

Comparison of ASG's S2A to S1A LVDT Signal Conditioner Modules

Descriptively, there are several significant improvements of the S2A module over its predecessor S1A:

1. The S2A has a fully differential input, which common modes out most ground-loop developed noise signals. The S1A has a single-ended input, which is easier to work with, but can be more susceptible to certain types of extraneous noise, usually from shield grounding issues.
2. The S2A has two user-selectable shield grounding points versus the S1A's single user-selectable shield grounding point.
3. S2A incorporates a cybersecurity feature to prevent tampering and to notify main system operations of a tamper attempt.
4. The S2A has improved filtering of the sine wave excitation signal to produce less harmonic distortion than the S1A's excitation. This reduces capacitively coupled noise issues arising from long cables.
5. An S2A permits changing the module's excitation frequency and analog output via ASCII commands over the RS-485 bus, which obviates any need to open the module's case for this purpose and offers a user complete remote setup for operation with an LVDT. For half-bridge sensors, 2 internal jumpers must be set by the user. An S1A does not offer this completely remote setup feature. Note that for either unit, the case must be opened to set the specific digital address
6. The S2A has more system diagnostic capabilities than the S1A, which can assist in fault detection for very high reliability applications like nuclear power plant turbine controls. At least 16 fault conditions can be detected by the S2A's diagnostics, including shorted primary, disconnected or open primary, shorted or grounded secondaries, disconnected or open secondaries, analog voltage output shorts or current loop opens, and the most common hook-up errors during initial setup and installation.
7. Any failure diagnosed during system operation drives the analog output out of range to alert the DCS and operates the failure output switch to set off an alarm, annunciator, or provide a DCS pull up signal. The S2A's failure output switch can be user-set to either Normally Open (default) or Normally Closed.
8. S2A has a real-time recalibration feature to tweak the analog output after the mechanical system's warmup. Recalibration can be performed either over the RS-485 bus or from the module's front panel.
9. The S2A has an S1A emulation mode to make it operate essentially the same as an S1A for retrofit requirements, although operation as an S2A is the preferred mode.

New Features and Diagnostics Comparisons

Features	S2A	S1A	Competitor
Differential Input Connection of Sensor's Output	X		X
Two User-Selectable Shield Grounds	X		
Remote Setup of Module via RS-485 bus	X		
Remote Calibration via RS-485 bus	X	X	X
Module Hot Swappable	X	X	X
S1A Emulation Mode for Backward Compatibility	X		
In-Process Recalibration of Zero and/or Full Scale	X	X	
Error Output Polarity Configurability as N.O. or N.C.	X	X	
Diagnostics			
Primary Connection Open	X	X	X
Primary Connection Shorted across leads	X		
Primary Connection Shorted to ground	X	X	
Secondary Connection Open	X	X	X
Secondary Connection Shorted across Leads	X		
Secondary Connection Shorted to ground	X	X	
Voltage Output Short	X		
Current Loop Output Open	X		
Sensor Wiring Errors	X		
Shorted Master / Slave Bus	X	X	
Module Wiring Errors	X		
Cyber Security			
Anti-Tampering Lockout	X		
Tampering Warning Flag to DCS	X		