

Sentry G3 API 670 std V5 Compliance Matrix			V3
Note: This matrix compares the Sensonics Sentry G3 System Monitoring Performance only and ignores specification references for transducers, installation and other guidance.			
Reference	Title	Compliance	Comments
4	General Design Specifications		
4.1	Component Temperature Ranges		
	Monitoring System	Y	-20degC to +65degC
4.2	Humidity		
4.2.2	Monitoring System	Y	<± 1% for all measurements apart from speed <± 0.1% or <1RPM up to 95% noncondensing
4.5	Accuracy		
4.5.2	Monitoring System	Y	<± 1% for all measurements apart from speed <± 0.1% or <1RPM. Sentry G3 is typically <± 0.5% accurate for all measurements apart from speed.
4.6	Interchangability		
4.6.1	Monitoring System	Y	Modules can be interchanged and the above accuracy maintained.
4.8	Segregation		
4.8.1	Separate and Diverse MPS	Y	Sentry G3 hardware provides dedicated DSP's to the protection function with separate hardware for non-protection functions (such as CMS). The module contains independent DSP's for each channel protection and a separate microprocessor to provide communications and display functions.
4.9	System Enclosures and Environmental Requirements		
4.9.3	Electromagnetic Radiation Immunity	Y	Complies with EN 61000-6-2
4.9.4	Conformal Coating	Y	Available as option
4.10	Power Supplies		
4.10.1	Accuracy over incoming power supply range	Y	Accuracy is maintained from 90Vac to 264Vac, 47Hz to 63Hz. Note Sentry G3 does not require switch selection range on the incoming power supply as it utilises a wide range solid state solution providing higher reliability over conventional transformer based designs.
4.10.2	Other options	Noted	Rack can be powered from external 18Vdc to 28Vdc without any further power supply hardware. G3 system operates on a +24Vdc power supply backplane.
4.10.3	Integral to monitoring system	Y	Rack fitted module
4.10.4	Short circuit protection	Y	+24Vdc output from power supplies is short circuit protected
4.10.5	Transducer power sources	Y	All independent and short circuit protected and current limited
4-10.6	Transient Performance	Y	Exceeds EN61000-4-4 Fast Transient and Burst Immunity
4.10.7	Transient Performance	Y	Exceeds EN61000-4-4 Fast Transient and Burst Immunity
4.10.8	Mains interruption	Y	Exceeds EN61000-4-11 Mains Dips and Interruptions
4.10.9	Power Supply Transformer	Y	Not susceptible to high voltage coupling or insulation fault since solid state
4.10.10	Redundant Power Supplies	Y	Completely independent redundant power supplies with separate bus feeds to each module on the rack. Failure of one supply has no effect on the system operation. Hot removal and insertion has no effect on the system operation.
4.11	Machinery Protection System features and Functions		
4.11.1	Safety Instrumented System	Y	Sentry G3 system has undergone full reliability analysis backed up with field reliability data to provide a range of SIL rated systems up to SIL-3 for overspeed protection.

