TNC-M13-CNC CONTROL BOX

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THIS MANUAL CONTAINS INFORMATION FOR INSTALLING AND OPERATING THE FOLLOWING PRODUCT:

- **TNC-M13- CNC CONTROL BOX**

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Introduction

TNC-M13 CNC Controller box is an independent standalone system for the CNC applications. This model offers 3 linear axes X, Y and Z. The system contains all the necessary components required for CNC machining in a single box making the process quite simple.

The front side of the box consist a cooling fan for cooling down the system, an emergency switch, a rotary switch for power On-Off control, a power indicator and slot for connecting pen drive and for the serial interface with handheld pendant. The rear side consist all the connectors through which the connections are made for inputs and outputs of CNC machine and the socket for mains power which drives the controller box.

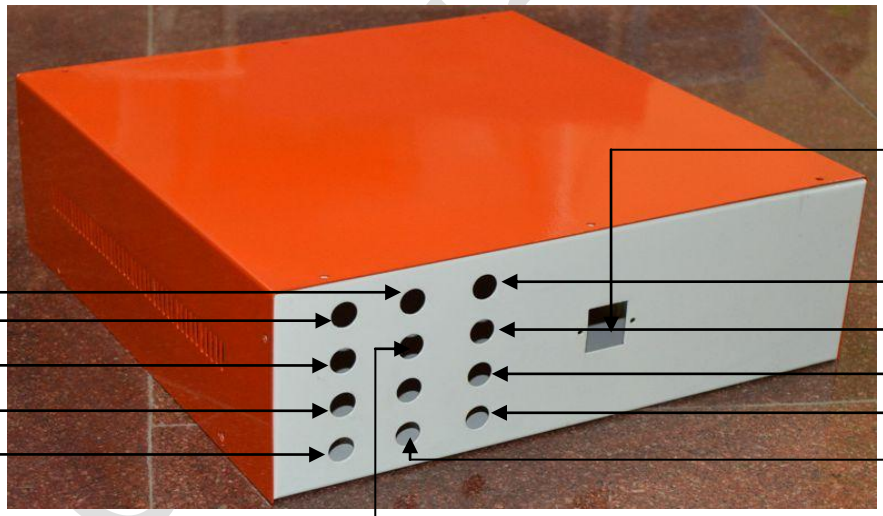
The system is enclosed in a metal powder coated rigid cabinet. Slots are made on the side walls of the cabinet for proper ventilation of heat dissipated by the components in the system.

The emergency button mounted ensures the safety of components mounted on the controller box. The emergency button if pressed cut the power supply to the stepper drives and the CNC controller board whereas the power indicator and cooling fan continues to run.

Features

- Prevention of entry and accumulation of lint, paper, fibers, dust or other foreign materials on the control board.
- Emergency switch for emergency conditions.
- Shields and covers are provided on all connections to ensure safety and long life. Connectors are properly insulated to avoid any chances of sparking within the system.
- Separate input connectors for home, limit and miscellaneous input (Tool zero, Block mode, Start-stop, hold-resume).
- 3 axes output connectors, 1 connector for spindle on-off control and VFD output, 1 connector for coolant flood and mist.
- Power on-off rotary switch and a 220V power indicator. Separate socket for mains power supply which drives the system.

CNC Controller Box Terminals



CNC CONTROLLER BOX SPECIFICATIONS

Contents	Specifications
USB Host Port	USB-2.0 Port
Communication Terminal 1	Serial Terminal for pendant
Communication Terminal 2	Serial Terminal (for PLC interface)
Operating Interface	External connectors for connections
Axes output connectors (X, Y, Z)	3
Spindle output (VFD output) connector	1
Coolants (Flood & Mist) output connector	1
Analog outputs (On board)	2
Home inputs connector	1
Limit inputs connector	1
Misc inputs (Tool Zero, Block mode, Start-stop, Hold resume) connector.	1
Fuse	2A
Power ON indicator	1
Emergency Switch	1
Supply voltage	220V
Ambient temperature range	0˚-55˚ Celsius
Relative Humidity	< 90% (without condensation)
Dimensions	400x400x130(in mm)
Weight	15 kg approx.

