SDI-12 Quick Start Guide

Standard FW Version 6.0

SDI-12 communication protocol allows compatible devices to communicate with each other. More information about SDI-12 can be found at http://www.sdi-12.org. 4.1, 4.0, 3.0, 2.8 and 2.7 firmware versions have a different array of commands. Contact Stevens Water for more information.

Model Numbers

Version Part # Suffix	
01	Standard, w/25 ft. cable
02	Professional, w/25 ft. cable
03	Standard, w/50 ft. cable
04	Professional, w/50 ft. cable
05	Standard, w/100 ft. cable
06	Professional, w/100 ft. cable

Power

Power Requirements	9 to 16 VDC (12VDC Ideal)
Power Consumption	<1 mA Idle, 10 mA for 2s Active

Wiring

Red Wire	+ Power Input
Black Wire	Ground
Blue Wire	SDI-12 Data Signal

Addressing

The first character of any command or response on SDI-12 is the sensor address. A lowercase ‘a’ is used to represent the address. Each SDI-12 sensor must have its own unique address. The default address is “0”. Use SDI-12 “Transparent Mode” to issue commands.

SDI-12 Command	Response	Description
aAb!	b	Change Sensor Address a – Sensor Address b – New Sensor Address

Identification

A request for identification will return the sensor address, part number, firmware version, sensor version, calibration, and serial number.

SDI-12 Command	Response	Description
aI!	a12STEVENSWnnnnnv.vvvcSNxxxxxxxx	Send Identification a – Sensor address 12 – SDI-12 protocol version STEVENSW – Manufacturer nnnnn – Part number v.vvv – Firmware version c – Calibration xxxxxxxx – Serial number

Measurement

SDI-12 Command	Response	Description
aM!	atttn	Request Measurement a – Sensor address ttt – seconds (000 – 999) until the measurement is ready n – number of data fields (1-9) in the measurement
aD0!	a<F><I><G>	Read Measurement Readings F – Soil Moisture I – Bulk EC (Temp Corrected) G - Temperature (C)
aD1!	a<H><K><O>	Read Measurement Readings H – Temperature (F) K – Pore Water EC O – Loss Tangent

The following tables list the values and units:

Selector Order	Parameter	Unit
F	Soil Moisture	Water fraction by Volume (wfv)
I	Bulk EC (Temperature Corrected)	Siemens/Meter (S/m)
G	Soil Temperature	Celsius (C)
H	Soil Temperature	Fahrenheit (F)
K	Pore Water EC	Siemens/Meter (S/m)
O	Dielectric Loss Tangent	-

Pore Water Offset

SDI-12 Command	Response	Description
aXR_PWOS!	a<Current Offset>	Read Pore Water Offset
aXW_PWOS_<New Offset>!	a<New Offset>	Write Pore Water Offset
aXD_PWOS!	a+3.4	Reset Pore Water Offset to default 3.4

Calibration

The default General calibration has been heavily reviewed and will provide reasonable accuracy for most applications. If you need to change the calibration, we recommend referring to the HydraProbe user manual for more information.

SDI-12 Command	Response	Description
aXR_SOIL!	a<G/O/R>	Read Current Soil Type G – General O – Organic R – Rockwool
aXW_SOIL_<New Soil Type>!	a<G/O/R>	Write New Soil Type G – General O – Organic R – Rock Wool

Accuracy and Ranges

Parameter	
Soil moisture for inorganic mineral soils	Accuracy*: +/- 0.01 WFV for most soils (m^3,m^{-3}) +/- <0.03 for fine textured soil (typical) Range: From Complete Dry to Full Saturation (0% to 100% of saturation)
Bulk EC	Accuracy: +/- 2.0% or 0.02 S/m Whichever is greater Range: 0 to 1.0 S/m
Temperature	Accuracy: +/- 0.3 °C Range: -40 to 75 °C
Inter-Sensor Variability	+/- 0.012 WFV (Typical)
Pore Water EC	Hilhorst Equation, depends on soil conditions

*Accuracy of soil moisture depends on the soil and is highly variable.