CandCNC LPTS Low Profile Tool Setter User Manual

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Introduction

The LPTS is a small, low profile touch sensor for use with rotary tool type cutting tools. It uses a powered highly sensitive electronics touch sensor (non-conductive) that uses mechanical pressure on a piezo element to generate a “pulse” . With just a few grams of down force it senses a solid object. A tiny amount of motion is all it takes and repeatability is excellent. With a custom molded case and sealed edges, the unit is resistant to moisture and impact. The 1” diamter Stainless Steel top button is wear resistant and easily replaced if needed.

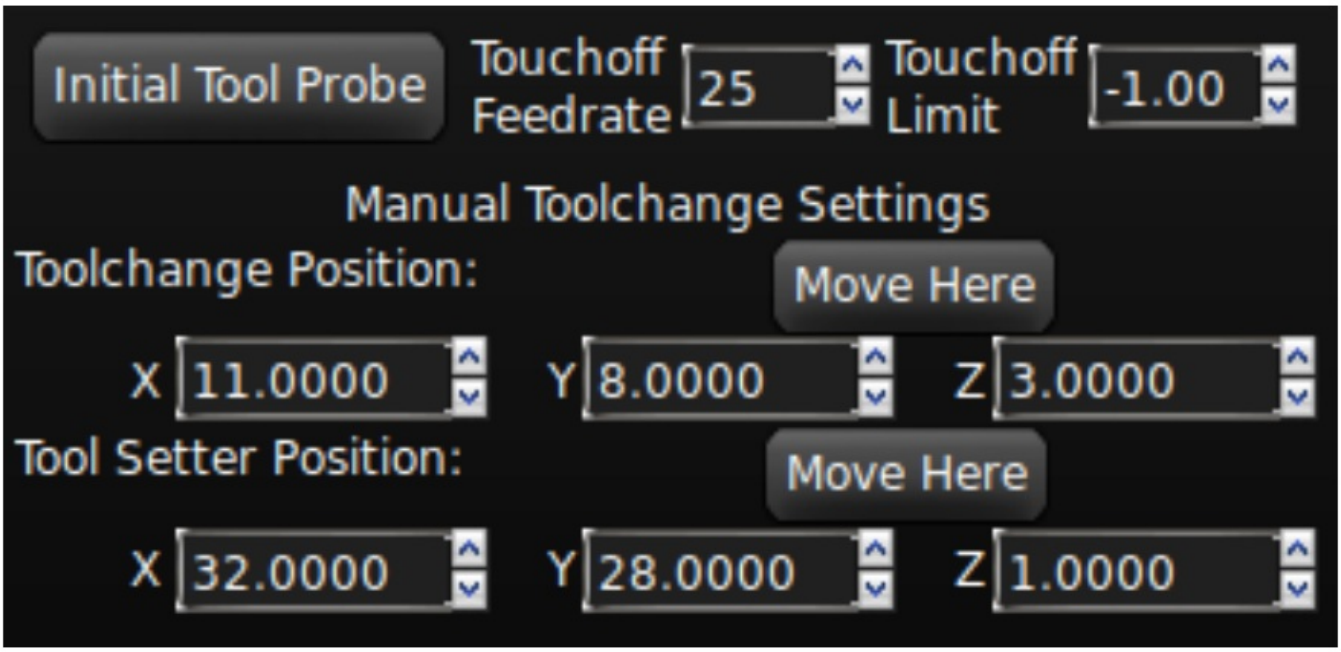
He LPTS features a mechanical Overrun switch that can be connected to an input setup as an ESTOP in case the sensor fails to trigger. It stops motion instantly and saves the LPTS from damage and possible damge to the tool itself .

This unit requires NO CONNECTION to the tool, the spindle or the chuck to work.

LPTS is designed to work with Command CNC™Version 1.3.0 or later. Earlier version of Command CNC™do not have the settings for the Toolchange . The LPTS is desinged to work in conjuction with the ISS-05 Intelligent Spindle Speed and the RC400 Remote Consloe Wireless tablet but they are not required.

