

**FIRST TIME** in Asia!

# **GAS TURBINE SPEEDTRONIC CONTROL SYSTEMS AND TROUBLESHOOTING**

**08 - 12 MAY 2017, KUALA LUMPUR, MALAYSIA**

## **TOPICS COVERED**

**Speedtronic Control**

**System Hardware  
Control System Interfaces  
(HMI)**

**Communication Systems**

**Control System  
Programming**

**Basic Fault Finding**

**Alarm Systems**

**Gas Turbine Control  
(Speedtronic Control  
Blocks)**

## **Expert Course Faculty Leader**

**Robert (Bob) J. Johnston**

40 years' experience in the Gas Turbine industry.



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**powerEDGE**<sup>®</sup>  
Empower your future

# GAS TURBINE SPEEDTRONIC CONTROL SYSTEMS AND TROUBLESHOOTING

08 - 12 MAY 2017, KUALA LUMPUR, MALAYSIA

## About This Training Course

This course will provide a detailed overview of Gas Turbine Speedtronic Control systems such that attendees will have a much clearer understanding of the configuration and reliability of these systems.

The course will begin with an overview of control system redundancy and configuration options. An analysis will be made of the advantages and disadvantages of TMR (Triple Modular Redundant Systems).

Programming methods will also be discussed together with a troubleshooting and fault finding session focusing on both turbine and diagnostic alarms. This topic will include practical sessions using simulators. Gas turbine control and protection will also be discussed in detail.

Valve calibration will also be covered including the measurements necessary to ensure the valve is operating as per the required specification.

In the final section of this course there will be a detailed examination of the requirements as regards the upgrading of Gas Turbine control systems. Also the options for remote monitoring systems will be discussed together with the advantages and disadvantages of these systems.

## Teaching Method

The course will be taught using a mixture of lecturing using PowerPoint presentations and practical sessions using simulators.

## Practical Sessions

This course will feature a high degree of practical content. Delegates will be given the opportunity to troubleshoot various Gas Turbine control faults using simulators.

## Who Should Attend

The course is ideal for those engineers/technicians that require a broad based understanding of Gas Turbine Speedtronic Control Systems and in particular an understanding of the requirements for Control System upgrade.

## Unique Features with **powerEDGE Training**

- Pre-Course Questionnaire to help us focus on your learning objectives
- Detailed Course & Reference Manual for Continuous Learning and Sharing
- Practical Exercises & Case Examples to better understand the principles
- Limited class size to ensure One-to-One Interactivity
- Assessment at the end of the course to help you develop a Personal Action Plan

**This training course has a limited attendance for up to 20 participants only.**

Sessions commence at 9am on all days, with short intervals at 10.30am and 3.30pm respectively.

Refreshments will be provided in the short intervals.

Lunch will be provided at 12:30pm for 1 hour. Sessions will end at 5pm on all days.

## 5 Day Course Outline

### DAY 1

#### Speedtronic Control System Hardware

- Simplex Control Systems
- Duplex Control Systems
- TMR Control Systems (MK V, MK VI and MK VIe)
- I/O Options and Configuration
- I/O Packs (Remote I/O)

#### Control System Interfaces (HMI)

- SCADA Systems
- Functions of SCADA system
- Screen Graphics

#### Communication Systems

- Ethernet/Serial
- Bespoke Communications

### DAY 2

#### Control System Programming

- Control System Sequencing
- Ladder Logic
- Control Blocks (Big Block Diagrams)
- Use of Toolbox and ToolboxST

#### Basic Fault Finding

- Alarm Tracing (Using Simulator)
- Commons Faults and Problems

#### Alarm Systems

- Process Alarms
- Diagnostics Alarms

### DAY 3

#### Gas Turbine Control (Speedtronic Control Blocks)

- Startup Control
- Acceleration Control
- Speed Control
- Temperature Control
- DLN/WLN Systems and Control
- Other Control Loops
- Software Control Blocks

