

SDI-12 V 1.3 Command Set

Name	Command	Response & Comments
Start Concurrent	aC!	a001nn<CR><LF>
Start Concurrent CRC	aCC!	nn parameters will be available for reading by the Send Data command within 1 second. No service request will be sent when the parameters are ready. The number of parameters returned is determined by the SDI-12 configuration file in the same manner as a Start Measurement command.
Send Data	aD0!	a<values><CR><LF> or a<values><CRC><CR><LF>
Additional Data	aD1!...aD9!	The number and type of parameters returned is determined by the SDI-12 configuration file in the same manner as a Start Measurement command. a<values><CR><LF> or a<values><CRC><CR><LF>
Additional Concurrent	aC1!...aC9!	a00000<CR><LF>
Additional with CRC	aCC1!...aCC9!	No additional concurrent measurements are started by the device.
Send Data	aD0!	
Additional Data	aD1!...aD9!	a<CR><LF> or a<CRC><CR><LF>
		No values are returned after an Additional Concurrent command.
Continuous Measurement	aR0!...aR9!	a<CR><LF>
Continuous with CRC	aRC0!...aRC9!	No values are returned after a Continuous Measurement command.

SDI-12 Extended Commands

Name	Command	Response & Comments										
ISCO Compatibility	aXPR0!	aIxIxIx<CR><LF> where each Ix is a character pair identifying the parameter and units for each measurement. The number of Ix pairs must equal the number of data values returned for the Start Measurement and Start Concurrent commands. The following pairs are supported: <table style="margin-left: 40px; border: none;"> <tr> <td>Pressure, PSIA = "d0"</td> <td>Level, millimeters = "??"</td> </tr> <tr> <td>Pressure, PSIG = "d2"</td> <td>Level, centimeters = "??"</td> </tr> <tr> <td>Pressure, KPa = "??"</td> <td>Level, meters = "I0"</td> </tr> <tr> <td>Temperature, °C = "A0"</td> <td>Level, inches = "??"</td> </tr> <tr> <td>Temperature, °F = "A1"</td> <td>Level, feet = "I1?"</td> </tr> </table>	Pressure, PSIA = "d0"	Level, millimeters = "??"	Pressure, PSIG = "d2"	Level, centimeters = "??"	Pressure, KPa = "??"	Level, meters = "I0"	Temperature, °C = "A0"	Level, inches = "??"	Temperature, °F = "A1"	Level, feet = "I1?"
Pressure, PSIA = "d0"	Level, millimeters = "??"											
Pressure, PSIG = "d2"	Level, centimeters = "??"											
Pressure, KPa = "??"	Level, meters = "I0"											
Temperature, °C = "A0"	Level, inches = "??"											
Temperature, °F = "A1"	Level, feet = "I1?"											
ISCO Additional	aXPR1...XPR9!	a<CR><LF> No values are returned after an additional ISCO compatibility command.										
Set Pressure Units	aXPUnn! where: nn = the pressure units id 17 = PSI (default) 19 = KPa	a0001<CR><LF> One result is available immediately for reading by the Send Data command.										
Send Data	aD0!	a+s<CR><LF> where: s = command status, 1 = command successful, 0 = invalid units id or an attempt to change units while the device is logging.										
Additional Data	aD1! ... aD9!	a<CR><LF> No values are returned after an Additional Data command.										
Set Temperature Units	aXTUnn! where: nn = the temperature units id 1 = °C (default) 2 = °F	a0001<CR><LF> One result is available immediately for reading by the Send Data command.										
Send Data	aD0!	a+s<CR><LF> where: s = command status, 1 = command successful, 0 = invalid units id or an attempt to change units while the device is logging.										
Additional Data	aD1! ... aD9!	a<CR><LF> No values are returned after an Additional Data command.										

