



Overview control systems for  
LM aeroderivative gas turbines

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# Content

1. A gas turbine control system ...
2. Overview OEM & alternative control systems
3. Issues with Speedtronic & Woodward



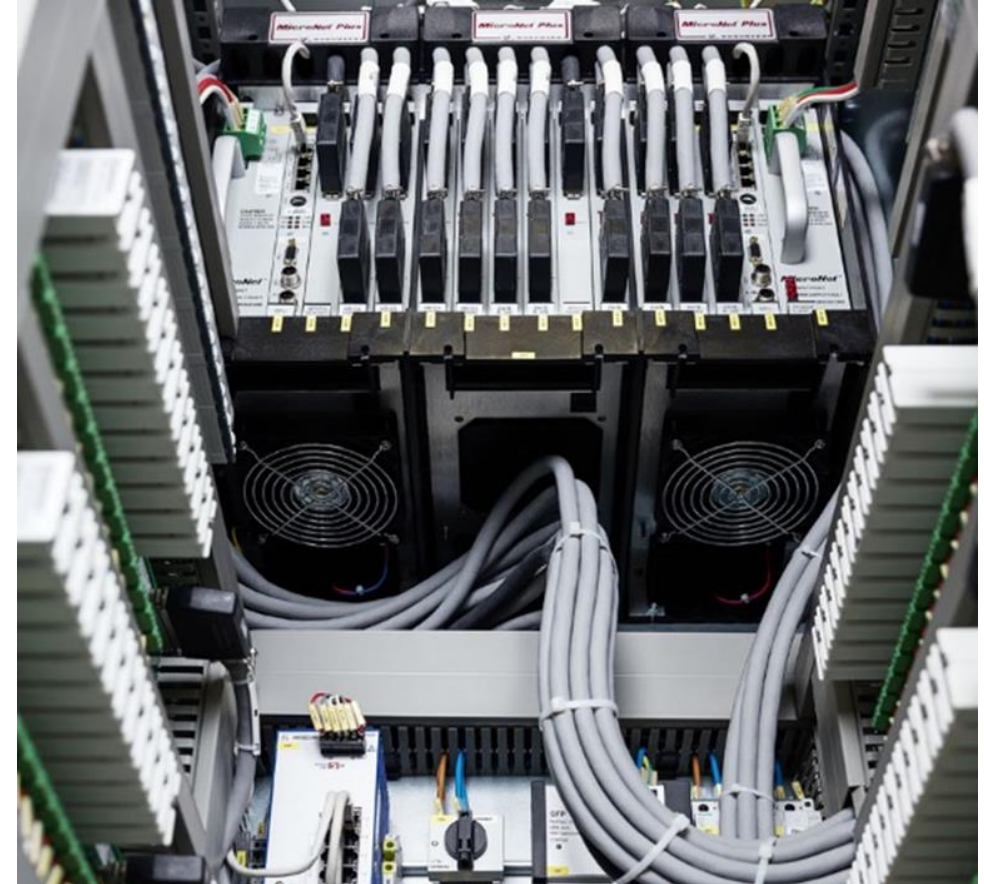


# A gas turbine control system ...

A gas turbine control system can be compared to the nervous system of a human being:

- The sensors can be compared with the senses
- The cables can be compared with the nerves
- The control panel can be compared with the brain

The control system of a gas turbine enables an operator to gain (and retain) insight into the operation and the condition of a gas turbine.





# Overview OEM & alternative control systems for LM aeroderivative gas turbines

## OEM-authorized control systems

### Speedtronic control systems for LM gas turbines

- Mark IV
  - Mark V (LM)
  - Mark VI
  - Mark VIe
- Hardware and software can only be supplied by the OEM

### IHI control systems for LM gas turbines

- CSI 7500
  - CSI 7500 II
  - CSI III
- Hardware & software can only be supplied by the OEM and IHI

### Woodward control systems for LM gas turbines

- Netcon (A,B,C)
  - Atlas
  - Micronet
- Hardware only supplied by the OEM and Woodward
- Software only provided by the OEM and after OEM approval by Woodward
- Recent development: independent software solutions for Woodward (applicable on SAC & DLE)

## Alternative control systems

### Independent alternative control system solutions applied on LM gas turbines

- Siemens
  - Allen-Bradley
  - Valmet
  - CCC
- Remark:  
So far applied on SAC engines only



# Issues with Speedtronic & Woodward control systems

Issue:

Availability of dedicated OEM Speedtronic & Woodward software expertise is decreasing.

- Software expertise independent service providers

Issue:

Speedtronic & Woodward control systems limited accessible (or partly closed) for owners & operators.

- Open software upgrade & retrofit solutions by independent service providers

Issue:

Speedtronic & Woodward hardware declared obsolete by the OEM.

- Sufficient independent sources for this hardware
- Partial upgrades by independent service providers

