



(BENTLY NEVADA) 3500 TSI SYSTEM (TG521)

Why does the turbine expand? Knowing why and how the turbine expands is invaluable knowledge when it comes to interpreting the information provided by a Turbine Supervisory Instrumentation System. The modular, software programmable Bently Nevada 3500 Machinery Protection System provides this information concerning not only the expansion of the turbine but vibration as well. This course provides a thorough working knowledge of the criteria involved in turbine expansion along with the many reasons for abnormal vibration levels, which may not be even related to the bearings. Once the physical attributes of the turbine are discussed, the Bently Nevada 3500 Machinery Protection System is thoroughly discussed from the aspect of its software programmable options, verification, operation, and troubleshooting. With the added bonus of utilizing the Rack Interface Software interactive demo, all of the items discussed associated with the configuration of the rack will be reinforced through the visualization of the real-time feedback, thereby providing the potential of having a very pleasant experience when you encounter your Bently Nevada 3500 Machinery Protection System at your workplace.

With this knowledge, the participant has the information needed to reliably configure a rack, configure the individual modules that make up the rack, and troubleshoot the Bently Nevada 3500 Machinery Protection System. Additionally, this information enables the participant to qualify the accuracy of the TSI indications to an operator; thereby providing confidence to the operator when important decisions have to be made.

Recommended for technicians, electricians, and/or engineers who have a responsibility to maintain this equipment at any fossil or nuclear turbine generator installation. Turbine experience is desirable but not necessary.

OBJECTIVES

Upon completion of this course the participant will be able to:

1. Explain how the turbine expands and why this is important.
2. Explain the purpose of each turbine supervisory instrument.
3. State the general physical location of each turbine supervisory instrument.
4. State the primary function of the Bently Nevada 3500 Machinery Protection System.
5. Name the two modules that must be in every rack, and state their respective position within the rack.
6. Name the two modules that have the responsibility of communicating with the rack monitors. (Note: Only one can be used at a time.)
7. Identify the three software packages associated with the BN 3500 Machinery Protection System and explain the function of each.
8. Identify the module to which incoming power is connected.
9. Explain the two positions of the Grounding Select Switch.
10. Identify the module through which the Power Supply Module is software configured.
11. State the status description on each of the front panel LEDs on the Rack Interface Module.
12. Identify the correct positions of the dip switches for a given address number.
13. Explain the purpose of the two passwords that are entered during configuration.
14. State the function of the Keyphasor® Module when its receiving one event per revolution.
15. State the grounding requirement when using Test Equipment.
16. Identify the ALERT condition that must be known prior to performing the Keyphasor® Module self-test or any other monitor self-test.
17. Name four functions that the Proximator®/Seismic Module can be programmed for utilizing the Rack Configuration Software.
18. State the status description on each of the front panel LEDs on the Proximator®/Seismic Module.
19. In reference to the Proximator®/Seismic Module, state the location of the jumper and its purpose.
20. Name the three items that can be used as an aid when troubleshooting the Proximator®/Seismic Module or its I/O Module.

INSTRUCTORS

All HPC instructors are educated 'experts' on the subjects they teach, with years of relevant hands-on experience (typically 20+ years), and have proven instructional skills. Brief resumes can be looked up on HPC's website, www.TurbineGeneratorTraining.com.

COURSE OUTLINE

I. Day One

A. Steam Plant Fundamentals

1. Introduction
2. The Plant Cycle
3. Basic Turbine Theory
4. Turbine Sections
5. Turbine Components

B. Turbine Supervisory Instruments

1. Introduction
2. Description of Turbine Supervisory Instruments
 - a. Eccentricity
 - b. Speed
 - c. Valve Position
 - d. Vibration
 - e. Shell Expansion
 - f. Differential Expansion
 - g. Steam and Metal Thermocouples