SDI-12 Extended Commands

Name	Command	Response & Comments
Set Level Units	aXLUnn! where: nn = the level units id 33 = mm 34 = cm 35 = m 37 = in 38 = ft (default)	a0001<CR><LF> One result is available immediately for reading by the Send Data command.
Send Data	aD0!	a+s<CR><LF> where: s = command status, 1 = command successful, 0 = invalid units id or an attempt to change units while the device is logging.
Additional Data	aD1! ... aD9!	a<CR><LF> No values are returned after an Additional Data command.
Set Level Mode	aXLMnn! where: nn = the level parameter id 3 = level-depth (default) 4 = level-top of casing 5 = level-elevation.	a0001<CR><LF> One result is available immediately for reading by the Send Data command.
Send Data	aD0!	a+s<CR><LF> where: s = command status, 1 = command successful, 0 = invalid units id or an attempt to change the mode while the device is logging.
Additional Data	aD1! ... aD9!	a<CR><LF> No values are returned after an Additional Data command.
Set Output Sequence	aXOnnn! where nnn = 1 to 3 characters (P = Pressure, T = Temperature, L = Level), in the required output order.	a0001,CR><LF> One result is available immediately for reading by the Send Data command.
Send Data	aD0!	a+s<CR><LF> where s = command status: 1 = command successful, 0 = invalid parameter characters or an attempt of change specific gravity while the device is logging.
Additional Data	aD1!...aD9!	a<CR><LF> No values are returned after an Additional Data command.
Set Specific Gravity	aXSGpd.d! where: pd.d = specific gravity p = polarity sign (+ or -) d = digits (1 to 7) . = decimal point (optional)	a0001<CR><LF> One result is available immediately for reading by the Send Data command.
Send Data	aD0!	a+s<CR><LF> where: s = command status, 1 = command successful, 0 = invalid parameter characters or an attempt to change the specific gravity while the device is logging.
Additional Data	aD1! ... aD9!	a<CR><LF> No values are returned after an Additional Data command.
Zero Pressure	aXPZ!	a0011<CR><LF> One value will be available for reading by the Send Data command within 1 second. A service request (a<CR><LF>) will be sent when the parameter is ready.
Send Data	aD0!	a+s<CR><LF> where: s = command status, 1 = command successful, 0 = invalid parameter characters.
Additional Data	aD1! ... aD9!	a<CR><LF> No values are returned after an Additional Data command.
Set Level Reference	AXLRpd.d! where: pd.d = reference level in current units p = polarity sign (+ or -) d = digits (1 to 7) . = decimal point (optional)	a0011<CR><LF> One value will be available for reading by the Send Data command within 1 second. A service request (a<CR><LF>) will be sent when the parameters are ready.
Send Data	aD0!	a+s<CR><LF> where: s = command status, 1 = command successful, 0 = invalid parameter characters.
Additional Data	aD1! ... aD9!	a<CR><LF> No values are returned after an Additional Data command.

Device Status

The device status register holds general status information. Each set bit represents a status value. There are a limited number of standardized predefined status values that all devices will support. These predefined status values are contained in the lower register. The upper register is reserved for device specific status values.

Device Status Bit Values

Bit	Category	Description
0	Alarm	Sensor high alarm
1	Warning	Sensor high warning
2	Warning	Sensor low warning
3	Alarm	Sensor low alarm
4	Warning	Sensor calibration warning
5	Alarm	Sensor malfunction
6-7	N/A	Reserved
8	Status	Power management disabled
9	Status	Device off line
10	Alarm	Device hardware reset occurred
11	Alarm	Device malfunction
12	Status	No external power
13	Warning	Low battery – battery capacity < 5%
14	Warning	Low memory – data log memory capacity < 5%
15	N/A	Reserved
16-31	N/A	Available for device-specific status

Bits 0-7 of the device status register are reserved for sensor status. These bits are the logical OR of bits 0-7 of the sensor status register in each sensor connection.

Bits 8-15 of the device status register are reserved for common device status. Any bit in this range that is not applicable to a device will be set to zero.

Bits 16-31 of the device status register are available for device-specific status. Any bit in this range that is not utilized by a device will be set to zero.

SDI-12 Configuration File

The device's SDI-12 configuration file may be edited with a serial connection and Win-Situ 5 software.

This dialog allows you to change the device's SDI-12 address and specify the parameter reporting order for SDI-12 communications.

1. While connected to a device in Win-Situ 5, click the **Setup** tab, then click the **SDI-12 Setup** button. A dialog box like this will open.



2. Address Character. The device's current SDI-12 address is shown (factory default: 0). Enter the desired address character to change the address.
3. Select the sensor to report. All sensors supported by the connected device are available in the drop-down list.
4. Select the parameter to report. All parameters supported by the selected sensor are available in the drop-down list.
5. Click **Add** to add the parameter to the Output Order. Repeat for all desired parameters.
If you wish to change the reporting order, select a parameter in the list and click the up arrow or the down arrow to change its position in the output order list.
6. Click **OK** when done. The software will write the SDI-12 configuration to the device.

Reference

- SDI-12, A Serial-Digital Interface Standard for Microprocessor-Based Sensors, version 1.3. SDI-12 Support Group, Logan, Utah, September 17, 2002. Available at www.sdi-12.org.
- In-Situ Modbus Communication Protocol. Bill Bonner, Senior Software Engineer, In-Situ Inc., Fort Collins, CO, January 2007. Available at www.In-Situ.com.