XYZ Machine Tools
ProtoTRAK® TMC
Safety and Quick Start Guide

Part Number:	19718
Version:	221122

Covers:

XYZ RMX 2-OP
XYZ 500 TMC
XYZ 750 TMC
XYZ 1000 TMC
XYZ 1600 TMC

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Introduction

This guide provides important safety Information and a very brief description of the operation of the CNC control.

Full safety and operating information is provided in the ProtoTRAK TMC Safety, Programming, Operating, and Care Manual. Please take time to read and understand these manuals before using the machine. These manuals can be downloaded from the support pages of our website https://www.xyzmachinetools.com/customer-support/downloads-manuals/

Safety

The ProtoTrak TMC machines are designed as dual purpose, Production/Toolroom Machining Centres.

When used in Production mode, the machine can only be operated when the enclosure door is closed. With the door open all machine movement is inhibited.

However, switching the mode select to the SETUP position allows limited machine operation (primarily for tool/job setup) with the door open. Due to the increased risk this presents to the operator, it is important that the operator understands what functions are active in SETUP mode and how they can be used safely.

Please refer to the description of the Production/Setup switch on the Run Panel (In the Operating Controls Section).

As with any machine tool, it is important that the responsible person (employer or machine owner/controller):

- Undertakes a Risk Assessment on the use of this machine,
- Generates and applies Safe Operating Procedures for the use of the ProtoTrak machine
- Provides any additional training, safeguarding and PPE identified by the risk assessment.
- Ensures the machine is only used by suitably trained, experienced and motivated operators.

These responsibilities fall to the machine controller under the Provision and Use of Work Equipment Regulations (1998) or equivalent local regulations.

Please note the following about the intended, and restrictions on, use of this machine:

- The machine is designed for the machining of cold metal within the stated capacity of the machine with axes movement occurring by manual use of handwheels or CNC control.
- It is designed to be used in a standard workshop environment only (temperature range: 10°C to 30°C, altitude: <1000m).
- This machine must not be used for machining flammable materials (e.g. magnesium) without undertaking a risk assessment and incorporating any additional safety measures identified.

The following Safety Features must be checked on a regular basis (e.g. at the start of every shift):

1. E-stop
    a. Press the E-stop button and ensure that the control flags up faults 261 (E-stop active) and 0055 (machine disabled) and that the axes and spindle cannot be started. Apply this test to both the Run panel and hand held MPG E-stop buttons.
    b. The side doors are also wired into the E-stop circuit. Check that the machine is E-stopped whenever these doors are removed (e.g. for maintenance)
2. Front Door Interlock
    a. Check the door is always locked except when the DOOR button has been pressed.
    b. Open the door and check that the door open message appears on the screen and that maximum feedrate is limited to 2m/min (78 ipm).
    c. Check the machine does not move when either JOG, EHWs or HH MPG are activated.
    d. Press in the enable button of the Hand Held MPG and confirm that the axes can be moved. Whilst moving the axes, release the enable button and confirm the axes stops.
3. Guards: Inspect the guards for signs of damage (especially the transparent panels). Replace if any part of the guard is damaged. Replace the transparent panels in accordance with the stated schedule, regardless of their apparent condition (see the FAQ on our website for why this is important).

Notes on the E-stop and Guard critical safety functions:

- E-stop:
  - This is provided by a safety rated, hard-wired E-stop system controlled by the E-stop button on the pendant or Hand Held MPG. When the machine is E-stopped, the axes are disabled and the spindle is put into a Safe Torque Off mode.
  - Releasing the E-stop button and pressing the Reset button, will always take the machine out of the hardware E-stop condition (unless there is a fault with the safety circuits). However, the machine may still be disabled because of the current machine mode, or on the results of software safety checks undertaken by the control (fault 0055). This an "NC Not ready" state; and does not carry the same high, safety reliability level as the hardware E-stop.
  - If you wish to leave the machine in a hardware E-stop condition, for example, when leaving the machine unattended, always press in, and leave pressed in, one of the E-stop buttons. Do not twist to release the E-stop button until you are ready to make the machine live again.
- Front Door Guard:
  - The front door guard is locked automatically whenever it is closed. It can only be opened by pressing the DOOR button (providing the axes and spindle are not running).
  - Once opened, the spindle is put into a Safe Torque Off state after a few seconds. DO NOT touch the spindle until the spindle is in the Safe Torque Off Mode. Wait at least 3 seconds after the door is opened.