II. Day Two

A. Bently Nevada 3500 System Overview

1. Introduction
2. System Essentials
3. Additional System Components
4. Features
5. Applications

B. Putting The System Together

C. Bently Nevada 3500 Power Supply

1. General Information
2. Power Input Module (PIM)

3. Configuration
4. Maintenance
5. Troubleshooting
6. Ordering Information

D. Rack Interface Module

1. General Description
2. Rack Interface I/O Modules
3. Transient Data Interface (TDI)
4. Configuration
5. Data Manager I/O Modules
6. Maintenance
7. Troubleshooting
8. Ordering Information

III. Day Three

A. Keyphasor® Module

1. General Description
2. Keyphasor® I/O Modules
3. Configuration
4. Maintenance
5. Troubleshooting
6. Ordering Information

B. Proximator®/Seismic Module

1. General Description
2. Proximator®/Seismic I/O Modules
3. Configuration
4. Maintenance
5. Troubleshooting
6. Ordering Information

COURSE DATES / LOCATION / FEE

See www.TurbineGeneratorTraining.com for detail on the course dates / locations / and registration fees.

HPC's 3-4-2 policy applies: Sign up 3 for the same course/date, pay in advance, and pay for only 2 (the 3rd participant is free)!

HPC Technical Services reserves the right to cancel any course/seminar within 10-working days of the scheduled date. Fees are 100% refunded or credited to another Seminar (clients' choice) if HPC should cancel any Seminar. HPC is not responsible for non-refundable airline tickets or other travel expenses under any circumstance.

FREQUENTLY ASKED QUESTIONS

- Will HPC Technical Services bring this course to our location for our personnel only? YES, call or email Stephen Parker, Stephen@TurbineGeneratorTraining.com for a price quotation.
- Will HPC Technical Services customize the presentation at our site to suit our particular needs? Yes.
- Is HPC Technical Services' textbook available for purchase as a reference document? No, this book is not yet available for purchase.
- What is the cost for HPC Technical Service to deliver this course at our location? Well, of course that can vary, but generally speaking, if you're planning on having 6+ attend, when considering your T&L, it is to your advantage to perform the course at your plant (office). You gain from the customization and price.
- Can HPC Technical Services perform a functional checkout and calibration of your control system during the upcoming outage OR provide troubleshooting support should it be required? Yes we can. Call or contact Stephen Parker, Stephen@TurbineGeneratorTraining.com for our rate sheets and any further information required.

WHAT YOU WILL RECEIVE

1. 1 copy of HPC Technical Services' textbook, (Bently Nevada) 3500 TSI System, as written by Mike Whisnant.
2. A "Certificate of Completion" with 21 PDH awarded.

STEAM TURBINE I&C MAINTENANCE CERTIFICATION

Those who attend this course are automatically qualified to take HPC Technical Services' Certification Examination. This examination is offered at no additional expense to the participant. An 80% passing grade is required. The examination length will not exceed 2-hours. Those who complete this examination will receive a revised "certificate of completion" that recognizes this accomplishment along with two-copies of a "To Whom It May Concern" letter that states their accomplishment. (Two copies are provided, one for the participants' employer and one for the participants' personal file.) Consult HPC's website, www.TurbineGeneratorTraining.com, for detail on this certification program.

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REGISTRATION FORM

Company: _____

Plant: _____

Address: _____

City/State/Zip: _____

Telephone: _____ FAX: _____

Course Number/Title: _____

Course Dates: ____/____/____ Thru ____/____/____

Course Location: _____ Course Fee: _____

Please enroll the following individual(s) listed below:

Student #1: _____

Student #2: _____

Taking advantage of HPC's 3-4-2 Policy: Send 3, Pay for 2 when paying in advance.

Student #3: _____

Enrolled by: _____ **Date:** _____

METHOD OF PAYMENT

- Check to Follow
- Check Enclosed #: _____
- MC/Visa/AMEX #: _____
Expiration Date: _____ CV Code: _____
- Purchase Order #: _____

HOW DID YOU LEARN OF THIS COURSE?

- Attended other HPC Courses.
- Received Fax
- Email Promotion
- Website Search
- Received info from others in plant.