Setting Manual Tool change Settings

There are two positions and a couple of other settings that must be set up before the manual tool change with auto tool setter can be used. They are found in the Manual tab in CommandCNC. If you are running a ‘Router” Machine type CONFIG



The Touch-off Feedrate sets the speed at which the tool will move down to the tool setter. This should be fairly slow (10 to 30 IPM) so the tool setter and tool are not damaged.

Touch-off Limit is a point at which the probe move will stop and give an error if the tool setter has not activated yet. Since the top of the material will be set to zero and the tool setter could be several inches lower (or higher) than that, this number should be a large enough negative number that the tool can reach the tool setter for any thickness of material you might use. So if the tool setter is level with the table and your machine can handle material 6” thick, you would need a number less than -6.00 here, say -7.00” It will not hurt to make this number a good bit more than you will need.

The Tool change and Tool Setter positions are set in absolute positions for X and Y. What that means is that you will need to make sure that you have homed your machine, and that there are no offsets in effect. You can view and edit the offsets in the Fixture Offsets page. (upper right Menu Bar)

The Tool change position should be a place where you can easily change the tool in the spindle. Typically that is towards the front of the table and several inces in the air in Z. After making sure the machine is homed in XY and there are no offsets active, move the spindle to the place where you want to do your tool changes, and then enter the values from the X and Y DROs in the X and Y boxes for Toolchange Position. The Z value will be in the current work offset, so that is essentially how high it will move above the top of the material. Put in a value that will be enough to clear anything that might be in the way such as clamps!

The Tool Setter position can be set by moving the tool over the center of the tool setter and then entering the values from the X and Y DROs in the X and Y boxes for the Tool Setter Position. The Z is again moved in the active work offset. For this Z position you need to make sure that it is high enough for every tool to clear the tool setter! If you put a new tool in the spindle and it is and inch longer than the previous tool, the tool will be an inch lower than the old one when it moves up to the Z position you enter h.

Manual Tool change with Auto Tool Setter

There is a sequence that MUST be followed in order to use manual tool changes in a GCode file and for them to be automatically touched off of a tool setter. This section assumes you have already set up the tool change location and tool setter location in the Manual tab in Command CNC.

This must be done before running G-code

1. Insert a tool in the spindle and move the spindle until the tip of the tool just touches the top of the material for the job you are about to do.
2. Zero the Z axis there by pressing the “Zero Z” button.
3. In the Manual tab in CommandCNC, click the “Initial Tool Probe” button. The tool will move to the tool setter position and move down until the tool setter activates, and the offset between the material top and the tool setter will be saved.

Alternately, if you use the first tool that will be used in the G-code file to set Z zero at the top of the material, then you can skip the third step above and it will be done automatically in the first tool probe while running code. In this case when it prompts you to insert the first tool simply press “Resume” since the tool is already in the spindle.

While running G-code

When a tool change is requested the following sequence will be performed:

1. The spindle will move to the tool change position entered in the Manual tab in CommandCNC
2. The code will pause and the user will be prompted to insert the tool by the name given in SheetCAM
3. After inserting the correct tool, press the “Resume” button.
4. The spindle will move to the tool setter position and move the tool down until the tool setter activates.
5. The dynamic tool offset (G43.1) will be set to the difference between the initial tool probe position and the current probe position, so that the tip of the new tool will be at the top of the material when Z is at zero.

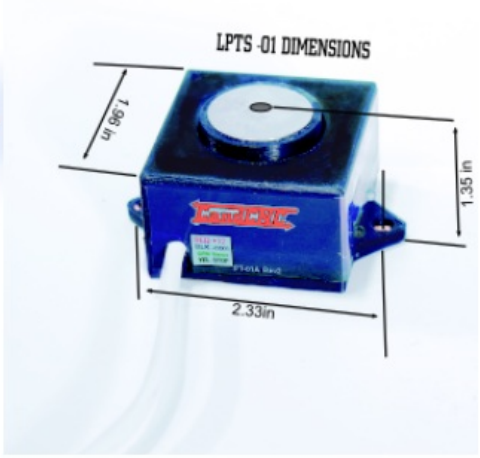
Connecting Touch-Off Sensor

While a touch off sensor can be a simple switch to be effective it needs to have good repeatability (switch trips at the same spot every time). And its best to have a secondary “overtravel” that is connected to the system ESTOP to keep it from punching a hole though your sensor or driving the bit into the table , breaking the bit and the sensor.