Drive can be Tstep-484 or Tstep-087. The rating for both drives is as shown below:

Tstep-087:

Supply voltage: 18-80 V DC
Phase current: 1.2-7.0 A
Chopping frequency: 20 KHz
Auto current reduction: 70% of set current after approx 1 second of inactivity.

Inputs: Step and direction opto-coupled (3.3 V or 5 V compatible).
Short circuit protection: Motor windings and motor outputs to ground.
Step frequency: 0-200 KHz
Step pulse: Step on rising edge, minimum low/ high time 2us.
Direction input: Stay 500ns unchanged before and after a step pulse.

Tstep-484:

Supply voltage: 18-48 V DC
Phase current: 0.7-4.2 A
Chopping frequency: 20 KHz
Auto current reduction: 70% of set current after approx 1 second of inactivity.
Inputs: Step and direction opto-coupled (3.3V or 5V compatible).
Short circuit protection: Motor windings and motor outputs to ground.
Step frequency: 0-200 KHz
Step pulse: Step on rising edge, minimum low/ high time 2us.
Direction input: Stay 500ns unchanged before and after a step pulse.

Power supply:

Option 1: 42V, 10A

Transformer type: Toroidal-CRGO
Total transformer rating: 300VA continuous
Power supply board: TL-PSB1 Linear power supply board
Output 1 (unregulated): 100V (15A)
Capacitor at output 1: 11000uF/ 100V DC
No of terminal at output 1: 4
Output 2 (unregulated): 24V (800mA)
Output 3 (regulated): 12V (800mA)
Maximum combined current from output2 and 3: 1A
Terminal for output 2 and 3: 1 each with common GND.

Option 2: 60V, 12.5 A

Transformer type: Toroidal-CRGO
Total transformer rating: 500VA continuous
Power supply board: TL-PSB1 Linear power supply board
Output 1 (unregulated): 100 V (15 A)
Capacitor at output 1: 11000uF/ 100V DC

No of terminal at output 1: 4
Output 2 (unregulated): 24V (800 mA)
Output 3 (regulated): 12V (800 mA)
Maximum combined current from output 2 and 3: 1 A
Terminal for output 2 and 3: 1 each with common GND.

CNC Controller Board:

Processor: 32 bit controller
USB host port: USB 2.0 port
Communication terminal 1: Serial terminal for pendant
Communication terminal 2: Serial terminal for PLC interface.
Axes drive control type: Step/ Dir 5V
Maximum frequency for step signal: 150 KHz
Supply voltage: 24 V DC

Refer to TNC-M14 CNC controller manual for more details.

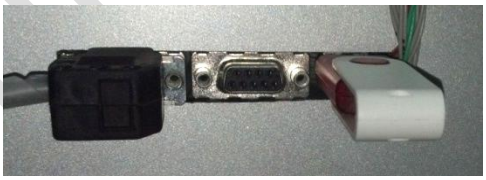
Power supply

The power is configured through this socket. Power supply is configured with a transformer and the TL-PSB1 power supply. All the power supply connections such as the controller board and drives have been made internally through the power supply card. A slot is provided to connect the power cord to mains supply.

Emergency switch

The emergency switch connected to the controller box is shown in this picture. An emergency switch is also connected on the top of pendant.

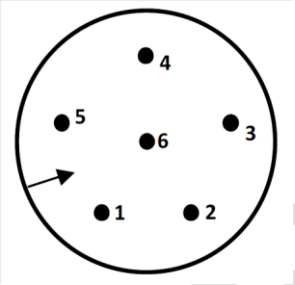
Connections to pen drive and Pendant



This picture shows the connections of pen drive and pendant with the board. The second DB-9 connector is for PLC interfacing or other media.