#### Gas Turbine Protection (Speedtronic Control Blocks)

- Overspeed Protection
- Overtemperature Protection
- Combustion Monitoring
- Vibration Protection
- Velocity (seismic) Probes
- Proximotors/Accelerometers
- Bentley Nevada Systems

### DAY 4

#### Valve Control and Calibration

- Gas Valves (SRV, GCV, DLN Valves)
- Liquid Fuel Valves (LFBV)
- Valve Control and Feedback (LVDTs)
- Valve Configuration
- Calibration Requirements
  - Equipment needed
  - Stroke Measurement (Dial Gauges)
  - Practical Valve Calibration
  - Auto and Manual Calibration
  - Valve Stroking
  - Common Valve problems and fixes

### DAY 5

#### Retrofitting Control Systems

- Considerations for retrofit
- Control system options
- Reliability Considerations
- Networking
- OEM Options for Upgrade
  - Speedtronic Systems
- PLC Options
  - PLC Redundancy
  - PLC Reliability
- Remote Monitoring and Diagnostic Systems
  - System capabilities
- Course Review and Assessment

## Your Expert Course Faculty

Bob has over 40 years' experience in the Industrial Gas Turbine industry with particular focus on the General Electric (GE) product family. He is experienced with all aspects of the GE Gas Turbines; from hands-on troubleshooting, to planning and costing of complete gas turbine package refurbishment. Bob has been involved with all facets of the GT maintenance and operation cycle including; testing, installation, commissioning, troubleshooting, maintenance, refurbishment, control system retro-fits, vibration analysis and correction, boroscope inspection & machine evaluation. Bob has had many years' experience in the preparation and presentation of training programs, project management and tender preparation & evaluation.

He spent 7 years as Director of a medium sized company and was involved in all aspects of the day-to-day operation. He is fully computer literate, both from a business perspective and as a home computer hobbyist.

## Employment History :

### **MJB International (UAE) January 2015 – Present**

Training Instructor/Consultant Engineer

Performed the following training and engineering assignments:

- GE MS3002J Gas Turbine Mechanical overhaul training conducted on site for Banagas, Bahrain.
- Providing general FS3002/5001/5002/6001/7001/9001 Gas Turbine introduction training courses for MJB in-house personnel conducted in MJB Training Center in Jebel Ali Dubai.
- Gas Turbine Mechanical Training course for GE MS5001/5002/6001 & MS9001E turbines in MJB Training Center in Jebel Ali, Dubai
- Preparation of training materials and updating of Speedtronic MKV Control training panels in MJB Training Center in Jebel Ali