If you get on line you will find a myriad of touch off solutions, from the cheap “ohmic” plate (where you manually clip a wire to the tool and it senses the plate. Its only redeeming feature is its its cheap. It has no over run sensor and if you forget to clip the wire to the tool or its not a good connection you will drive the tool into your table with predictable results. Its better suited for a totally manual process .

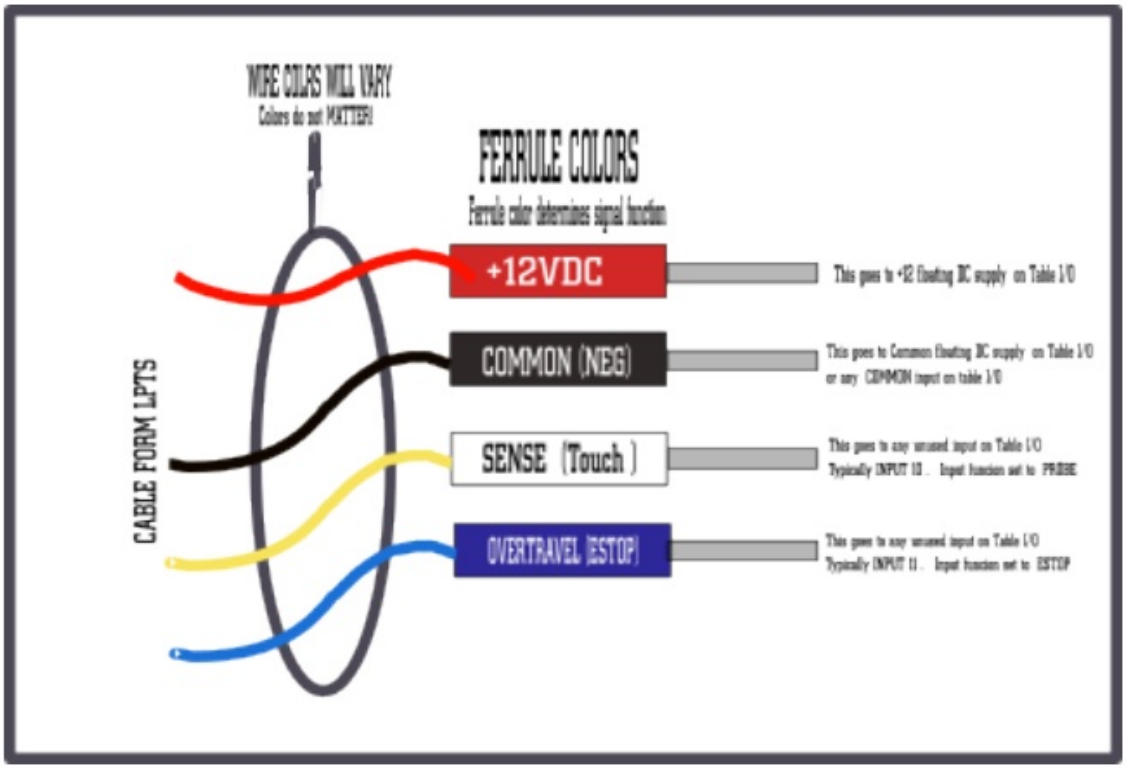
Connecting and Using the Low Profife ToolSetter (LPTS) from CANDCNC

