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Updated: March 12, 2018 for re-branding

Specifications

Power supply voltage: 9.0 – 16.0VDC
Default SDI-12 Address: 0

SDI-12 Command Nomenclature

a= Sensor address
{crc} = SDI-12 compatible 3-character CRC
<cr> = ASCII carriage return character
<lf> = ASCII line feed character
highlighted values indicate variable data

SDI-12 Commands

Setup Commands

Name	Command	Response
Sensor Identification	aI!	a13 INWUSA SMDO2.01sssssssss<cr><lf> *Note: 2.01 will change to reflect current firmware revision,* *sssssssss = device serial #*
Acknowledge Active	a!	a<cr><lf>
Address Query	?!	a<cr><lf>
Start Verification	aV!	a0000<cr><lf>
Change Address	aAb!	b<cr><lf> Change address from a to b

Measurement Commands

Request Measurement

Name	Command	Response

Request measurement:
    Temperature (on-board)
    Pressure
    Power
    DO
    Temperature (on probe)
	aM!	atttn<cr><lf>
		"n" values available after "ttt" seconds
		Sample: a0045<cr><lf>

Read results	aD0!	aValue1Value2<cr><lf> *Value1 = temperature (on-board)* *Value2 = pressure* *Value3 = power* *Value4 = DO* *Sample*: >+23.1374+14.9829+12.1616+3.9829<cr><lf >
Read results	aD1!	aValue1<cr><lf> *Value1 = temperature (on probe)* *Sample*: >+19.1374<cr><lf>

Request Measurement with CRC

Name	Command	Response
Request measurement: 　　Temperature (on-board) 　　Pressure 　　Power 　　DO 　　Temperature (on probe)	aMC!	atttn<cr><lf> *"n" values available after "ttt" seconds* *Sample:* a0045<cr><lf>
Read results	aD0!	aValue1Value2{crc}<cr><lf> *Value1 = temperature (on-board)* *Value2 = pressure* *Value3 = power* *Value4 = DO* *Sample*: >+23.1374+14.9829+12.1616+3.9829{crc}<cr><lf >
Read results	aD1!	aValue1{crc}<cr><lf> *Value1 = temperature (on probe)* *Sample*: >+19.1374{crc}<cr><lf>

Note: The DO2 comes in both a box version and a tube version. The box version may include a barometric sensor, while the tube version does not. If your unit does not have a barometric sensor, the second value returned from the SDI-12 command (M!, MC!, C!, or CC!) should be ignored.

Concurrent Measurement

Name	Command	Response
Request measurement: 　　Temperature (on-board) 　　Pressure 　　Power 　　DO 　　Temperature (on probe)	aC!	atttnn<cr><lf> *"nn" values available after "ttt" seconds* *Sample:* a0045<cr><lf>
Read results	aD0!	aValue1Value2<cr><lf> *Value1 = temperature (on-board)* *Value2 = pressure* *Value3 = power* *Value4 = DO* *Sample*: >+23.1374+14.9829+12.1616+3.9829<cr><lf >

Read results	aD1!	aValue1<cr><lf> *Value1 = temperature (on probe)* *Sample*: >+19.1374{<cr><lf>

Concurrent Measurement with CRC

Name	Command	Response

Request measurement:
  Temperature (on-board)
  Pressure
  Power
  DO
  Temperature (on probe)
	aCC!	atttnn<cr><lf>
		"nn" values available after "ttt" seconds
		Sample: a0045<cr><lf>

Read results	aD0!	aValue1Value2Value3Value4{crc}<cr><lf> *Value1 = temperature (on-board)* *Value2 = pressure* *Value3 = power* *Value4 = DO* *Sample*: a>+23.1374+14.9829+12.1616+3.9829{crc}<cr><lf >
Read results	aD1!	aValue1Value2Value3Value4{crc}<cr><lf> *Value1 = temperature (on probe)* *Sample*: >+19.1374{crc}<cr><lf>

Note: The DO2 comes in both a box version and a tube version. The box version may include a barometric sensor, while the tube version does not. If your unit does not have a barometric sensor, the second value returned from the SDI-12 command (M!, MC!, C!, or CC!) should be ignored.

Modbus Register Definitions

Parameter data

Read measurements using Modbus function 03 – Read Holding Registers. Readings are located in two registers each, starting at address 62592. (Seametrics Smart Sensor register addressing is

zero based, i.e., starts at zero. If your equipment uses one based addressing, you will need to add one to the register address.

Modbus parameter data is returned as 32-bit IEEE floating point values, high word first, also referred to as big-endian, float inverse, or float AB CD. Each value is 32 bits in length, and therefore occupies two Modbus registers. As a result, the parameter registers must be read as pairs.

Modbus Register	Description
62592	Temperature (on-board)
62594	Pressure
62596	Power
62598	DO
62600	Temperature (on probe)

Note: The DO2 comes in both a box version and a tube version. The box version may include a barometric sensor, while the tube version does not. If your unit does not have a barometric sensor, any values in the Pressure register should be ignored.

Power On Function

In order to save power, the power to the sensing probe on the DO2 is normally off, even when the DO2 sensor itself is powered. The sensing probe requires a warm-up or stabilization time before returning valid readings. The sensing probe is turned on when a reading is requested or when a Power On command is written to the DO2.

(Note: If you are recording sessions, reading with Aqua4Plus, or using SDI-12, you do not need to be concerned with the stabilization period. It is automatically taken care of in these situations. You only need to be concerned when using your own device to take Modbus readings.)

There is a "power on" register on the DO2 (register 62720 or 0xF500). When a positive value "n" is written to this register, the power is turned on to the sensing probe and remains on for n/4 seconds. When a reading is requested, the timer is reset and the sensing element remains on for another n/4 seconds. To force the power off immediately after a reading, for power savings, write a zero to the register. If the power to the entire DO2 sensor is turned off, this value defaults to 30 (or 7.5 seconds).

The recommended procedure to ensure proper warm-up/stabilization and to conserve power is:

Write Power On value of 30 (30/4 = 7.5 seconds)

- o Power turns on
- o Starts sampling about two times per second

Wait 7 seconds then request a reading

- o Returns most recent sample
- o Resets Power On value to 30 (30/4 = 7.5 seconds)

Write Power On value of 0 (zero)

- o Turns power off
- o Retains last reading

If You Cannot Write to the Power On Register

If you are reading your sensor using a meter or other device that cannot write the Power On value but simply takes readings on a specified schedule, be sure to set the polling interval to less than 7.5 seconds. This will ensure that the DO2 is always providing power to the sensing probe and readings should be fresh and stable. Note that the first reading when you turn on the DO2 will be old but will refresh within a second or two.

Sensor configuration/control

Modbus registers are provided for the following configuration and control functions.

Modbus Register	Description
62976=a	Set sensor Modbus address = a (Write Only)
64544=b	Set Modbus baud rate according to b (Write Only) b=0:38400 b=1:19200 b=2:9600

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