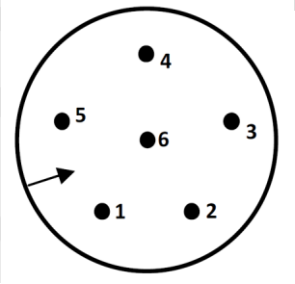
CNC CONTROL BOX CONNECTIONS

TERMINALS	CONNECTIONS
1	X
2	Y
3	Z
4	-
5	GND
6	+24 V



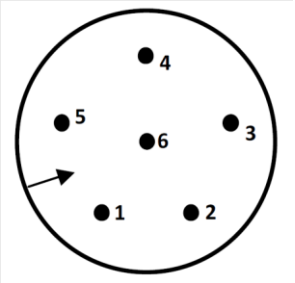
HOME

TERMINALS	CONNECTIONS
1	X
2	Y
3	Z
4	-
5	GND
6	+24 V



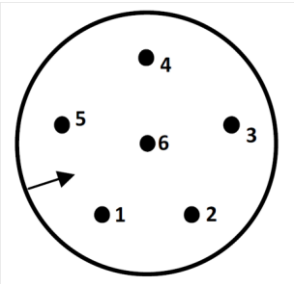
LIMIT

TERMINALS	CONNECTIONS
1	NC
2	COM
3	NO
4	10V IN
5	0V IN
6	0-10V OUT



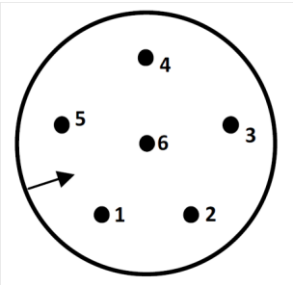
SPINDLE

TERMINALS	CONNECTIONS
1	Coolant Mist NC
2	Coolant Mist COM
3	Coolant Mist NO
4	Coolant Flood NC
5	Coolant Flood COM
6	Coolant Flood NO



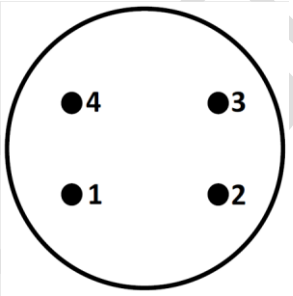
COOLANT

TERMINALS	CONNECTIONS
1	TOOL ZERO
2	BLOCK MODE
3	START
4	STOP
5	GND
6	HOLD-RESUME



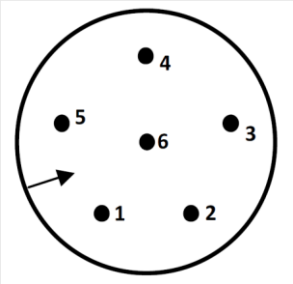
MISCELLANEOUS

TERMINALS	CONNECTIONS
1	MA+
2	MA-
3	MB+
4	MB-



MOTOR TERMINALS

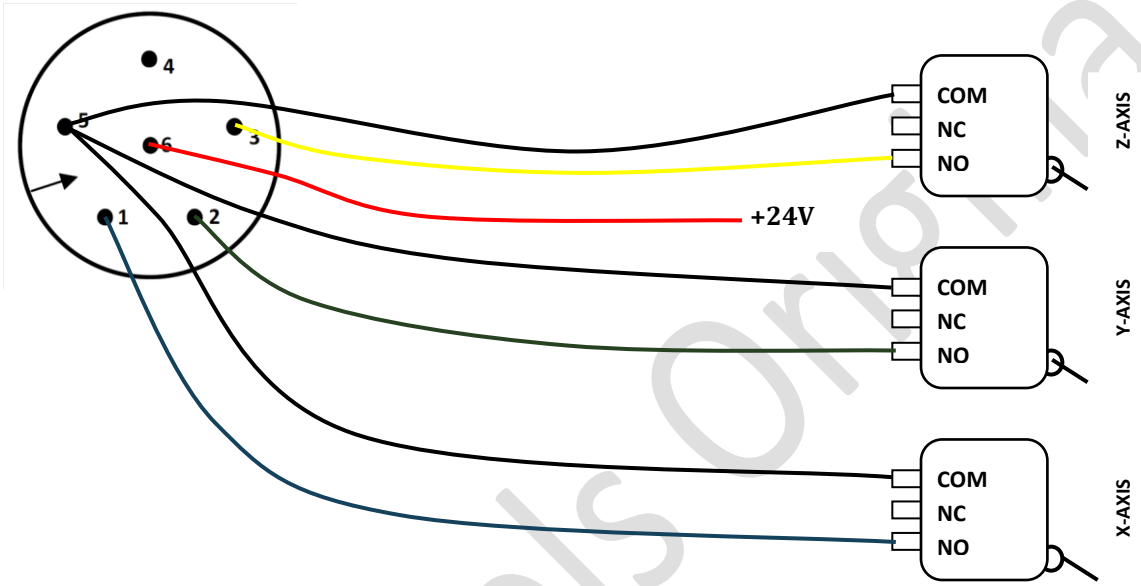
TERMINALS	CONNECTIONS
1	Y-Slave Home
2	-
3	-
4	-
5	GND
6	+24V