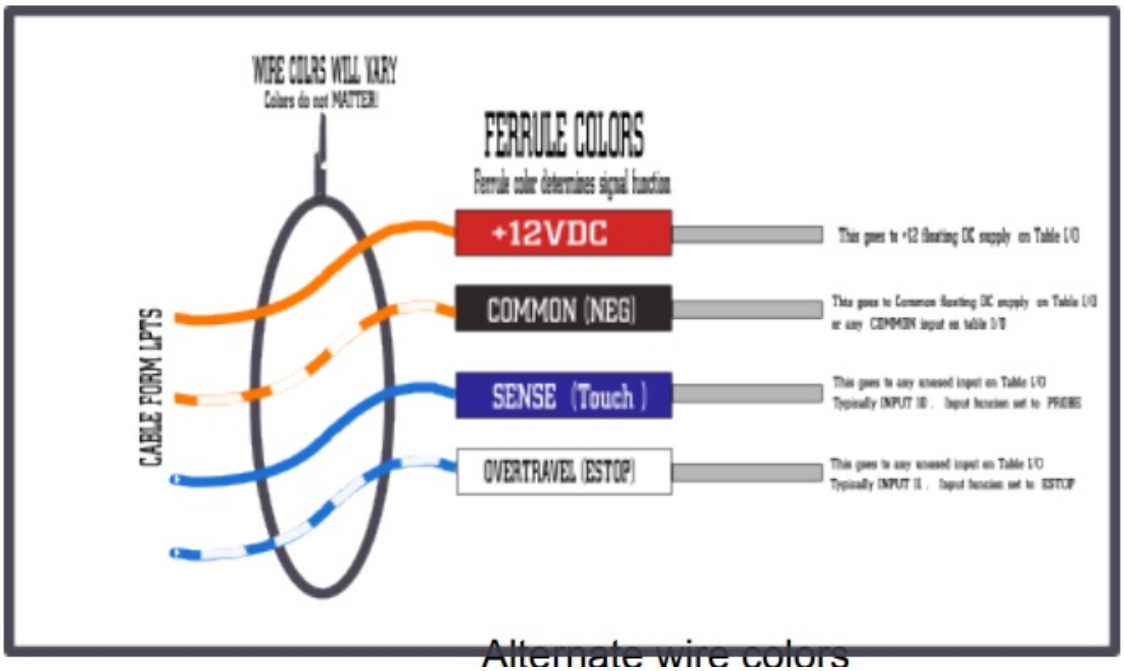
The biggest problem with the available Tool Setters that have a true independent touch sensor and and overtravel sensor is theu are rather large and well over 2 inches in height .. Using some enginnering and a lot of testing we built a small , extremely sensitive touch sensor that needs less than an oubce of down force at a moderte speed (10 IPM minimum) and triggers in less than .050 of travel . The touch sensor is electronic and provides a solid ½ second pulse back to the Table I/O . It has a mechanical overrun sensor that stops motion and prevents damage to the sensor or the tool. The case is ABS plastic with seals and is water resistant . The to p button is about 1” in diamter and the surface is Stainless steel.



The LPTS is:

- Sealed; Water/fluid resistant
- Low Profile : top of button is about 1.35” above the mounting surface .
- Unit is very sensitive to a light down stroke but ignores machine vibrations and noise
- Advanced Piezo Sensor Technology NOT OHMIC! Does not require connect to tool to sense.
- Pulse extender provides > 1/2 sec pulse to input logic low) and shows as a Green flssh on the status LED
- Overtravel is independent and does not need power to operate Status LED turns RED on overtravel.
- Unit shipped pre-wired wth 20Ft cable . Cable ends terminated in crimp ferrules s(no bare wires) for easy connection to Table I/O screw terminals .
- Mounting ears
- Repeatability of sensor is .002 or less when touch is within ¼ “ of center
- Low current circuit runs on 12V on table I/O 17 or using a 12V wallplug (not included)
- 1 year warranty
- Unit not designed to workl with other brands of controllers or older models with older I/O cards. Minimum rev 12.6 Table I/O required .