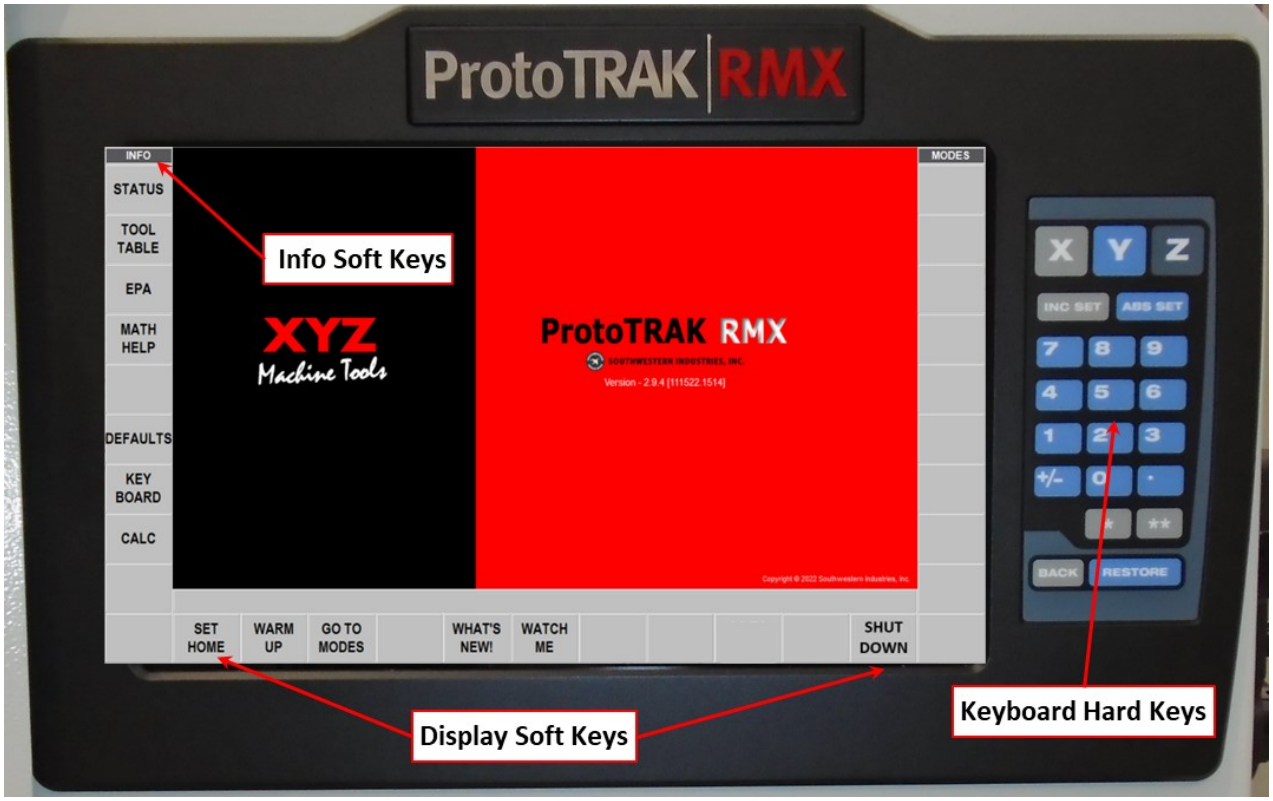
When operating this machine, always observe the following safety precautions