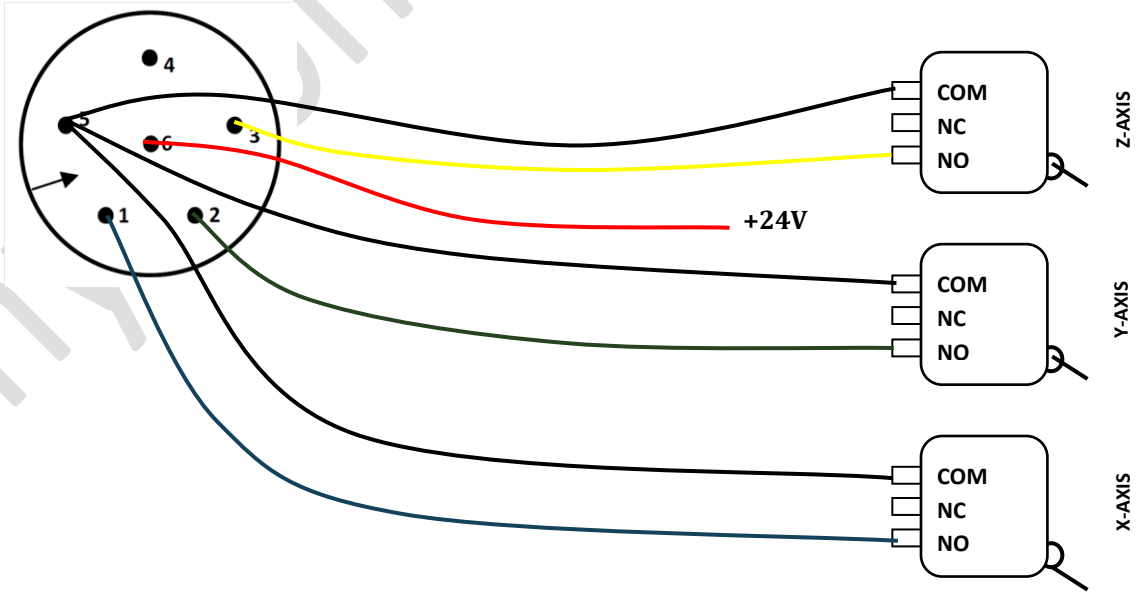
Y-SLAVE HOME

Connections

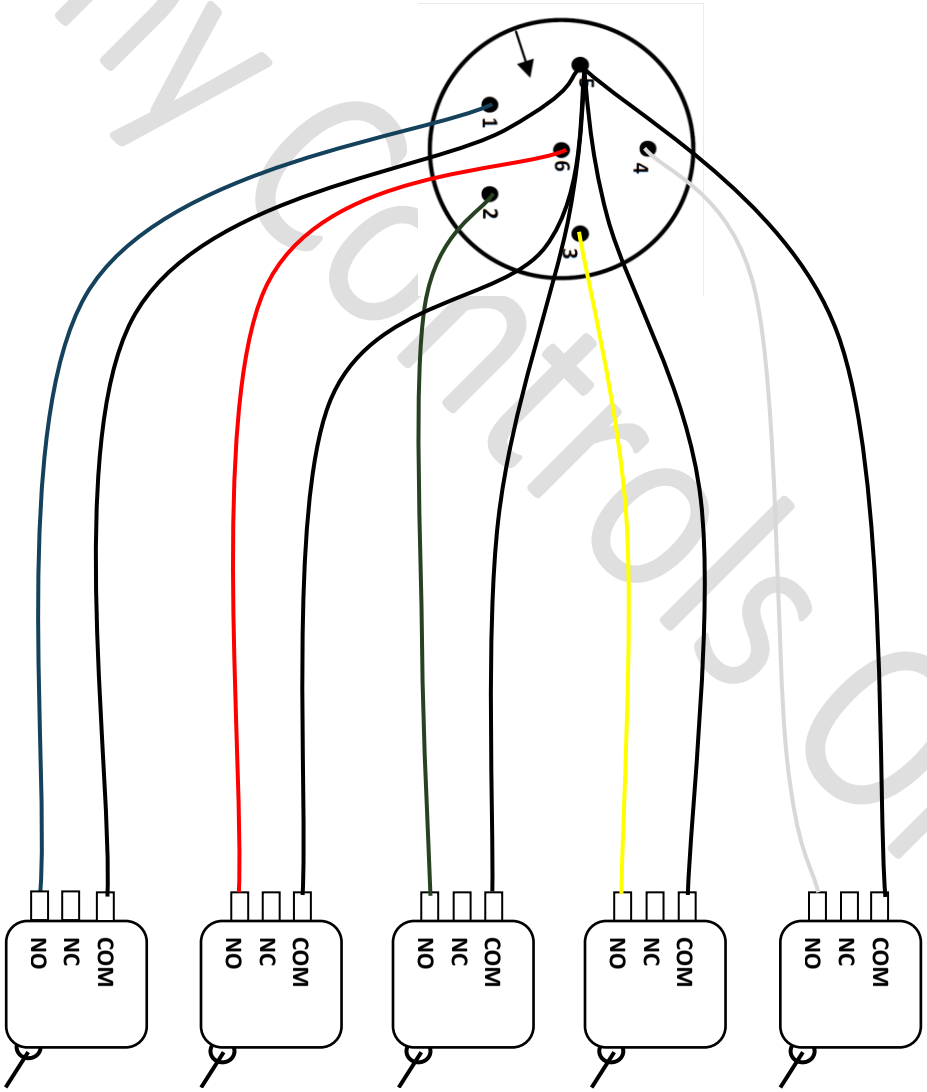
HOME SWITCH CONNECTIONS



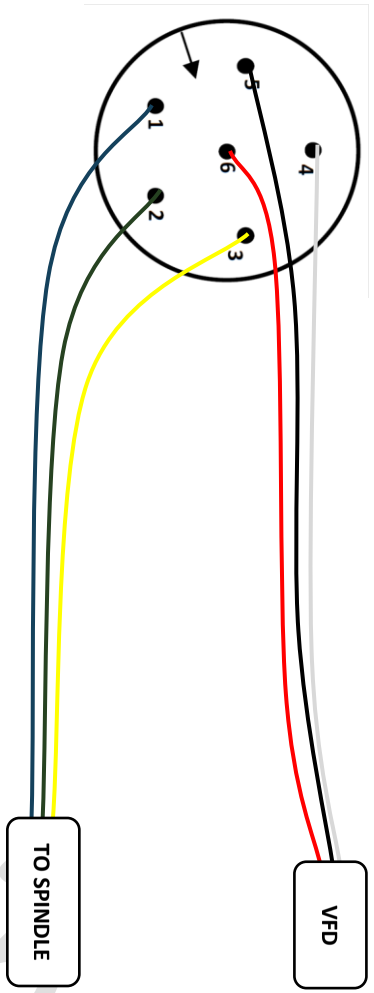
LIMIT SWITCH CONNECTIONS

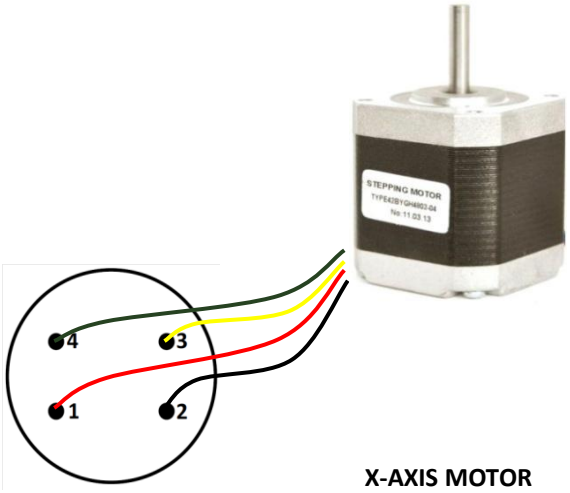


MISCELLANEOUS CONNECTIONS

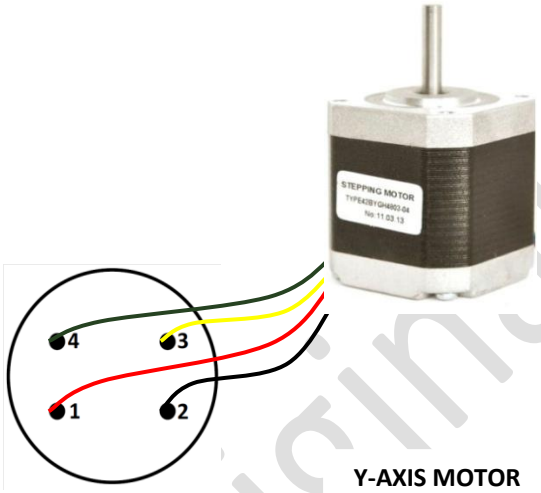


SPINDLE CONNECTIONS

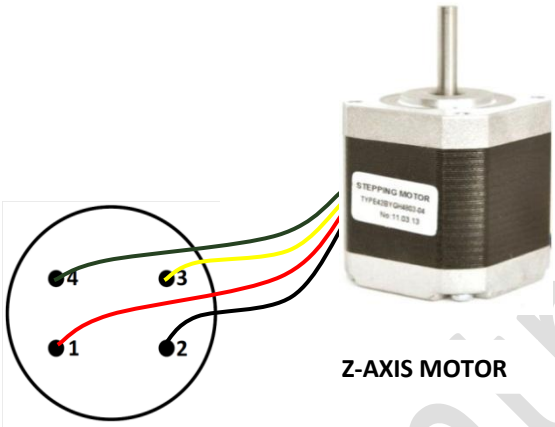




X-AXIS MOTOR



Y-AXIS MOTOR



Z-AXIS MOTOR

