

**Touch Panel Sensor Modules
TPS-E1 and TPS-E2 User's Manual**



Crist Instrument Co., Inc.
Hagerstown MD Made in the USA

The TPS-Ex touch panels are contact sensitive devices designed to activate when a grounded primate subject touches it. Attaching one side of the device's electronics component to the primate chair's metal perch, then attaching the other side of the device to a rod (that is easily reached by the primate) achieves the grounding of the primate. When contact is made, the "normal" output will give a "positive logic" TTL signal while the "invert" output will give a "negative logic" TTL signal. The signal can then drive another device – like Crist Instruments "RLD-Ex" Reward systems, or it can be sent to the I/O BUS in your computer. If your computer is running an interactive program, e.g. LabVIEW® or Test-Point® etc., it will send the TTL pulse. From there, one can process the signal, or drive a device like the reward system.

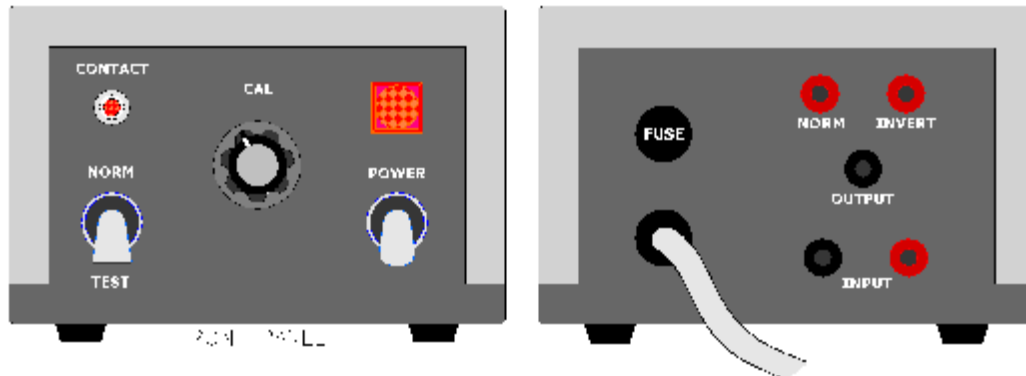


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Input

Below, you see a representation of both sides of the TPS-Ex Touch panel.



The jacks that must be used are "banana" type for one end of the cables. The other end is for the users choice to put what best applies to his/hers solution. Polarity plays no role for the input, because it is a type of short circuit configuration.

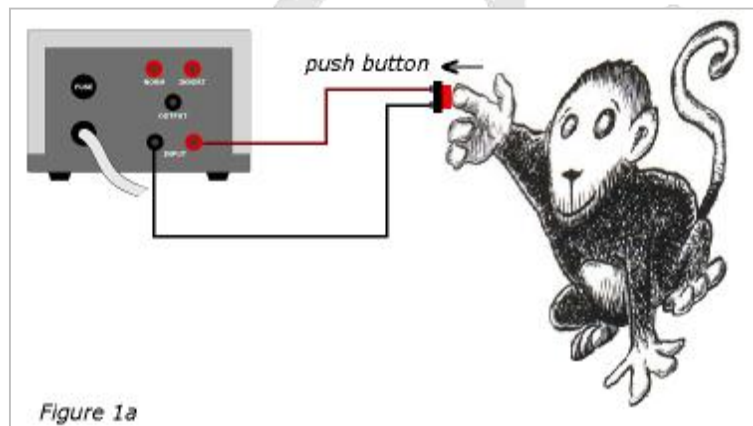


Figure 1a

The subject (man or animal) that closes the circuit needed to induce the detection signal can either push a button (figure 1a), or be itself a part of that closed circuit (figure 1b). For the first case the resistance of the circuit is 0, and for the second case the resistance will vary with the subjects body resistance (normally 10 to 100 kohms). Current through the subject is limited to 0.5 uA. For the system not to

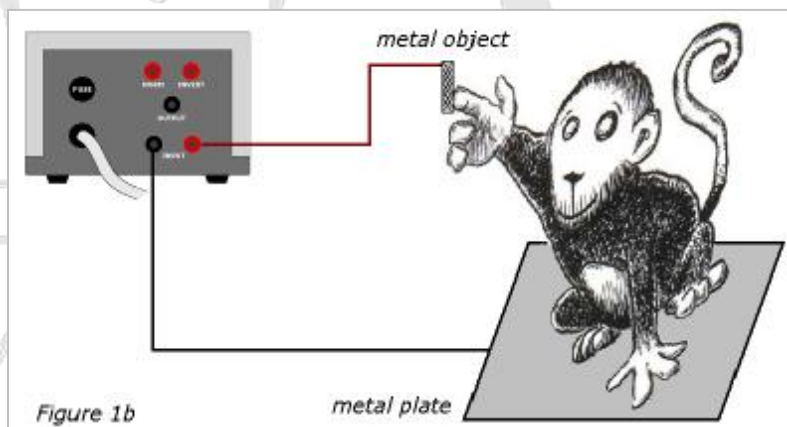


Figure 1b

make detection, the resistance must be above that threshold.