- Do not operate this machine without knowing the function of every control key, button, knob, or handle.
- Always wear the appropriate personal protective equipment, including safety glasses and safety shoes.
- Do not wear loose fitting gloves whilst operating this machine as they could easily get caught in moving parts.
- Never wear rings, watches, long sleeves, neckties, jewelry, or other loose items when operating the machine.
- Keep your hair away from moving parts. Wear adequate safety head gear.
- Never operate any machine tool after consuming alcoholic beverages, or taking strong medications, or while using non-prescription drugs.
- Carry out a COSHH risk assessment and use the correct protection equipment, e.g. barrier cream/latex gloves, to prevent harm from items such as cutting fluid, lubrication oil and other substances used on the machine.
- Do not use compressed air to remove swarf or clean the machine. This can damage the slideway seals and create coolant mist which can be harmful. XYZ recommend the use of BioConcept cutting fluids which do not present a risk to the respiratory tract.
- Observe and understand the warning and safety information labels affixed to this machine.
- Do not attempt to tamper with or override any guarding/safety device fitted to the machine.
- Keep the Hand Held MPG close by (and your hand off the enable button) whenever:
  - changing tools.
  - changing parts.
  - Clearing away the Swarf, oil or coolant. Always use a chip scraper or brush.
  - Making an adjustment to the part, vice, coolant nozzle or take measurements.
- Keep the working area clear and remove all tools (spanners, chuck keys etc.) from the machine before you start the machine running. Loose items can become dangerous flying projectiles.
- Keep work area well lit. Ask for additional light if needed.
- To prevent slippage and personal injury, keep the working area around the machine dry and clean. Ensure there is no swarf, oil, coolant and obstacles of any kind around the machine.
- Securely clamp and properly locate the workpiece in the vice, fixture or chuck. Use proper tool holding equipment.

- Use the correct tooling for the process being undertaken. Never use damaged or worn tools and ensure the correct cutting parameters (speed, feed, and depth of cut) are used to prevent tool breakage.
- Prevent damage to the workpiece or the cutting tool. Never start the machine (including the rotation of the spindle) if the tool is in contact with the part.
- Avoid large overhangs on cutting tools when not necessary.
- To prevent fires, keep flammable materials and fluids away from the machine, hot swarf and workpieces.
- Stop and disconnect the power to the machine before undertaking any cleaning or maintenance.

Operating Controls

Programming Panel



Keyboard Hard Keys

X, Y, Z: selects axis for subsequent commands
INC SET: loads incremental dimensions and general data
ABS SET: loads absolute dimensions and general data
0-9, +/-, . : inputs numeric data with floating point format. Data is automatically + unless **+/-** key is pressed. All input data is automatically rounded to the system's resolution
RESTORE: clears an entry, aborts a keying procedure
BACK: Moves back within the screen or the DIL when there isn't a better way to do it.
*** KEY:** Takes a screen shot (use with Service Code 1)
**** KEY**: Not used at this time.

Display Soft Keys

The soft keys are enabled and operated by the touchscreen.

Fly Out Windows

Touching one of the INFO Soft Keys (on the LHS) initiates another window to open (or "fly out"). When one of these windows is active, the associated INFO Soft Key will be yellow. In order to put the window away, or switch to another Fly Out Window, press the INFO Soft Key again.

Warnings are also presented in a Fly Out Window. When a Warning appears, you must press the Clear soft key to dismiss the warning.

Please note a number of control features designed to maximise the productivity of the machine:

- The **Touch Screen** Interface enables you to interact with your programs and set ups with more certainty and control than ever before.
- **Defaults** allow you to customize the ProtoTRAK RX for how *you* make parts; they are easy to set and easy to change.
- The **large LCD screen** and **fly out windows** allow you work with everything you need at the same time without flipping between screens.

- **Enhanced ProtoTRAK Assistance (EPA)** is always available for you to quickly look up the information you need for what you are doing at the time.

Run Panel

POWER RESET: This button is used to reset the machine from a hardware E-stop condition or NC Not Ready state.. It will need to be pressed at first power up and any time the control gets into a critical fault condition. For example, if the user presses the Emergency Stop button.

