ALLIANCE SENSORS GROUP
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Using the RS-485 port of ASG S2A/SC-200 LVDT signal conditioners Aug 1, 2019

ASG's LVDT signal conditioners incorporate an RS-485 two-wire multi-drop serial communications interface for up to 16 devices. This port enables half-duplex serial communication by which a module can be set up and calibrated remotely and system data can be read or stored on a PC running an ASCII terminal program like Hyper Terminal with a 2-wire RS-485 converter for the computer's com port or USB port connected to terminals J3-1 and J3-2 of the signal conditioner. The PC's com port parameters are: 9600 bps, no parity, 8 data bits, and 1 stop bit (9600, NP, 8, 1), with echo on and no flow control. Be sure that the RS-485 connection for Data A *(D-)* is connected to J3-2 and Data B *(D+)* is connected to J3-1. **Always follow the data polarity *(D)* indicated above, regardless of the letters for data lines used by the RS-485 converter.**

ASG offers a 1.8 m long 2-wire USB-to-RS-485 converter cable, *USB-RS485-WE, p/n 5810-0001,* having an orange wire with a red tip plug that is Data B *(D+),* and a yellow wire and tip plug that is Data A *(D-)*. Normally no driver is needed for a *USB-RS485-WE* used with MS Windows 7 or later. For Windows XP or earlier, or MAC or Linux operating systems, driver software can be found on: *www.ftdichip.com*. In most cases, the optimum driver for any particular OS is the VCP version.

RS-485 user commands for S2A/SC-200 ASG LVDT signal conditioner modules

Note that all commands must be formatted to begin with **UXX** followed by a space, where XX is the numerical value between 00 and 15 of the module's decimal digital address as set up on DS2, switches 5, 6, 7, and 8 according to Table 1b in the S2A instruction manual, or by following the DIP switch settings diagram shown on the S2A module's left side label.

Note: Some **Set** command descriptions show in bold face the range of values that follow the command and a (*space*).

Analog In *RUN* mode, returns the nominal analog output value scaled in electrical units that depend on the setting of DS1, or the analog output range selected with the **Set Aout** command.

Cal Enters *CALIBRATION* mode; command is the same as pressing **FULL SCALE** and **ZERO** pushbuttons together.

Clrall In *RUN* mode, clears EEPROM of all RS-485 command settings used to override module's DIP switch settings.

Config Lists the module's setup data and displays DIP switch settings and current EEPROM values. Specifically, it shows the module's firmware version, operating mode, digital address (*00 - 15*), date stamp, serial number, analog output setting (*1 - 8*), excitation frequency setting (*0 - 3*), output invert switch *off* or *on*, low frequency filter status (LF) *off* or *on* and filter corner frequency, excitation drive jumper (J7) *in* or *out*, failure output delay time (FD) and polarity (FOP) *NC* or *NO*, Lock status, and stored EEPROM values for ADC Lo, ADC Hi, Input pot, and Gain pot. (Log and store all **Config** data and values by digital address to be able to reconfigure a hot swapped module at a later time).

Error In *RUN* mode, displays any setup or operations error code(s); for multiple errors, the error code sum is displayed.

Errsec In *RUN* mode, **ON**, **OFF** (*default*) toggles error indications and failure outputs from low DCR LVDT secondaries.

Errsig In *RUN* mode, **ON** (*default*), **OFF** toggles error indications and failure outputs for all errors found during setup.

Exit Required to exit *CAL* mode, or to exit any **Set** command writing a value to the module's EEPROM in *RUN* mode.

FS In *CAL* mode, sets the module's full scale output point at the LVDT core's maximum position and is the same as pressing **FULL SCALE** pushbutton. Occasionally it may require setting a second time after using the **Z** command.

Help Shows all ASCII user commands available for execution over the RS-485 bus, including a few not shown in this list.

LEDs In *RUN* and *CAL* modes, outputs the status of the 3 green LEDs, displayed in **S-E-P** order, e.g.: **- * 0** means **S** LED is off, **E** LED is flashing slow, and **P** LED is on. **+** is a fast flash and **!** indicates alternating solid and flashing.

