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Tektronix

# 067-0405-02 and above CSA/TDS/DPO7000 Series Probe Calibration and Deskew Fixture Instructions

**071-0730-05**

071073005

## Safety Summary

To avoid potential hazards, use this product only as specified.

**To avoid fire or personal injury**

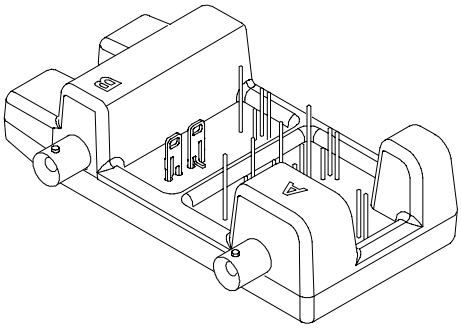
**Do not operate in wet/damp conditions.**

**Keep product surfaces clean and dry.**

**Safety terms in this manual**

**WARNING.** *These statements identify conditions or practices that could result in personal injury or loss of life.*

## Overview



This fixture converts the PROBE COMPENSATION output into a set of test points that give you a convenient way to:

- Compensate a passive probe (low-frequency).
- Optimize the instrument gain and offset accuracy at the probe tip.
- Compensate for timing differences between two, three, or four voltage probes (deskew).
- Compensate for timing differences between one, two, or three voltage probes and a current probe (deskew).

## Connecting to the Instrument

The fixture has two BNC inputs, A and B. Use the BNC cable (included) to connect the instrument PROBE COMPENSATION output to either the A or B input. The input you use depends on the type of probes you have and the operation you want to perform.

| Probe[2] | Operation | Jumper | Use input |
|---|---|---|---|
| Passive voltage probes, including P6139A | Low frequency compensation | Yes | A |
| | Gain and offset calibration [1] | No | A |
| | Compensate timing with respect to other voltage probes | Yes | A |
| | Compensate timing with respect to TCP202 current probe | Yes | B |
| | Compensate timing with respect to CT-6 current probe | Yes | A |
| Active voltage probes, including P6243 P6245 P6246 P6247 P6248 P6249 P7240 P7330 | Gain and offset calibration | No | A |
| | Compensate timing with respect to other voltage probes | Yes | A |
| | Compensate timing with respect to TCP202 current probe | Yes | B |
| | Compensate timing with respect to CT-6 current probe | Yes | A |
| Current probe TCP202 | Compensate timing with respect to voltage probes | Yes | B |
| Current probe CT-6 | Compensate timing with respect to voltage probes | Yes | A |

1 **Gain and offset calibration for these probes is generally not needed.**

2 **Not all probes are useable with all instruments.**

**NOTE.** *The A side of the fixture has a small jumper over two pins. Remove the jumper for gain and offset calibration. Install the jumper for all other functions.*

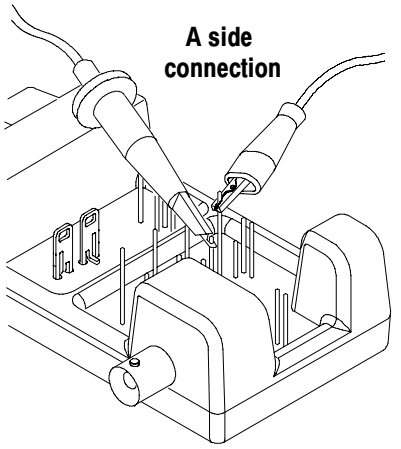
## Connecting Probes

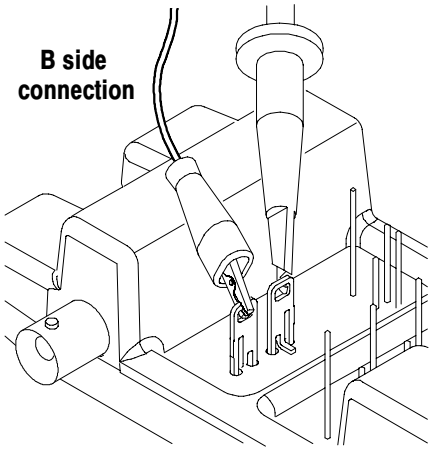
**WARNING.** *To avoid personal injury, use care while connecting probe tips to the square pins on the fixture. The ends of the square pins are sharp.*

The following diagrams show how to attach each type of probe tip to the fixture. Refer to the ground symbols screened on the fixture to establish the correct polarity.

### P6139A

Connect the probe tip and the ground lead to the two terminals as shown.

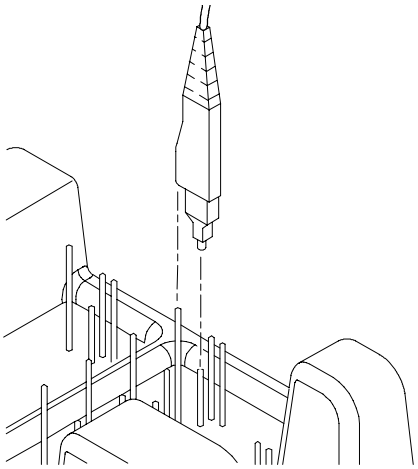



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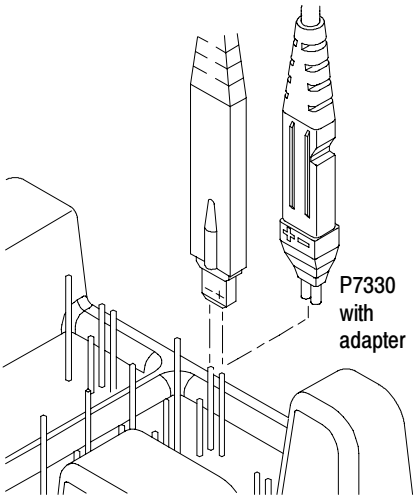
### P6243 or P6245

Connect the probe tip to the short pin and the probe ground to the long pin as shown.