Emergency Stop Button: Pressing this will put the machine into a hardware E-stop condition and the control into a "NC Not Ready" state. Twist to release the button. Equipment such as fans and the worklight (option) are also turned off in E-stop, so this state will reduce the standby power consumption of the machine by a small amount.

Spindle Keys:

REV: runs the spindle in reverse at programmed speed with any override.
OFF: Turns spindle off.
FWD: runs spindle in the forward direction at programmed spindle speed with any override.

Feed Keys:

GO: initiates motion in Run mode/during tool change etc.
STOP: halts motion during Run.

COOLANT: Press this key to turn on the coolant pump in DRO or RUN modes. Press and hold until the AUTO LED comes on and coolant pump operation will be controlled by AUX events in the programme.

AIR: Pess this key to turn on the tool air blast. Press and hold until the AUTO LED comes on and air blast will be controlled by AUX events in the programme.

WASH: Press this key to turn on the coolant washdown pump (not for RMX 2-OP – washdown comes on with main coolant pump).

CTS: Press this key to turn on the Coolant through Spindle pump (option - not available for RMX 2-OP).

CONVEYOR: Press this key to turn on the chip conveyor (option - not available for RMX 2-OP).

DOOR: Press this key to unlock the door. The door is unlocked for 3 seconds only and then locks again. The door cannot be unlocked if the spindle or axes are running. Press OFF/STOP first.

EHW FINE/COURSE: Selects the resolution for the Toolroom Electronic Handwheels (option - not available for RMX 2-OP).

PRODUCTION/SETUP SWITCH: Selects PRODUCTION or SETUP mode.

If the door is closed, the machine is fully operational regardless of the position of this switch.

However, once the door is unlocked and opened, the machine behaves differently depending on the switch position:

- In PRODUCTION:
  - All hazardous machine functions are disabled regardless of control mode, namely: axes, spindle, ATC, conveyor and coolant pumps.
  - Manual tool changes are still possible.
  - Remember to insert a "Part Change Position" Aux Event at the end of your programme to bring the table towards the door, before the axes are disabled.
  - Please note that if you wish to render the machine safe for cleaning or other maintenance activities, we would recommend powering down the machine, or at least engaging the E-stop. If venturing into the machine, press the E-stop button on the Hand Held MPG and take it with you to avoid someone accidentally enabling the machine.
  - The key can be removed in the PRODUCTION position.
- In SETUP:
  - All hazardous machine functions are disabled (as for PRODUCTION)
  - However, the axes (only) can be re-enabled using the ENABLE button on the Hand Held MPG (if you are in a drive enabled mode such as DRO or Tool Table).
  - As long as this button is held in, the axes will be live (you may have to wait a few seconds for the drives to become ready – a warning message will be displayed on the screen). Releasing the button will stop the axes immediately.
  - To provide further safeguards the axes speed is limited to 2m/min.
  - The key cannot be removed in the SETUP position.

USER PORTS

The following are provided:

- **USB ports (4 off):** Can be used for USB memory sticks for Programme I/O and/or a USB keyboards. DO NOT use these ports to charge any devices unless you use a charging only cable (NO data connection).
- **Audio Jack:** 3.5mm stereo audio jack for use with the help videos. Headphones are supplied with machine.
- **RSG:** A Remote Stop Go control (option) may be plugged into this port. It provides the same function as the CYCLE STOP/GO keys on the Run Panel.

Hand Held MPG (HH MPG)

Emergency Stop Button: Pressing this will put the machine into a hardware E-stop condition and the control into a "NC Not Ready" state. Twist to release the button.

Enable Button: See the description of the PRODUCTION/SETUP Switch.

