



Course Information Letter ---- TG511

(GE) FEED PUMP TURBINE UT70 CONTROLS TG511

The intent of this presentation is to familiarize mechanics, technicians and engineers with the design, operations, and maintenance of the (GE) UT-70 Mechanical Hydraulic Controlled Feed Pump Turbines. To maintain this control system we need to appreciate the equipment that is controlled. Lack of understanding of the 'big-picture' is often the root-reason (if we can coin a phrase) as to why in-house technicians are unable to troubleshoot a problem themselves. In this course we address this "root-reason" then move onto the use of the tools (print systems) available. The complete concept of turbine controls is presented as well as the detail of the components that make up this mechanical control system.

A **topical outline** includes: Feed Pump Turbine Fundamentals and Auxiliaries, Basic Principles of Speed Governing, Speed Governing System using Hydraulic Relays, Description of Prolop UT70-15 and UT70-30 Turbine Arrangements, UT-70 MHC Turbine Arrangement, Description of UT70-15 MHC Control System, General, Speed Control System, Speed Setting System Controls Diagram, Trip Valves Function, Trip and Reset Mechanism, Operating Cylinder and Air Motor Friction Lag Limits, Travel vs. Travel Lag Checks, Troubleshooting to Correct Friction and Lost Motion, Explanation of UT70 Lever Diagram, Sequence of Lever Setting Instructions.

OBJECTIVES:

Upon successful completion of this course the participant should be able to:

1. Describe the major components of a feed pump turbine.
2. List and describe the usage of all required drawings and support documents required for system calibration.
3. Describe the relationship between speed control and flow control.
4. Describe the operation of typical hydraulic relays found in the UT70 control system
5. Demonstrate the ability to interpret information from the control and lever diagrams.
6. Explain all necessary adjustments required on turbine related parts.
7. Using the Governing Diagram, the Control Line Up Diagram, and the UT70 Lever Diagram and Setting Instructions, list and describe the steps required in the line up and calibration of the control system.
8. Demonstrate the knowledge necessary to troubleshoot routine problems.

COURSE DATES/LOCATION/FEE

For current dates / locations / prices, please see HPC's website, www.hpcnet.com.

WHAT YOU WILL RECEIVE:

1. 1 copy of HPC Technical Services' textbook, *(GE) Feed Pump Turbine UT70 Controls*.
2. A "Certificate of Completion" with 1.3 CEUs, authorized for issue by the International Associate of Continuing Education/Training.

COURSE OUTLINE

Day One

Introduction

Feed Pump Turbine Fundamentals and Auxiliaries: Design Data, Shells, Rotors and Valves, Lubrication System, Steam Seal System

Basic Principles of Speed Governing: Elementary Speed Control, Speed Regulation, Speed Setting Function, Hydraulic Relays, Speed Governing System using Hydraulic Relays

Description of Prolop UT70-15 and UT70-30 Turbine Arrangements: General Feed Pump Turbine Applications, Prolop MHC Arrangement, UT-70 MHC Turbine Arrangement, Description of UT70-15 MHC Control System, General, Speed Control System, Speed Setting System

Controls Diagram

Trip Valves Function: Overspeed Governor, Thrust Bearing Wear Trip Device, Zero Speed Indicator, Hydraulic Low Vacuum Trip Device, Trip and Reset Mechanism

Day Two

Operating Cylinder and Air Motor Friction Lag Limits: Operating Cylinders, Secondary Operating Cylinder Connected to Valve Gear, Air Motors, Pressure Tap Locations for Operating Cylinder Lag Tests, Travel vs. Travel Lag Checks, Troubleshooting to Correct Friction and Lost Motion

Explanation of UT70 Lever Diagram: MGU-MSC Speed Setting System, Air Motor - MSC Speed Setting System

Sequence of Lever Setting Instructions

FREQUENTLY ASKED QUESTIONS

- Will HPC Technical Services bring this course to our location for our personnel only? YES, call or email Stephen Parker, stparker@hpcnet.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 course is too dependent upon print reading.
- 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 Harold Parker, hparker@hpcnet.com for our rate sheets and any further information required.

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.hpcnet.com, for detail on this certification program.

INSTRUCTOR/CONSULTANT(S):

Robert Johndrow. Bob Johndrow has 35+ years experience as a Field Engineer working on steam turbine generators. His experience includes steam turbine generator maintenance and testing, as well as considerable work on the steam turbine controls. His work on the steam turbine Mechanical Hydraulic Controls included work on nuclear (BWR) units, fossil applications, and industrial 3-arm governors. Bob earned a BS in Industrial Distribution from Clarkson University in Potsdam NY and also has GE Six Sigma Green Belt Certification. Bob accepted an early retirement package late 2003 and has worked as an independent as well as being associated with HPC Technical Services since then. He resides in Rhode Island.

Robert Doughty. Mr. Doughty has more than 30 years of experience in start up, maintenance and operation of both large and small turbine-generators. Bob started his career as a power plant instrumentation technician while he completed his BS degree in Engineering Technology (1976) at the University of Houston. He has worked as a start up and field engineer for one of the major turbine-generator OEM's and as a consulting engineer, supporting the initial operation of two nuclear fueled power plants. His most recent position (1999) as the President of Turbine Services, Inc., has allowed him to continue to provide on site technical direction, start up and controls adjustments. Bob is a member of ASME (18 years) and has worked closely with HPC on multiple projects; training as well as field service.

Harold Parker is the founder & President of H Parker & Company, Inc. Mr. Parker has worked in the "Power Generation" industry for 36 years, 14-years with GE as a Field Engineer, Start-Up Engineer, Technical Training Specialist and Manager. In 1983 Mr. Parker resigned from GE and started a training company, Schenectady Learning Systems, in Schenectady NY, which evolved into H Parker & Company, Inc. today. During this post-GE period, Mr. Parker was briefly employed as Manager Turbine-Generator Services with General Physics (2-years) and as a Field Engineer with Mechanical Dynamics & Analysis (2-years). Mr. Parker holds a BSME ('69 from Lawrence Institute of Technology), a MBA ('81 from the State University of New York @ Albany) and is a member of ASME and ASTD.

Joe Byrd. Joseph Byrd has over 29 years of experience in the power industry, concentrating in the area of turbine-generator controls and operations. He graduated from North Carolina State University in December 1978 with BS in Mechanical Engineering. He began his career in January 1979 as a Field Engineer, and subsequently a Start-Up Engineer with GE and was lead Start-up Engineer on five turbine-generator installations. He left GE in 1986 to consult directly to utilities on control systems calibration and maintenance with MD&A. In June 2008, he ended his relationship with MD&A and became available to HPC to instruct. His primary areas of expertise are GE manufactured Large Steam and Mechanical Drive Turbine MHC control systems as well as EHC systems. Joe resides near Raleigh NC.

HPC TECHNICAL SERVICES
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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 HPC courses before
- Received a fax
- Received an email
- Internet search
- Other: _____