4.11.2	Reliability data	Y	Available on request.
4.11.3	Features and functions		
a)	Energising indicators for test	Y	Through appropriate use of facilities provided by user interface software.
b)	Internal Time Clock	Y	Through appropriate use of facilities provided by user interface software.
c)	Hot Swappable Modules	Y	All Sentry G3 modules are hot swappable.
c)	Redundancy	Y	When appropriately configured
4.11.4	Signal Processing		
a)	Transducer isolation	Y	Each transducer is on a separate isolated circuit
b)	Internal circuit faults	Y	External circuit fault for each individual channel available through LCD display and summary front panel LED. No fault is visibly indicated and a common relay available in each module for summary fault indication.
c)	Circuit Fault Effect	Y	Shutdown alarms deactivated on circuit fault.
d)	Buffered Outputs	Y	Front Panel SMB connectors and Rear of rack connections.
e)	4-20mA Outputs	Y	2-off analogue outputs provided for each channel and programmable between current and voltage.
f)	Digital communications	Y	Dual redundant RS-485 modbus available to module level.
4.11.5	Alarm / Shutdown Functions		
a)	Alarm Setpoints	Y	Alert and Danger fully adjustable set points over range.
b)	Alert per Channel or Voted Output	Y	Configurable on rack via Software
c)	Danger per Channel or Voted Output	Y	Configurable on rack via Software
d)	Alarm Response Time	Y	<100ms
e)	Shutdown Indication	Y	Front Panel Red Led as well as LCD display per channel
f)	Disarming	Y	Applied via password protected user software.
g)	Alarm Reset	Y	Local and Remote.
h)	First Out alarm	Y	Front Panel Indicator
4.11.6	Redundancy		
a)	Single circuit failure (power source excepted)	Y	Independent signal processing per channel with detection of sensor and channel integrity alarm resulting in alarm disable (if selected for sensor). In addition relay to be configured as energised to alarm (optional)
b)	Single circuit failure (power source included)	Y	As above, however dual redundant power supplies will need to implemented in the rack.
4.11.7	Indications	Y	
a)	Power Status	Y	OK green LED
b)	Digital Communications	Y	TX / RX LED
c)	System Circuit Fault	Y	Flashing LED and through LCD advanced displays
d)	System Shutdown	Y	Alarm LED and through LCD advanced displays
e)	System Alert	Y	Alarm LED and through LCD advanced displays
f)	Shutdown Disabled	Y	RED Flashing LED
4.11.8	Indications (ODS)	Y	As per a) to d) above

4.12	System Output Relays		
4.12.3	Relay type	Y	Epoxy Sealed.
4.12.5	Relay configuration	Y	SW changeable energised / de-energised to alarm.
4.12.6	Relay connections	Y	Change over contacts provided.
4.12.7	Latching configuration	Y	SW changeable to latching.
4.12.8	Fault Relay	Y	Normally Energised.
4.12.9	Contact ratings	Y	5A 120Vac available as option through digitally connected raft.
4.12.10	Power supply effect	Y	No effect on shutdown if normally de-energised.
4.12.11	Disarming Shutdown	Y	a) - e) compliant.
4.13	Digital Communication Links		
4.13.1	Digital output	Y	RS-485 Modbus.
4.13.2	Available Data	Y	Channel Status / Transducer status / Measured Variable / Set Points.
4.17	Reliability		
4.17.2	Uninterrupted Operation	Y	Specified MTBF on request.
7	Vibration Monitor Systems		
7.1.2	Contiguous Enclosure	Y	Signal processing / alarm / integrity / display / indication and all other function specified above are in a 19" rack based format.
7.1.3	Features and functions		
a)	Failure effect	Y	Limited to 2 channels if system design selected accordingly.
b)	Resolution of full scale	Y	<1% for all measurement modes, speed <1RPM or <0.1%.
c)	Adjustments	Y	Through password protected SW via front panel.
d)	Multiple Machine Monitoring	Y	When appropriately configured in the modules and up to 6 key phasor signals can be managed in a single rack.
e)	CMS interface	Y	Via buffered outputs at rear of rack
7.1.4	Signal Processing		
a)	Gain adjustment	Y	Through password protected SW via front panel.
b)	Default gain	Y	Set to 7.87mV/um.
7.1.5	Alarm and Integrity		
a)	Time Delay	Y	Through password protected SW via front panel.
b)	Alarm indication for each channel	Y	Via front panel LCD display - colour coded bar graph
7.1.6	Integral Display		
a)	Measured Variable	Y	All measured variables available under bargraph and on advanced display.
b)	Alarm Set Points	Y	Indicated on bargraph and colour coded.
c)	DC gap voltages	Y	Advanced display will also provide gap and transducer bias voltage values.
7.1.7	Display update	Y	Less than 1 second update time.
7.1.8	Display type	Y	Bargraph, traffic or indication available under user control.

