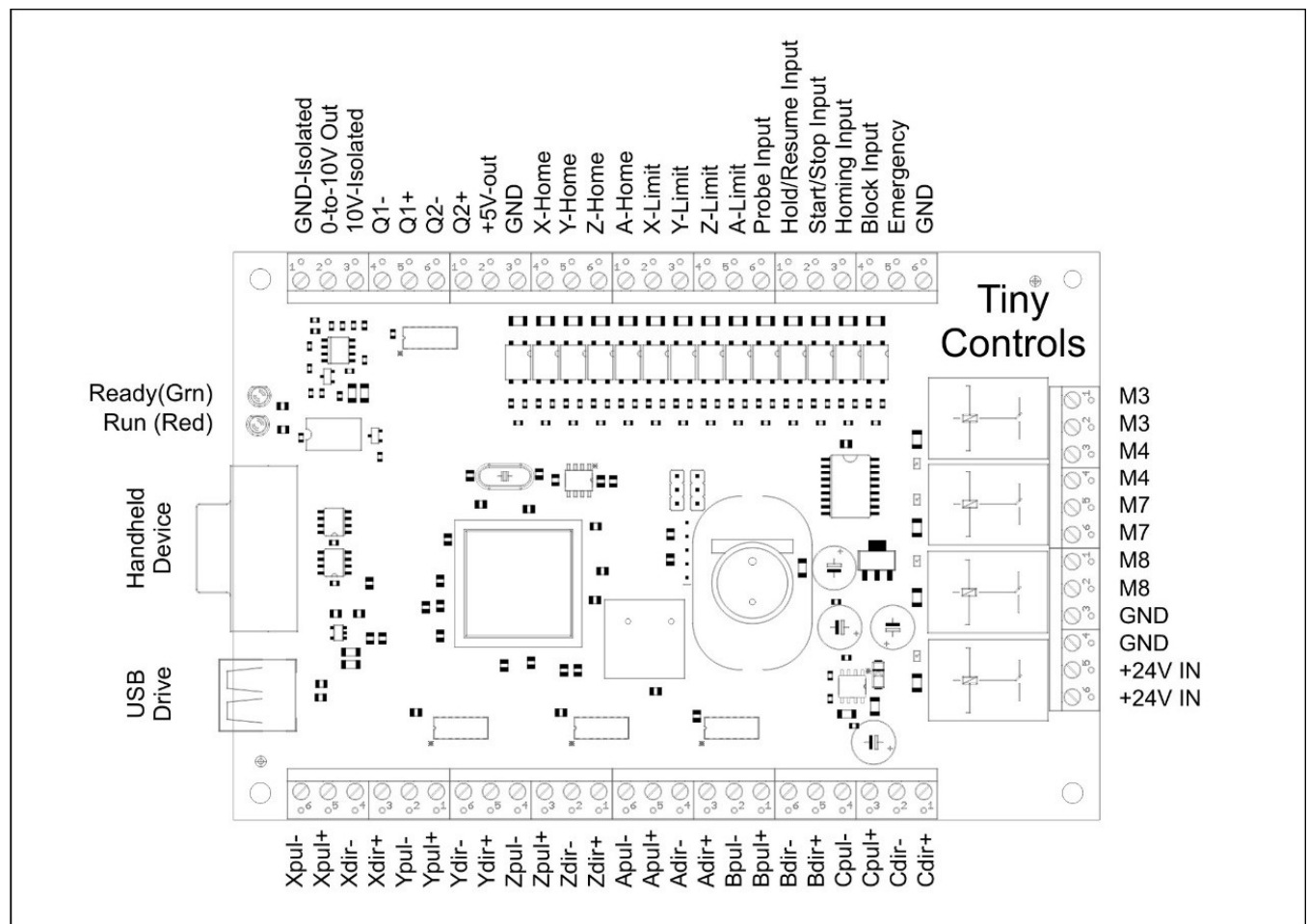
6.8 Firmware Version

To view the software and hardware versions: from the main status screen (machine not running), press Esc. The firmware and hardware version numbers will appear on the pendant display.

To update firmware: download the latest firmware file from www.tinycontrols.com, copy it to the root of a USB drive, insert the drive, and follow the on-screen update prompt.

⚠ WARNING

Do not power off the controller during a firmware update. Interrupting the update may corrupt the firmware and require factory service.



Chapter 7 — Supported G and M Codes

The TNC-M24 supports the following standard G and M codes. Advanced features such as macro variables and arithmetic operations are not supported — use external CAM software for these.