Alternate wire colors

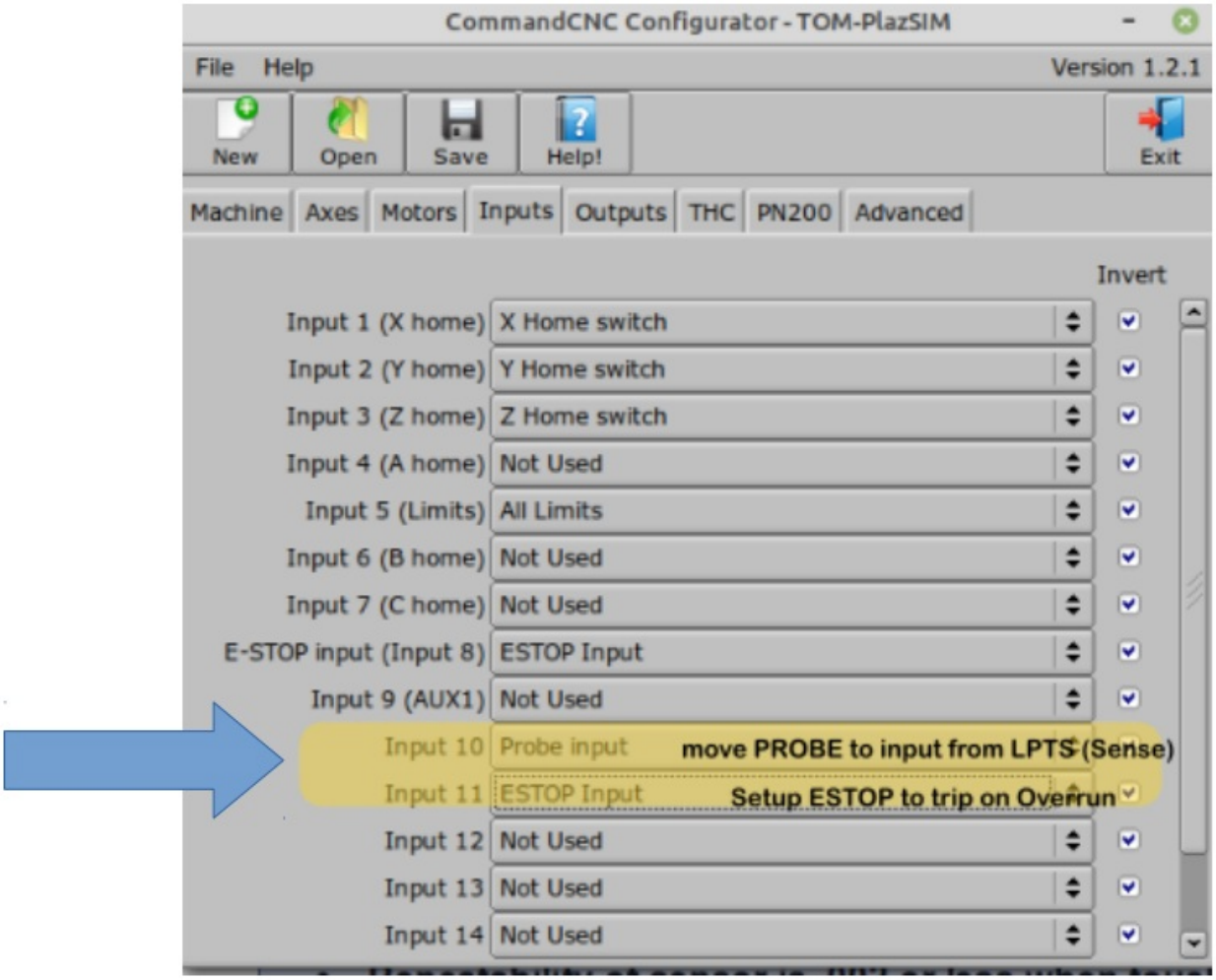
Setup and testing

Note the FERRULE colors list in the chart above. (NOT THE WIRE COLORS) .
Find the screw terminals on th einputs on the table I/O rev 12.6 or the