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## OTHER AVAILABLE COURSES

[4 Pillars of Transformer Condition](#)  
[Advanced Project Finance for Power](#)  
[Advanced Technical Report Writing & Presentation Skills](#)  
[Advanced Turnaround Shutdown & Outage Management](#)  
[Ancillary Services in Competitive Electricity](#)  
[Asset Management for the Power Industry](#)  
[Best Practice Renewable Energy Capital & Project Management](#)  
[Biomass Power Generation](#)  
[CFB Combustion for Boiler Operations](#)  
[Clean Development Mechanism and Carbon Markets](#)  
[Coal Contracts](#)  
[Combined Cycle Power Plants Operation](#)  
[Combined Heat & Power \(CHP\) and Co-Generation Plant Operations](#)  
[Competency Management System for the Power Industry](#)  
[Design & Operations of Circulating Fluidized Bed Boiler](#)  
[Developing & Structuring Public-Private Partnership \(PPP\) for Infrastructure](#)  
[Effective Tender Process Management for Power & Utilities](#)  
[Electrical Hazop \(eHazop\) Studies for the Power Industry](#)  
[Electricity Demand-Side Management](#)  
[Electricity Industry Design](#)  
[Electricity Network Planning](#)  
[Electricity Retail Contracts](#)  
[Electricity Theft](#)  
[Electricity Trading Essentials](#)  
[Energy Efficiency](#)  
[EPC Contract Management for Power & Utilities](#)  
[Essentials of Coal Markets and Trading](#)  
[Essentials of Power Trading](#)  
[Excitation Systems](#)  
[Feed-In Tariffs for PV Systems](#)  
[Finance for Non-Finance Professionals in Power & Utilities](#)  
[Financial Modelling for Project Finance in Power & Utilities](#)  
[Fitness-For-Service AP1 579 & High Energy Piping Life Management](#)  
[Fundamentals of Geothermal Energy](#)  
[Fundamentals of Power Generation](#)  
[Gas & LNG Contract Negotiation](#)  
[Gas Turbine Generator Selection, Operation & Maintenance](#)  
[Gas Turbine Hot Gas Paths, Rotors & Failure Analysis](#)  
[Gas Turbine Major Inspection & Overhaul](#)  
[GE Gas Turbine Operations Simulation Based](#)  
[HRSG Design, Operations & Understanding, Controlling of HRSG Damage Mechanisms](#)  
[HV Substation Design & Construction](#)  
[IEC for Utilities](#)  
[Integration of Distributed Generation](#)  
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[Introduction to Clean Coal Technology](#)  
[Introduction to Power Systems](#)  
[Keeping Electrical Switchgear Safe](#)  
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[LNG Markets & SPOT Trading](#)  
[Maintenance Planning & Scheduling](#)  
[Making IPP & Renewable Energy Projects Contract Frameworks Bankable](#)  
[Managing Complex Projects for Power and Utilities Professionals](#)  
[Medium Voltage & High Voltage Switchgear](#)  
[Metallurgy for Engineers](#)  
[Mechanical Engineering for Non-Mechanical Engineers](#)  
[Mini Hydro Project Analysis](#)  
[MKV Speedtronic Control System](#)  
[MK VI Speedtronic Control System](#)  
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[Operations of Coal Fired Power Plants](#)  
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[Writing Effective Standard Operating Procedures \(SOP\) for Power & Utilities Professionals & Engineers](#)

## Frequently Asked Questions (FAQs)

**1. Does PowerEdge have other programmes than those listed?**

We have more than 200 programmes that we are capable of running. All we need is for you to contact us and request for the preferred programme and we will be able to develop it.

**2. Where is PowerEdge based?**

PowerEDGE is headquartered in Singapore but we run our training programmes in different venues around Asia.

**3. What does PowerEdge do?**

We are a Power & Utilities Training Specialist.

**4. Can this course be done in our city?**

It absolutely can. Get in touch with us to request for a training programme to be carried out in your city.

**5. Can you reduce the price of our preferred course?**

While our price has been reduced before it is even launched, we are always happy to help you with further discounts.

**6. Can you change the dates of the course?**

If you have a special requested date, let us know and we will arrange another session for you.

**7. Who are the companies that will be participating?**

This varies from a diversity of Power Operators, Regulators, Financiers, to Vendors in the Power & Utilities industry.

**8. Where is the venue for the course?**

We usually engage a 4 to 5 star hotel meeting room to ensure the comfort of our participants.

**9. How many delegates should we expect for each course?**

This varies from 15 to 20 participants. Class sizes are kept small to allow trainers to focus better on each participant.

**10. What are the different payment modes?**

We accept Visa/MasterCard, cheques, bank transfers and cash on site.

**11. Is accommodation included when I sign up for a course?**

Accommodation is not included in the course fee but we are always happy to advise on available accommodations.

**12. Can I get a cheaper accommodation through PowerEdge?**

We will be pleased to help you negotiate a better rate with hotels.

**13. Is lunch provided during the course?**

We provide lunch and 2 tea breaks every day during our training programmes.

**14. Are the training materials included once I have signed up for a course?**

Yes, training and course materials are included in the course fee.

**15. Will there be a certificate for the course?**

Yes, there will be a certificate of participation upon completion of a course.

**16. Who are PowerEdge trainers?**

They are expert consultants and practitioners with many years of experience in the subject matter that they deliver on.

