Quick Start Guide : ICP Signal Conditioner TSP 02

This quick start guide is designed to provide documentation for ICP Signal Conditioner Simulator. Read these instructions carefully before starting.

Contents

Thanks for purchasing the ICP Signal Conditioner,TSP 02. Hope our product will be beneficial for your application. !

Incase of any help, please contact *support@tieraonline.in*

Your comments and recommendations on our products are valuable for us. Please share us your review on *sales@tieraonline.in*

We have made sure that the manual is free from any errors to the best of our knowledge, incase of any inconsistencies (contact our support) we shall clarify and make the rectification as soon as possible.

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Safety Instruction

Read this section carefully and follow the safety instructions to avoid any damages or accidents. Make sure the operator is aware of these instructions before starting to use the system.

Follow the below safety instructions

1. **Do not use any other power adapter** other than the one supplied along with the conditioner. This may **damage the device and void the warranty.**
2. Do not drop the instrument,this may damage the electronic components.
3. **Do not plug normal voltage/current output sensors** other than IEPE/ICP (4mA) sensors into the sensor input terminal. This may damage the sensor due to the 4mA current loop.
4. Do not expose or immerse the conditioner to water/ environment above $50^{\circ}C$elsius
5. The input voltage range is ± 5 Vdc, above with there would be clipping in the signal output.
6. Due to the sophisticated nature of instrumentation, **field servicing and repair is not recommended and, if attempted, will void the factory warranty**.

Getting Started

Introduction

Model **TSP 02** Series are portable power sources for ICP® sensors. They are powered by power adapters (which require **230VAC 50Hz Supply)** and provide constant current excitation (4mA) to the charge amplifier within ICP® sensors and decouples the sensor output signal from the power. Signal output is a high quality, voltage output compatible with standard readout, recording or acquisition instruments.

Fig 1 : TSP 102 Signal Conditioner

Description

Models TSP 02 Series Conditioner works on Power adapter (220VAC /50 Hz) to provide DC power (27VDC) to internal electronics which provide regulation for 4 mA of constant current power. Connections include two BNC jacks, one for Sensor (ICP® power/ IEPE) and one Voltage output (output to oscilloscope, data recorder, or DAQ). The Bias voltage indicator displays the voltage output when connected to a sensor.

Fig 2 : TSP 102 Signal Conditioner: Features Description

1. **Sensor Input** : Connect the ICP/ IEPE Sensor to this BNC Jack
2. **Voltage Output** : Connect the output from the sensor (isolated from the input) to the oscilloscope or Data Acquisition System.
3. **Bias Voltage Indicator ON/OFF Switch** : Switch ON to view the Bias Voltage from the ICP Sensor. Make sure this switch is ON only if required. It is recommended to keep the indicator OFF while taking measurements.
4. **Bias Voltage Indicator** : The value indicates the status or condition of the circuit. Please see the below table for identification.
5. **Power Supply Port** : Connect the Power adapter with 220VAC/50Hz Input and Output 27VDC.
6. **Power ON/OFF Switch**: Switch ON to power the Signal Conditioner.

Table 1.1 : Bias Voltage Indicator Status

SL No.	Readings from the Bias indicator (Vdc)	Possible causes of the circuit condition
1.	19-24	Short-open [1] Cable/connector/sensor circuit, **sensor not connected,** faulty sensor
2.	0	Dead Shorted [2] cable, power adapter failure
3.	**9-13**	**Normal IEPE Sensor**
4.	**3 to 8V**	**Some low bias IEPE sensors (seismic/Cryo) sensor**
5.	**14 to 17V**	**IEPE sensors with built-in circuit gain.**
6.	Fluctuating voltage	Erratic/loose connections

1. **Short-open:** Install new cable (or remove old cable and check end-to-end continuity of center conductor and shield with a DMM). Be sure when connecting the cable to the sensor to turn the cable's floating connector and do not turn the sensor. Turning the sensor may cause shavings off the center pin causing shorts or alternatively the cable connector pin to catch and also rotate tearing free of its wiring connection and cause an "open" in the circuit. A short open occurs when there is a break or an open circuit in the sensor amplifier or cable. This means that the electrical path is interrupted, and there is no continuous connection between the two points in the circuit. When a short open occurs, the resistance in the circuit increases significantly. As a result, the meter indicates a high voltage or reads in the full-scale range.
2. **Dead Shorted:** A short-closed or dead short, on the other hand, happens when there is an unintended and direct connection (short circuit) between two points in the sensor amplifier or cable where there shouldn't be one. This creates a low-resistance path, allowing current to flow more easily than intended.In this case, the low-resistance path results in a significant increase in current flow. As a result, the meter indicates zero volts or reads in the zero-scale range.

Immediately after connecting the readout instrument, (oscilloscope, meter, recorder, etc.) to the output jack, the coupling capacitor will begin charging through the internal resistor and input resistance of the readout instrument. This charging will cause an apparent "drifting" of the output signal until the capacitor is fully charged.Such drifting is considered normal operation. Use a settling time of at least 10-15s before taking measurements.

Performance Limits

Frequency Response

The frequency response (1%) limits of the conditioner is 0.5 Hz- 50 KHz. Low frequency response specified into 1G ohm load.

Output Voltage Limits

TSP 02 can only be used for sensors with maximum of ±5 V Output. This must be taken into consideration or resulting outputs may show signs of clipping. Maximum possible output is ±6 V Output.

Constant Current Limits and preferred cable length

TSP 02 provides 24 V, 4mA constant current supply to ICP Sensors. This current will adequately handle **high frequency (20kHz) signals in cables (30pF/ft) up to approximately 45 meters in length.** Longer cables can be driven but it sacrifices some high-frequency response.

Troubleshooting

If there is no output voltage from the signal conditioner follow the below steps for troubleshooting

First step, Check whether the conditioner is connected to a proper power supply.

Use a multimeter and measure the DC Voltage from the power adapter after connecting it to the power socket. The measured voltage should be 27Vdc.

Second step,Check whether the sensor and cable are working properly. Probably the most common cause preventing ICP sensors from turning on is an “open” or "short” circuit in the input cable from sensor to power unit. Cable connectors have an inherently shorter life and often are considered consumable. This can be checked with the help of Bias Voltage Indicator. Refer to **Table 1.1 f**or assessing whether the sensor or cable is working properly.

Third step, Check if the instrument, i.e. DAQ or oscilloscope is configured properly and working.

If the problem persists, return the conditioner for inspection and service.

Deliverables

SL No.	Item Description	Quantity	Item code
1.	Power adaptor	1	TSP 02-A1

Support

For any queries or assistance, contact our helpline: ***+91 471 314 0342*** *(Working hours: 10:00 am to 5:00 pm) or email us to support@tieraonline.in*

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