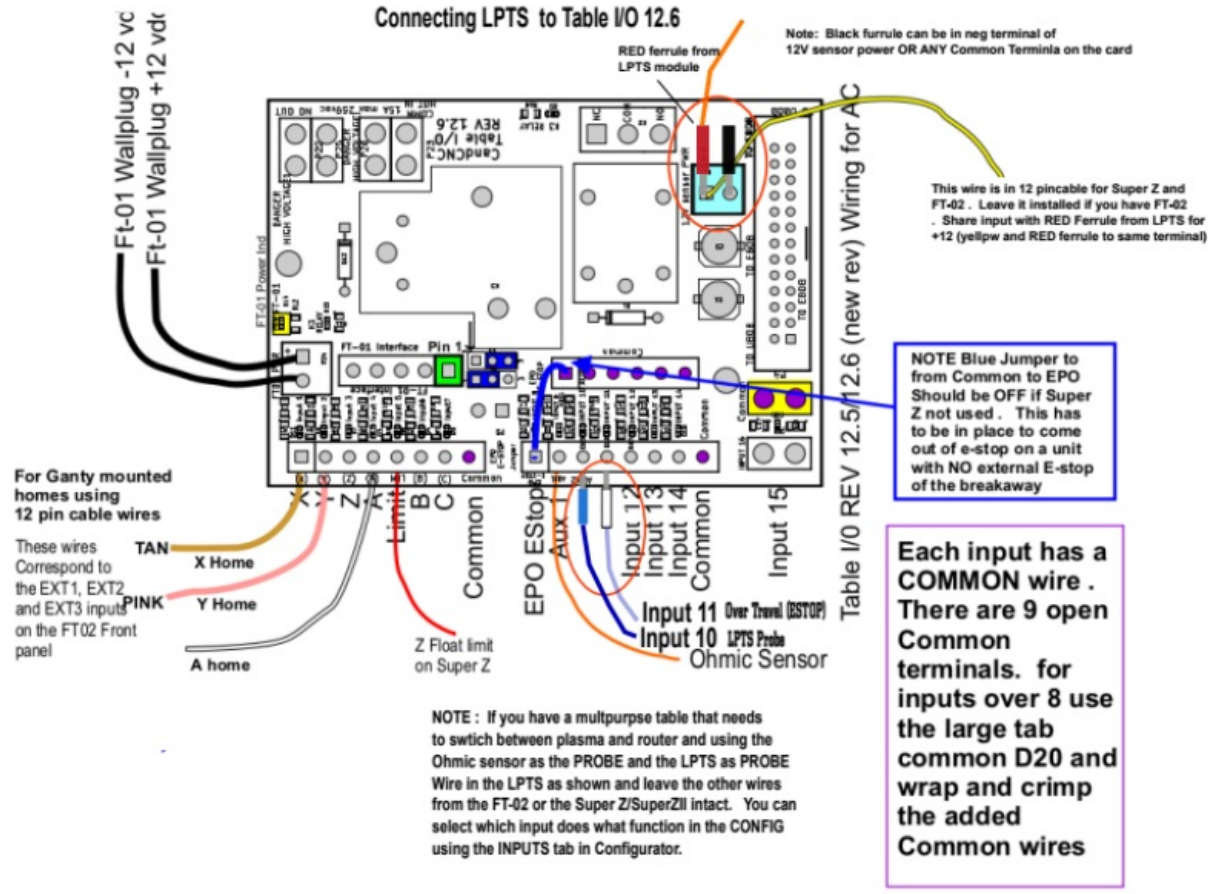
Table I/O rev 17 on the G5 and G5XL system. The LPTS needs a source of 12V that is common to the table I/O inputs .