7.1 Supported G Codes

Code	Name	Description
G0	Rapid Positioning	Moves to the specified coordinates at maximum speed.
G1	Linear Interpolation	Moves at the programmed feed rate (F value).
G2	CW Circular Interpolation	Clockwise arc or helix using I, J, K offsets or R radius.
G3	CCW Circular Interpolation	Counter-clockwise arc or helix using I, J, K offsets or R radius.
G4	Dwell	Pauses for the time specified by the P value (seconds).
G17	Select XY Plane	Selects the XY plane for circular interpolation (default).
G18	Select XZ Plane	Selects the XZ plane for circular interpolation.
G19	Select YZ Plane	Selects the YZ plane for circular interpolation.
G20	Inch Units	Sets the unit system to inches.
G21	Millimetre Units	Sets the unit system to millimetres.
G28	Return to Home	Returns to the predefined home position.
G30	Return to Secondary Pos.	Returns to the secondary predefined position.
G38.2	Probing Cycle	Probes toward workpiece and stops on contact (probe required).
G40	Cancel Cutter Comp.	Cancels cutter radius compensation (default state).
G43.1	Tool Length Offset	Applies dynamic tool length offset.
G49	Cancel Tool Length Offset	Cancels active tool length offset.
G53	Machine Coordinates	Non-modal move in machine coordinate system.
G54–G59	Work Coordinate Systems	Selects WCS 1 through 6 for offset positioning.
G90	Absolute Mode	Coordinates are relative to the active WCS origin.
G91	Incremental Mode	Coordinates are relative to the current position.
G92	Temporary Offset	Sets a temporary coordinate system offset.
G93	Inverse Time Feed Mode	Feed rate is expressed as moves per minute.
G94	Units per Minute Feed	Standard feed rate mode (default).

7.2 Supported M Codes

Code	Name	Description
M0	Program Pause	Stops execution until manually resumed with Resume (key 6).
M1	Optional Pause	Stops execution if optional stop is enabled; otherwise ignored.
M2	Program End	Stops program execution without resetting to line 1.
M3	Spindle On — CW	Starts spindle clockwise at speed S. Also activates relay output.
M4	Spindle On — CCW	Starts spindle counter-clockwise at speed S. Also activates relay output.
M5	Spindle Off	Stops the spindle and deactivates the relay output.
M7	Mist Coolant On	Turns on mist coolant relay (if connected and configured).
M8	Flood Coolant On	Turns on flood coolant relay (if connected and configured).
M9	Coolant Off	Turns off all coolant relays.
M30	Program End & Reset	Ends the program and resets to the initial state.
M62 Pn	Output On (in-motion)	Turns on the specified output in sync with motion (n = output number).
M63 Pn	Output Off (in-motion)	Turns off the specified output in sync with motion.
M64 Pn	Output On (immediate)	Turns on the specified output immediately, independent of motion.
M65 Pn	Output Off (immediate)	Turns off the specified output immediately.
M66 Pn L1	Wait for Input	Waits for the specified input (n) to go high before continuing.

Chapter 8 — Troubleshooting

Use this table to diagnose and resolve common problems. If your issue is not listed, or if the solution does not resolve the problem, contact Tiny Controls support.

⚠ WARNING

Never open the controller enclosure while power is applied. Always disconnect the power supply before inspecting any connections.

8.1 Common Faults and Solutions

Problem	Possible Cause	Solution
Controller does not power on	No power supply; incorrect voltage; blown fuse	Verify 24 VDC supply is on and correctly wired. Check polarity. Measure supply voltage with a multimeter.
Pendant display is blank	Pendant cable not connected; LCD brightness set to 0	Reconnect the pendant cable securely. Set LCD Brightness to a higher value in General Settings.
Axis moves in wrong direction	Dir Pin polarity incorrect	Change Dir Pin setting for the affected axis (High → Low or Low → High) in Axis Settings.
Homing fails or misses sensor	Home sensor not connected; sensor polarity incorrect; Home Feedrate too high	Check sensor wiring. Change X/Y/Z/A-Home polarity in Sensor Settings. Reduce Home Feedrate.
Limit alarm triggered unexpectedly	Machine exceeded travel; limit sensor polarity incorrect; electrical noise	Press Shift + LO to override temporarily and jog back to a safe position. Check X/Y/Z/A-Limit polarity in Sensor Settings.
Motor vibrates but does not move	Steps Per mm too low; STEP Pulse Width too short for the drive	Increase Steps Per mm. Increase STEP Pulse Width in General Settings to match motor driver specification.
Spindle does not start	No M3/M4 in G-code; spindle wiring fault; Spindle mode set to Disabled	Verify M3/M4 is in the G-code. Check 0–10 V / PWM / Step wiring. Set correct Spindle mode in I/O Settings.
Program stops mid-run	Limit triggered; alarm active; M0 in G-code file	Check Status LED and pendant display for alarm message. Search G-code for M0 pause command.
USB file not found	USB not FAT32 formatted; file in subfolder	Format USB drive as FAT32. Place G-code files in the root directory of the USB drive.