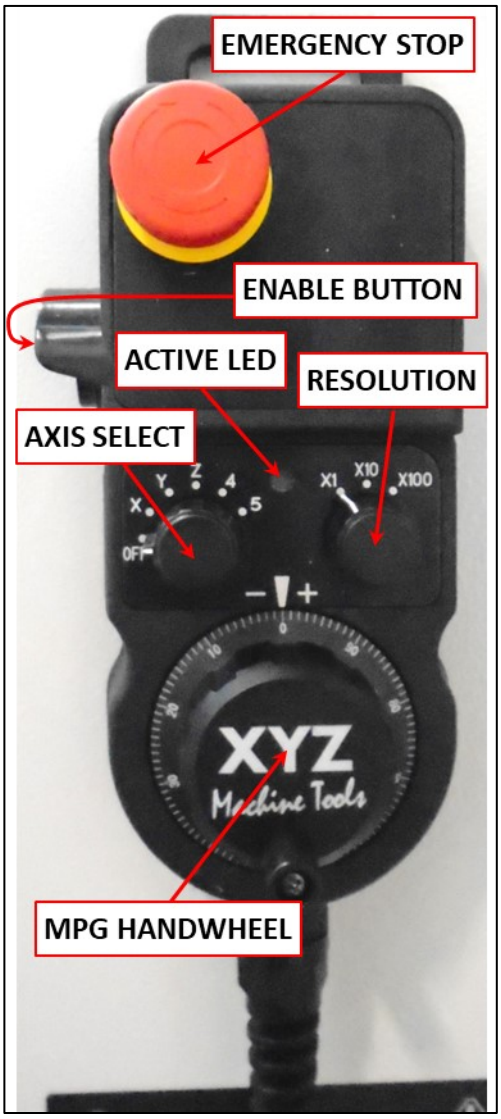
Axis Selection Switch: Selects the axis under control of the MPG handwheel. The HH MPG is common to other XYZ machines which have a 5th axis. However, the TMC range does not have a 5th axis option. The RMX 2-OP does not have a 4th or 5TH axis option.

Resolution Switch: Selects the resolution of the MPG hand wheel: Each click of the handwheel will jog the axis:

- X1: 2µm (1 x 2µm)
- X10: 20µm (10x 2µm)
- X100: 200µm (100x 2µm)

Active LED: Will light up whenever the axis selection is not set to OFF. Note, even if the LED is on, axes may not move when you move the MPG handwheel; it will depend on whether the current control mode allows motion or not.

MPG Handwheel: rotating the handwheel will jog the selected axis. The handwheel can also be used to TRAK in programme RUN mode. Axis selection is not important in this case. The resolution switch will affect how fast the programme is TRAKed.



Tool Room EHWs (option – not RMX 2-OP)

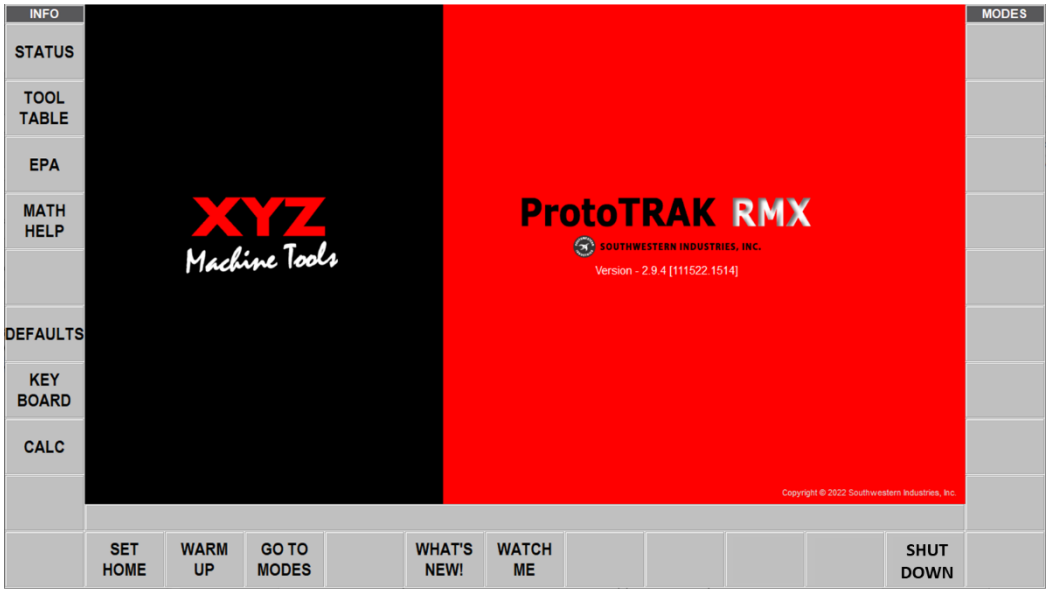
X, Y and Z EHWs are provided to move the axes in any control mode which allows motion. The X and Y handwheels can also be used for TRAKing in programme RUN mode. The handwheels must be turned on in the STATUS info window.