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Lock In *RUN* mode, locks the module against any changes and displays attempted tampering over the RS-485 bus.

Null In *RUN* mode, displays the Null Output voltage at any core position and is typically used to verify that the core of an LVDT is at null; may also be used to establish the symmetry of an LVDT's endpoint outputs versus core position.

Read LF In *RUN* mode, when DS2-4 is *ON,* or the LF filter is invoked, shows the status and frequency setting of the supplemental low frequency low pass filter.

Recal FS In *RUN* mode, after a calibration has been completed, if the actual full scale output value is within ±4% of the nominal full scale output value selected by DS-1 or the **Set Aout** command, this command trims the actual full scale output value to match the selected full scale output value. The command may be repeated once to get the most precise FS output value. Recal can be set at module by pressing and holding the **FULL SCALE** button until the **POWER** LED blinks.

Recal Z In *RUN* mode, after a calibration has been completed, if the actual zero output value is within ±4% of the nominal zero output value selected by DS-1 or the **Set Aout** command, this command trims the actual zero output value to match the selected zero output value. This command may be repeated once to get the most precise zero output value. Recal can also be set at the module by pressing and holding the **ZERO** pushbutton until the **POWER** LED blinks.

Reset In *RUN* mode, produces a "soft" reset of the module's processor so the module restarts as if it is powering on. Command is the same as pressing the **FULL SCALE** pushbutton three times for at least one-half of a second each.

Reset All In *RUN* mode, using prefix **U90** instead of **Uxx**, this command performs a simultaneous "soft" reset on all modules connected to the RS-485 bus. Each module on the RS-485 bus then restarts itself as if it is powering on.

Restore In *RUN* mode, resets module to factory set condition by cancelling all user setup values stored in EEPROM. It can also be invoked by pressing the **ZERO** pushbutton three times in a row for one-half of a second each time.

Set ADC Hi In *RUN* mode, writes an A/D converter high value into module's EEPROM. Command is used during a hot swap module reconfiguration to enter the ADC Hi value logged from the original module's **Config** command.

Set ADC Lo In *RUN* mode, writes an A/D converter low value into module's EEPROM. Command is used during a hot swap module reconfiguration to enter the ADC Lo value logged from the original module's **Config** command.

Set Aout In *RUN* mode, permits setting the analog output range: **1** - **8**, independent of the setting of DIP switch DS1.

Set Exf In *RUN* mode, permits setting excitation frequency: **0** - **3**, independent of settings of DIP switches DS2-1, -2.

Set FD In *RUN* mode, permits the user to set the delay time before the failure warning output switch is activated from 0 to 900 msec in 100 msec increments: **0** - **9**. The factory default delay time is set at 200 msec.

Set FOP In *RUN* mode, sets failure warning switch polarity: **NC,** Normally Closed (*default*) or **NO,** Normally Open.

Set Gain In *RUN* mode, writes a Gain pot value into module's EEPROM. Command is used during a hot swap module reconfiguration to enter the Gain pot value logged from the original module's **Config** command.

Set In Pot In *RUN* mode, writes an Input Pot value into module's EEPROM. Command is used during a hot swap module reconfiguration to enter the Input Pot value logged from the original module's **Config** command.

Set Inv In *RUN* mode, permits inverting analog output by overriding setting, **ON**, **OFF,** of invert DIP switch DS2-3.

Set LF In *RUN* mode, sets the corner frequency of the supplemental low pass filter between 0.1 Hz and 10 Hz. If DS2-4 is not *ON,* command permits LF filter status to be changed: **ON**, **OFF,** and its corner frequency to be set.

Ver In *RUN* mode, returns the version number of the module's firmware.

Z In *CAL* mode, sets the module's zero output point at the minimum position of the LVDT's core; function is the same as pressing the **ZERO** pushbutton. Occasionally it may require setting a second time after using the **FS** command.

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