Sensitivity

Before any use, the sensitivity of detection must be adjusted. The procedure is as follows:

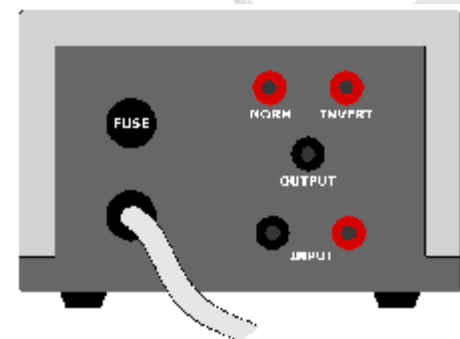
- ✚ Turn on the power (right switch)
- ✚ Set the left switch to "Test"
- ✚ Fully turn the "Cal" knob left (counter clock wise)
- ✚ Start turning the knob right (clock wise) until the detection LED lights.
- ✚ Leave the knob at that position and set the left switch to normal "Norm".
- ✚ If you are using a push button, stop here. If you are using a through the subject circuit, continue.
- ✚ Make the subject touch the metal rod.
- ✚ Make final sensitivity adjustments. Your goal is for the LED to light when the subject makes a contact.
- ✚ Do not rotate the knob any more. This is the most sensitive you can get. By rotating the knob more you make the detector less sensitive.



The sensitivity is a function of the resistance of the circuit. The less resistance the better. This means that all connections must be tight, and the contacts of the subject with the metal electrodes must be good. At a very big resistivity (e.g. open circuit) TPS-Ex are insensitive to changes, as it should be.

Output

The output signals have an amplitude of 0 or 5V (TTL). For the E1 configuration, the outputs will give a pulse of width the same duration as the subject is touching the metallic rod, or pushing the button. At the E2 configuration, the outputs will give a pulse of a factory-preset width when the subject makes a contact. That time is preset to 1/3 of a second, but can be changed by communicating with Crist Instrument Co., Inc. The signals are to be picked up by the red "Norm" and Black (ground) and/or by the red "Invert" and Black (ground).



When contact is made, the "normal" output will give a "positive logic" TTL signal (Figure 2a) while the "invert" output will give a "negative logic" TTL signal (Figure 2b).

The outputs leave with banana jacks and enter a device that can be controlled by a pulse (such as Crist Instruments' "RLD-Ex" Reward systems), or can enter a PC for further processing. At the schematic of Figure 3, we see a touch

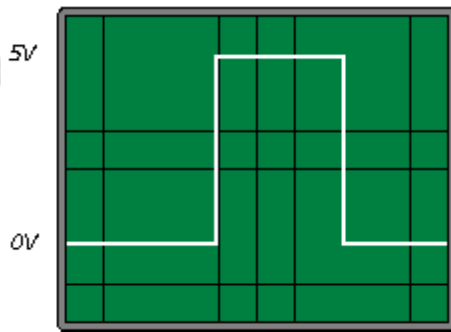


Figure 2a

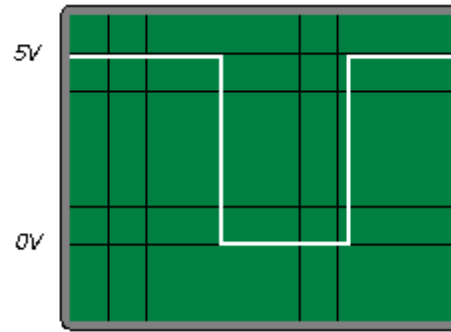


Figure 2b

panel driving both a PC with the negative logic signal and a reward system with the positive logic signal. Of course, from the same output we can feed more than

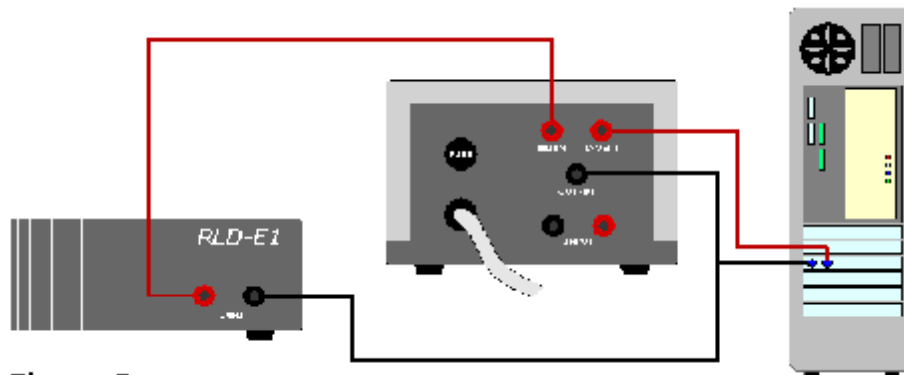


Figure 3

one device, but it is not recommended for a large number of devices. The output comes from a 4049 Hex Buffer /converter which has a limit of 1.6 to 6.4 mA.

Voltage supply

The voltage can be easily changed by turning the rotary switch (located on the back) to the desired setting using a straight screwdriver. You may need a simple plug converter to convert the USA plug to adapt to your country's voltage wall outlet. This plug converter is not included with this system.

Miscellaneous

LED: In the front panel there is an LED that lights when there is contact. The LED stay's on for the duration the subject is touching the metallic rod, or pushing the button, whether you have the TPS-E1 or TPS-E2. This is a preset factory feature. By contacting Crist Instrument Co., Inc. this can be changed to set the LED to light like the E2 configuration (as with the pulse width time explained in the "Output" section on page 3). The problem is that the preset time is 1/3 of a second, and can be missed by the eye of the observer in comparison with a usual long time of activation by the subject.

FUSE: The fuse of the system is a 1A glass fuse.

We are always happy to help with any questions or inquiries.

Thanks for choosing our products!

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