If the door is open, you will have to hold in the HH MPG enable button to enable the axes drives. Since the HH MPG is on a coiled cable, you can place it somewhere convenient to use with the toolroom EHWs.

Powering Up the System

To turn on the machine, rotate the power switch on the Electrical Cabinet to the On position. The cabinet door must be closed.

The control will go through its boot up sequence. When it is finished, the following screen will appear.



The machine will always power up in an Estop condition, Press the POWER Reset hard key to make the machine ready.

Close the door and tap the SET HOME soft key to home the machine (this is particularly important if you are using the SAVE/OPEN TEMP feature).

Once homing is complete, press the GO TO MODES soft key to begin using the machine.

Shutting down the Control

Important: The system must be turned off properly or you may lose unsaved data such as programs or certain machine configurations. The SHUT DOWN soft key will initiate the process of shutting down safely. When the screen goes blank, turn off the power switch at the back of the electrical cabinet.

First close any Fly Out Windows that are open. We also recommend that you complete any prompted activity, such as programming an Event. Press the BACK hard key repeatedly until you get to the screen shown above.

The ProtoTRAK control should be shut off regularly (say once a week). Failure to reboot regularly may cause the control to run slowly. Use the SAVE TEMP feature prior to shut down to save your current positions, tool information and program.

If the screen does not go blank after the RX software closes, use the on-screen keyboard or an external keyboard to shut down Windows in the normal way (do not switch off power if Windows is still running).

Please refer to the Operating Manual for full operating instructions.

Maintenance

Please refer to the maintenance schedule on the machine or in the service manual for important maintenance activity.

XYZ Machine Tools Ltd.

ProtoTRAK UK Warranty Policy

ProtoTRAK products are warranted to the original purchaser to be free from defects in workmanship and materials for the following periods:

Product	Warranty Period
New ProtoTRAK Controlled Machine	12 Months
Any Exchange Unit or Spare Part	6 Months

The warranty period starts on the date of the invoice to the original purchaser from XYZ Machine Tools Ltd (XYZ) or their authorised distributor. If a unit under warranty fails, it will be repaired or exchanged at our option for a properly functioning unit in similar or better condition. Such repairs or exchanges will be made carriage paid within the UK mainland.

Disclaimers of Warranties This warranty is expressly in lieu of any other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular purpose, and of any other obligations or liability on the part of XYZ (or any producing entity, if different). Warranty repairs/exchanges do not cover incidental costs such as installation, labour, etc.

- XYZ is not responsible for consequential damages from use or misuse of any of its products.
- ProtoTRAK products are precision mechanical/electromechanical measurement systems and must be given the reasonable care that these types of instruments require.
- Replacement of slideway wipers and covers is the responsibility of the customer. Consequently, the warranty does not apply if swarf or coolant have been allowed to enter the mechanism.
- This machine is designed to cut common, metallic engineering materials (such as steel and aluminium). DO NOT use to cut special materials (such as composites or abrasives) without agreement from XYZ Machine Tools. Any damage caused to the machine by processing such materials will not be covered by the warranty.
- Accidental damage, beyond the control of XYZ, is not covered by the warranty. Thus, the warranty does not apply if an instrument has been abused, dropped, hit, disassembled or opened.
- Improper installation by or at the direction of the customer in such a way that the product consequently fails, is considered to be beyond the control of the manufacturer and outside the scope of the warranty.