Inaccurate positioning	Steps Per mm incorrect; loose mechanical coupling	Recalibrate Steps Per mm using a dial gauge. Check couplings and motor mounts for looseness.
Firmware update fails	USB not FAT32; incorrect firmware file; power interrupted	Use a FAT32 USB drive. Download the correct firmware for hardware V1.0 from www.tinycontrols.com . Do not interrupt power during update.

8.2 Status and Error Reference

Display Message / LED State	Meaning and Action
Status LED lit (alarm)	An alarm condition is active. Check pendant display for the specific alarm message.
Run LED lit	A G-code program is currently executing.
Shift LED lit	Shift is active. Alt-functions are available on all keys.
Limit Alarm	A limit sensor was triggered. Use Shift + LO to override temporarily, jog clear, then reset.
Homing Error	The homing sequence failed to find a sensor. Check sensor wiring and polarity settings.
Spindle Error	Spindle did not respond as expected. Check spindle wiring and Spindle mode setting.
File Error	G-code file could not be read. Re-copy the file to USB and try loading again.

Chapter 9 — Maintenance and Care

9.1 Routine Maintenance Schedule

Frequency	Task	Notes
Daily	Inspect the pendant cable for damage or kinking	Replace cable immediately if the outer sheath is damaged.
Weekly	Clean the pendant display with a soft dry cloth	Do not use solvents or abrasive cleaners.
Weekly	Check ventilation openings for dust blockage	Clear with compressed air if needed.
Monthly	Inspect all wiring for wear, chafing, or corrosion	Replace damaged cables immediately.
Monthly	Verify homing repeatability with a dial gauge	Recalibrate Steps Per mm if error exceeds 0.05 mm.
As needed	Update firmware	Check www.tinycontrols.com for the latest release.

9.2 Cleaning

- Use only a soft, dry cloth to clean the pendant and controller enclosure.
- Do not use water, solvents, or abrasive materials on any surface.
- Keep coolant and cutting fluid away from the pendant and controller at all times.

CAUTION

Do not spray cleaning agents directly onto the controller or pendant. Moisture ingress will damage the electronics.

9.3 Storage

- Store the TNC-M24 in a clean, dry environment between 0 °C and 60 °C.
- Avoid storing in areas with high humidity, direct sunlight, or vibration.
- Coil the pendant cable loosely — do not bend sharply or wrap tightly around the unit.

Chapter 10 — Warranty and Support

10.1 Warranty

Tiny Controls Private Limited warrants the TNC-M24 against defects in materials and workmanship for a period of 12 months from the date of purchase under normal use conditions.

The warranty does not cover:

- Damage caused by incorrect installation or wiring.
- Damage caused by operating outside the specified voltage or environmental conditions.
- Physical damage including cracks, broken connectors, or liquid ingress.
- Damage resulting from unauthorised modifications or repairs.
- Firmware issues caused by incorrect or interrupted firmware update procedures.

10.2 Obtaining Support

Before contacting support, have the following information ready:

- Product model: TNC-M24
- Hardware version (press Esc from the main screen to display)
- Firmware version (press Esc from the main screen to display)
- A clear description of the problem and the conditions under which it occurs

Contact Method	Details
Website	www.tinycontrols.com
Email	anil@tinycontrols.com
Phone	+91-991-119-3210
Address	Tiny Controls Private Limited, B-17/A, Nishat Park, Kakrola, New Delhi, India – 110078

10.3 Returning the Controller for Service

45. Contact Tiny Controls to obtain a Return Merchandise Authorisation (RMA) number.
46. Pack the controller and pendant securely in original or equivalent protective packaging.
47. Write the RMA number clearly on the outside of the package.
48. Include a written description of the fault and your contact details inside the package.
49. Ship to the address above using a tracked courier service.

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