CURRENT SETTING USING "CSET" JUMPER BLOCK IN TSTEP-087 DRIVE

The following table shows the jumper settings for the corresponding currents (in A):

Jumpers				Current (A) for Tstep-087
J1	J2	J3	J4	
1	1	1	1	1.2
0	1	1	1	1.8
1	0	1	1	2.2
0	0	1	1	2.8
1	1	0	1	3.2
1	1	1	0	3.4
0	1	0	1	3.8
0	1	1	0	4.0
1	0	0	1	4.2
1	0	1	0	4.4
0	0	0	1	4.8
0	0	1	0	5.0
1	1	0	0	5.4
0	1	0	0	6.0
1	0	0	0	6.4
0	0	0	0	7.0

However, 1 means jumper mounted and 0 means jumper removed.

CURRENT SETTING USING "CSET" JUMPER BLOCK IN TSTEP-484 DRIVE

The following table shows the jumper settings for the corresponding currents (in A):

Jumpers				Current (A) for Tstep-484
J1	J2	J3	J4	
1	1	1	1	0.7
0	1	1	1	1.0
1	0	1	1	1.4
0	0	1	1	1.7
1	1	0	1	1.9
0	1	1	0	2.1
1	0	0	1	2.2
0	0	1	0	2.4
1	1	0	1	2.6
0	1	1	0	2.7
1	0	0	1	2.8
0	0	1	0	3.0
1	1	0	0	3.2
0	1	0	0	3.6
1	0	0	0	3.9
0	0	0	0	4.2

However, 1 means jumper mounted and 0 means jumper removed.

CONNECTION DIAGRAM