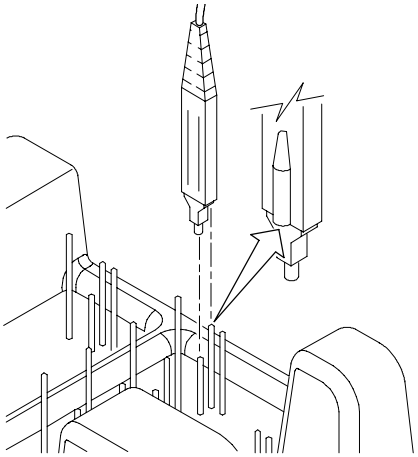
### P6246, P6247, P6248, or P7330

Connect the probe + input to the signal pin and the probe – input to the ground pin as shown. There is no connection to the probe ground input.



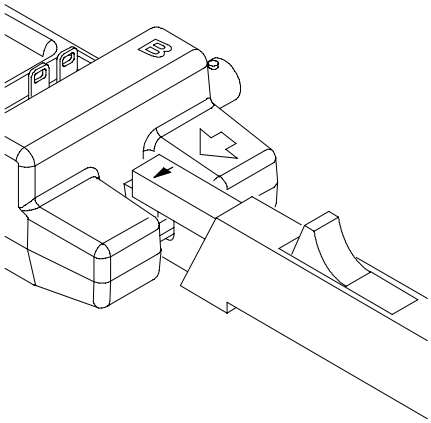

### P6249 or P7240

Connect the probe tip to the short pin and the probe ground to the long pin as shown.



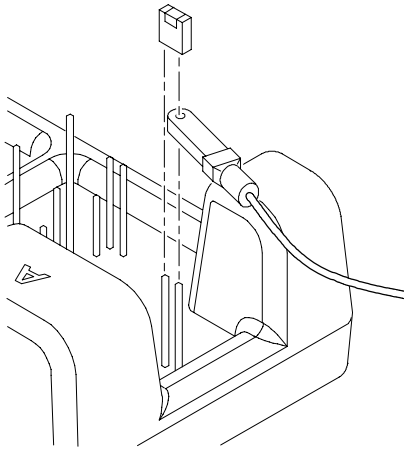
### TCP-202

Snap the current probe closed around the current loop as shown. Be sure to align the polarity arrows on the current probe and the fixture.



### CT-6

Remove the small jumper on the A side of the fixture. Slip the CT-6 probe head over the outboard pin, and then replace the jumper.



After you are finished with this probe, be sure to replace the small jumper.

## Using the Fixture

Do these steps to use the fixture. For best results, warm up the instrument for 20 minutes before performing these functions.

### Low Frequency Compensation

1. Connect the A side of the fixture to the instrument.
2. Connect one probe to the fixture.
3. Push the **AUTOSET** button on instrument.
4. Optimize the adjustment on the probe compensation box for best square corner.
5. Remove the connections.

### Optimize Gain and Offset Accuracy

1. Connect the A side of the fixture to the instrument.
2. Remove the small jumper from the fixture.
3. Connect one probe to the A side of the fixture.
4. Touch the **VERT** button or use the **Vertical** menu to display the vertical control window.
5. Touch the Probe **Cal** button to display the vertical probe cal control window.
6. Select the instrument channel to which the probe is attached.
7. Touch the **Calibrate Probe** button.
8. When the routine is finished, remove the connections and replace the small jumper.

### Compensate Probe Timing (Deskew)

1. Connect the A or B side of the fixture to the instrument according to the operation desired (see the table in *Connecting to the Instrument*).
2. Connect up to four probes to the fixture.
3. Display all channels that you want to deskew.
4. Push the **AUTOSET** button on instrument.
5. Adjust vertical **SCALE**, and **POSITION** (with active probes adjusting **offset** may be required) for each channel so that the signals overlap and are centered on screen.
6. Adjust horizontal **POSITION** so that a triggered rising edge is at center screen.
7. Adjust horizontal **SCALE** so that the differences in the channel delays are clearly visible.
8. Adjust horizontal **POSITION** again so that the first rising edge is exactly at center screen. The fastest probe is connected to this channel. (The fastest probe is probably the one with the shortest cable or the highest bandwidth.)
9. Touch the **VERT** button or use the **Vertical** menu to display the vertical control window.
10. Touch the Probe **Deskew** button to display the channel-deskew control window.
11. Select one of the slower channels.

    **NOTE.** If possible, do the next step at a signal amplitude within the same attenuator range (vertical scale) as your planned signal measurements. Any change to the vertical scale after deskew is complete may introduce a new attenuation level (you can generally hear attenuator settings change) and therefore a slightly different signal path. This different path may cause a 200 ps variation in timing accuracy between channels.

12. Adjust the deskew time for that channel so that its signal aligns with that of the fastest channel.
13. Repeat steps 11 and 12 for each additional channel that you want to deskew.
14. Remove the connections.

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