7.1.9	Indications		
a)	Highest radial shaft vibration	Y	All channels displayed - bargraph indicates highest.
b)	Axial position	Y	All channels displayed - bargraph indicates highest.
c)	Highest temperature	Y	All channels displayed - bargraph indicates highest.
d)	Highest casing vibration	Y	All channels displayed - bargraph indicates highest.
e)	Speed and Overspeed	Y	All channels displayed - bargraph indicates highest.
f)	Highest Rod Drop	Y	All channels displayed - bargraph indicates highest.
7.1.10	Blind Monitor	N/A	
7.2	Power Supplies	Y	-24Vdc and fully regulated available for each channel.
7.3	System Output Relays		
7.3.2	Monitored variables	Y	Pair of relays available for axial position, radial shaft vibration, casing vibration, bearing temperature and piston rod drop.
7.3.3	Fault Relay	Y	One available per module.
7.4	Monitor Systems		
7.4.1	Radial Shaft Vibration Monitoring		
7.4.1.1	Full scale range	Y	Software configurable.
7.4.1.2	Fault system	Y	Software configurable.
7.4.1.4	Voting logic	Y	Software configurable.
7.4.1.5	Voting logic	Y	Software configurable.
7.4.1.6	Set point multiplier		
a)	Actuation	Y	Rack bus function.
b)	Positive Indication	Y	Utilising bus function display module.
c)	Effect	Y	No measurement or analogue output effects.
7.4.2	Axial Position Monitoring		
7.4.2.1	Full scale range	Y	Software configurable.
7.4.2.2	Fault system	Y	Software configurable.
7.4.2.3	Monitoring format	Y	Software configurable.
7.4.2.4	Voting logic	Y	Software configurable.
7.4.2.5	Voting logic	Y	Software configurable.
7.4.4	Casing Vibration Monitoring		
7.4.4.2	Filtering		
a)	Gain Parameters	Y	For both HPF and LPF
b)	Roll - off	Y	>24dB for both HPF and LPF
c)	Filtering prior to integration	Y	
7.4.4.3	Fault circuit	Y	Open or short circuit detection and channel defeat

7.4.4.4	Set point multiplier		
a)	Actuation	Y	Rack bus function.
b)	Positive Indication	Y	Utilising bus function display module.
c)	Effect	Y	No measurement or analogue output effects.
7.4.4.5	Casing Vibration rolling element		
a)	Gear casing Acceleration / Velocity	Y	Software configurable.
b)	Other equipment	Y	Software configurable.
7.4.4.6	Measurement Options	Y	Software configurable.
7.4.5	Temperature Monitoring		
7.4.5.1	Full scale range	Y	Software configurable.
7.4.5.2	Fault system	Y	Software configurable.
7.4.5.3	Monitoring format	Y	Software configurable.
7.4.5.4	Voting logic	Y	Software configurable.
7.4.5.5	Voting logic	Y	Software configurable.
7.4.6	Speed Indication		
7.4.6.1	Functions	Y	Trending and peak values stored in Alarm Historian
7.4.6.2	Reset function	Y	Peak readings can be reset locally
7.4.6.3	Transducer Interface	Y	Software configurable.
8	Electronic Overspeed System		
8.1	General		
8.1.4	Power supplies	Y	Fully Redundant Power Supplies.
8.2	Accuracy	Y	Speed $\leq \pm 0.1\%$ or $< 1\text{RPM}$.
8.3	Segregation	Y	The OSP can be configured with Sentry G3 as independent rack based system. Shutdown function is independent from communications.
8.4	Functions		
8.4.1	Channels / Alarm Logic	Y	The OSP can be configured for the required voting options in fail safe mode.
8.4.2	Output Relays		
a)	Output Relays	Y	One pair per channel.
b)	Shutdown Relay	Y	High integrity shutdown relay located in 2oo3 voting module.
c)	Relay rating	Y	Interposing relays to be implemented.
8.4.3	Inputs / Outputs / Config		
8.4.3.1	Probe Type	Y	Software configurable.
8.4.3.2	Freq Test	Y	Injected via voting module.
8.4.3.3	Indications	Y	Speed display for each channel.
8.4.3.4	Setting	Y	Software configurable with protected access.

8.4.3.5	Peak hold feature	Y	Alarm historian captures peak reading / set up disable available as bus function.
8.4.3.6	IEC61508	Y	Sentry G3 is available to SIL-3.
8.4.3.7	Online testing	Y	Trip level divide and signal injection per channel with key lock access.
8.4.3.10	System Bypass	Y	This can be disabled in the configuration.
8.4.4 Response Time			
8.4.4.1	Response	Y	Typically <20ms, <40ms guaranteed including 2oo3 voting
9 Surge Detection		N/A	Not included in Sentry G3
10 Emergency Shutdown Systems		N/A	Not included in Sentry G3