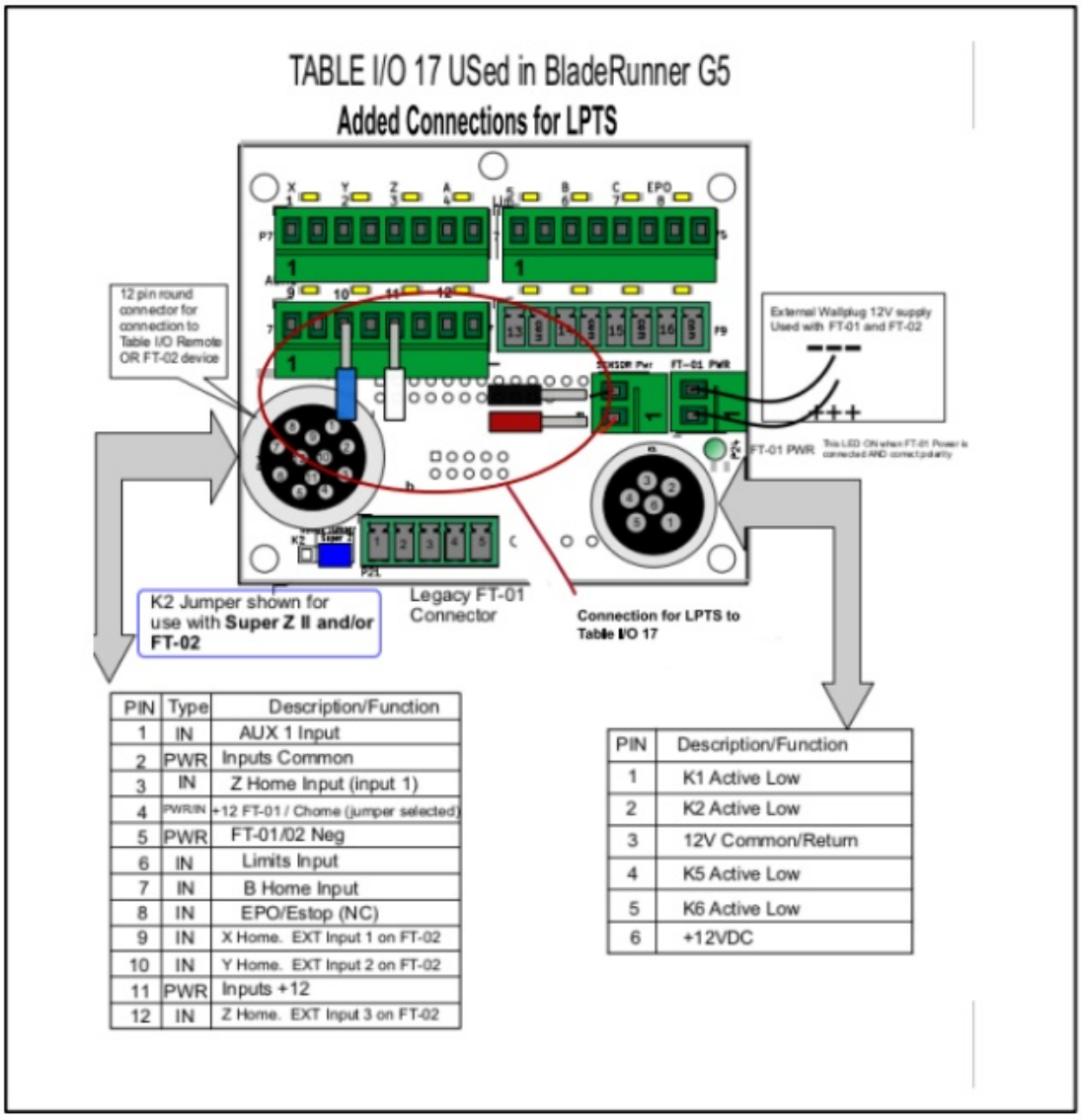
The LPTS can be used with a conventional router although an ER collet adapter for the router is suggested to make swapping tools easier. It works best with a true 3 phase spindle controlled by the ISS-05. If you have a mixed use tabel and swtich between different types of cutting like plasma and routing the LPTS can be added to an existing plasma setup with a full ohmic sensor and an FT-02 or the popular SuperZ II . No need to disconnect any of the other inputs , just add in the connects from the LPTS . The following images show connect of the LPTS to the Table I/O 12.6 and the later Table I/O The important thing is to get to the 12V (floating) supply for the inputs

and to unused higher numbered inputs. If you already have inputs that use the Input 10 and Input 11 , simply move them up to unused inputs above them and setup the input numbers in the Config it have the proper PROBE and ESTOP functions. The only signal shared with outer inputs would be the +12 on the Table I/O



Wiring instruction





PIN	Type	Description/Function
1	IN	AUX 1 Input
2	PWR	Inputs Common
3	IN	Z Home Input (input 1)
4	PWR/IN	+12 FT-01 / Chome (jumper selected)
5	PWR	FT-01/02 Neg
6	IN	Limits Input
7	IN	B Home Input
8	IN	EPO/Estop (NC)
9	IN	X Home. EXT Input 1 on FT-02
10	IN	Y Home. EXT Input 2 on FT-02
11	PWR	Inputs +12
12	IN	Z Home. EXT Input 3 on FT-02

PIN	Description/Function
1	K1 Active Low
2	K2 Active Low
3	12V Common/Return
4	K5 Active Low
5	K6 Active Low
6	+12VDC

Documents / Resources

	CandCNC LPTS Low Profile Tool Setter [pdf] User Manual LPTS Low Profile Tool Setter, LPTS, Low Profile Tool Setter, Profile Tool Setter, Tool Setter

Manuals+,