Vantage XC/GC Configurable Turbine Control Specification

The Vantage controller is designed to operate single valve, or single extraction/admission industrial steam turbines of all sizes and applications. This steam turbine controller includes specifically designed algorithms and logic to start, stop, control, and protect industrial steam turbines or turbo-expanders, driving generators, compressors, pumps, or industrial fans.

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Figure 1 Vantage Front Panel

The Vantage controller is packaged in an industrial hardened enclosure designed to be mounted within a system control panel; either in a plant control room or next to the turbine. The control's front panel serves as both a programming station and operator control panel (OCP).

The user-friendly front panel allows engineers to access and program the unit to the specific plant's requirements, and plant operators to easily start/stop the turbine and enable/disable any control mode. Password security protects all unit program mode settings. The controller's graphical display allows operators to view actual and setpoint values from the same screen, simplifying turbine operation.

The Vantage has two versions: The Vantage XC and the Vantage GC. The Vantage GC provides solid control for simple, API 611 type applications, while the Vantage XC is designed for more challenging multi-value applications.

The Vantage GC controller is designed to operate single valve, or single extraction/admission industrial steam turbines of all sizes and applications. This steam turbine controller includes specifically designed algorithms and logic to start, stop, control, and protect industrial steam turbines or turbo-expanders, driving generators, compressors, pumps, or industrial fans.

Vantage XC controllers can be used for:

- Extraction control
- Cascade control
- Overspeed anticipation and shutdown protection
- Configurable under- or over-pressure shutdown logic
- Minimum and maximum speed and load settings
- Maximum low pressure stage overpressure limits
- Minimum high pressure stage flow limits

Table 1 Model Comparison

	Vantage XC	**Vantage GC**
Single Valve Steam Turbines	X	X
Single/Dual Inlet Valve Steam Turbines	X	X
Speed Control	X	X
Acceleration Limiter Control	X	X
Auxiliary Control/Limiter Control	X	X
Inlet Header Pressure Control	X	X
Exhaust Header Pressure Control	X	X
Single/Dual Inlet Valve with Single Extraction	X	
Cascade Control	X	
Generator Control	X	
Stand-alone PID Control	X	X
Critical Speed Zones	3	3
Multiple Language Support (English, Chinese, Portuguese, Japanese, Spanish)	X	

Inputs/Outputs	16AI, 4AO, 16DI, 16DO	16AI, 4AO, 16DI, 16DO
Cutout Dimensions	11.1” H x 13.25” W x 3.5” D	11.1” H x 13.25” W x 3.5” D

Features

- Critical Speed Avoidance (3 speed bands)
- Auto Start Sequence (hot & cold starts)
- Multiple Ratio/Limiter Decoupling Modes
- Manual Valve Control and Limiter(s)
- Security (program is password protected)
- Adaptive Speed and Extraction PID Dynamics
- First-Out Indication (shutdowns)
- Zero Speed Detection with proximity probe (< 0.5 Hz)
- Peak Speed Indication for overspeed trip
- Remote analog setpoints for all PID controllers
- Multilingual Display (English, Chinese, Portuguese, Japanese, and Spanish)[1]

Operating Conditions

- -30° to +70°C
- Humidity: 5% to 95% non-condensing - Lloyd’s ENV2 test #1
- Dry Heat: Lloyd’s ENV3
- Shock: 10 G
- Vibration: 8.2 Grms - Lloyd’s ENV2 test #1

Pollution Resistance:

- Particulate Pollution Resistance: IEC 60664-1 Pollution Degree 2 (normally only non-conductive pollution occurs)
- Gaseous Pollution Resistance: Module conformal coating withstands NO_2, CO_2, SO_2, and H_2S gases

Table 2 Input Signals

Power Source	Low Voltage Power Supply (18–32 Vdc), 4.3A (77 w) maximum
Speed Signals	2 Passive MPUs or 2 Active Proximity probes (0.5–32,000 Hz)
Discrete Inputs	20 Configurable Contact Inputs
Analog Inputs	8 Configurable 4–20 mA Inputs

1. Vantage XC only.

Table 3 Output Signals

Valve/Actuator Drivers	2 Actuator Outputs 4-20 mA or 20–200 mA
Discrete Output Relays	8 Configurable Outputs 2 relays rated for 5 A @ 24 VDC 6 relays rated for 2 A @ 24 VDC
4–20 mA Analog Output	6 Programmable 4–20 mA Outputs

Table 4 Communications

Ethernet	4 ports (Modbus TCP or OPC Protocols)
Serial	1 Modbus port (ASCII or RTU) Comm port (RS-232 or RS-485 compatible)
CAN	4 Ports

Table 5 Regulatory Compliance

North American Compliance	CSA Certified for Class I, Division 2, Groups A, B, C, and D, T4 at 70 °C Ambient
European Compliance	• EMC Directive: 2014/30/EU • ATEX Directive: 2014/34/EU Zone 2, Category 3, Group IIG, Ex nA IIC T4, Gc X • WEEE Directive: Exempt/Compliant as a component with 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE). • EuP Directive: Exempt/Compliant from 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting
Other Compliance	• IEC60068-2-60: 1995 Part 2.60 Methods 1 and 4 (con-formal coating) • API670, API612 and API611 compliant • IECEx Ex ic nA IIC T4 Gc EAC CU-TR
Marine Compliance	• Lloyd's Register (LR) - ENV1, ENV2, ENV3 • DNV-GL: Temp Class D, Humidity Class B, Vibration Class A, EMC Class A

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