**17. Are PowerEdge trainers competent?**

We have received numerous favourable feedbacks on our trainers from past participants.

**18. Can PowerEdge assist with Visa travel applications?**

We can assist in advising you on the relevant procedure(s) and embassies/consulates that provide Visa for travel purposes.

**19. Can we purchase training materials without attending a course?**

Unfortunately this option is not available as training materials are specially developed for courses.

**20. Can course content be tweaked to cater to our needs?**

Of course! Just let us know your request and we will get the trainer to assist in carrying it out.

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## 08 - 12 MAY 2017, KUALA LUMPUR, MALAYSIA

	PER PARTICIPANT	2 PARTICIPANTS OR MORE	IN-HOUSE TRAINING
<b>5 Day Programme</b>	<b>SGD 4,900 Per Participant</b>	<b>SGD 4,100 Per Participant</b>	<b>Guaranteed Minimum 40% Off Normal Price</b>
	<b>*SGD 5,243 Per Participant (GST Inclusive)</b>	<b>*SGD 4,387 Per Participant (GST Inclusive)</b>	

\*GST FOR SINGAPORE REGISTERED COMPANIES ONLY

### ATTENDEE DETAILS

Name ..... Job title .....

Tel ..... Department ..... Email .....

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Name ..... Job title .....

Tel ..... Department ..... Email .....

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Name ..... Job title .....

Tel ..... Department ..... Email .....

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Name ..... Job title .....

Tel ..... Department ..... Email .....

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Name ..... Job title .....

Tel ..... Department ..... Email .....

### COMPANY DETAILS

Organisation name ..... Industry .....

Address .....

Postcode..... Country.....

Tel ..... Fax.....

### PAYMENT METHODS

By Cheque/ Bank Draft: Make Payable to PowerEdge Pte Ltd.

By Telegraphic Transfer: Please quote AE1 with the remittance advise

Account Name: PowerEdge Pte. Ltd.

Bank Code: 7339 Branch code: 686 Account Number: 686-253386-001 Swift Code: OCBCSG5G

Bank Address: 65 Chulia Street OCBC Centre, Singapore 049513

All bank charges and payment in Singapore dollars (SGD) to be borne by payer. Please ensure that PowerEdge Pte Ltd receive the full invoiced amount.

### PAYMENT POLICY

Payment is due in full at the time of registration. Full payment is mandatory for event attendance. I agree to PowerEdge Pte Ltd. payment terms

\* GST- Exclusive price is only applicable for overseas corporate customers subject to qualifying conditions.

### CANCELLATIONS & SUBSTITUTIONS

You may substitute delegates at any time. POWEREDGE PTE LTD does not provide refunds for cancellations. For cancellations received in writing more than seven (7) days prior to the training course you will receive a 100% credit to be used at another POWEREDGE PTE LTD training course for up to one year from the date of issuance. For cancellations received seven (7) days or less prior to an event (including day 7), no credits will be issued. In the event that POWEREDGE PTE LTD cancels an event, delegate payments at the date of cancellation will be credited to a future POWEREDGE PTE LTD event. This credit will be available for up to one year from the date of issuance. In the event that POWEREDGE PTE LTD postpones an event, delegate payments at the postponement date will be credited towards the rescheduled date. If the delegate is unable to attend the rescheduled event, the delegate will receive a 100% credit

[Online Web Registration](#)

✉ info@poweredgeasia.com

☎ (65) 6741 9927

☎ (65) 67478737

### RELATED TRAINING

✓ [Keeping Electrical Switchgear Safe](#)

✓ [Introduction to Power Systems](#)

✓ [Excitation Systems](#)

✓ [Fundamentals of Power Generation](#)

### ON SITE TRAINING

Can't make it for the Course?  
We'll make the course come to you!!

Simply let us know your preferred time and dates and we will meet you at your schedule and venue.

With a host of highly trained experts, we will be happy to customize your programme with your needs 100% fulfilled.

Contact us today at

✉ info@poweredgeasia.com

☎ (65) 6741 9927

