

SDI-12 Converter

7SDI-300 User Manual

Version 1.00

7SDI-300 User Manual

Table of Contents

1.	Introduction.....	2
1.1	System Overview.....	2
1.2	Sensor Compatibility.....	2
1.3	SDI Converter Functions	2
1.4	Instrument Details.....	3
2.	Wiring & Connection	4
2.1	Quick Set Up	5
3.	Special User Commands.....	6
3.1	Changing Sensor Model Type using XM Command.....	7
3.2	Set data channel output order using XC command.....	8
3.3	Read Sensor Status using XS command	9

I. Introduction

1.1 System Overview

The 7SDI-300 Converter can be used with Greenspan 300 series sensors to convert the serial RS232 interface to an SDI protocol electrical interface and command protocol. The converter connects to the sensor by means of an HS7 connector and provides power to the sensor through that connector.

1.2 Sensor Compatibility

The 7SDI-300 SDI-12 Converter supports the following sensor models and is compatible with sensor firmware version 2C130 and onwards.

Greenspan 300 Series Sensors:

- PS310
- EC350
- PH300
- ORP300
- TS300
- DO300
- CTD350
- CTDP300
- CS304
- CS305

1.3 SDI Converter Functions

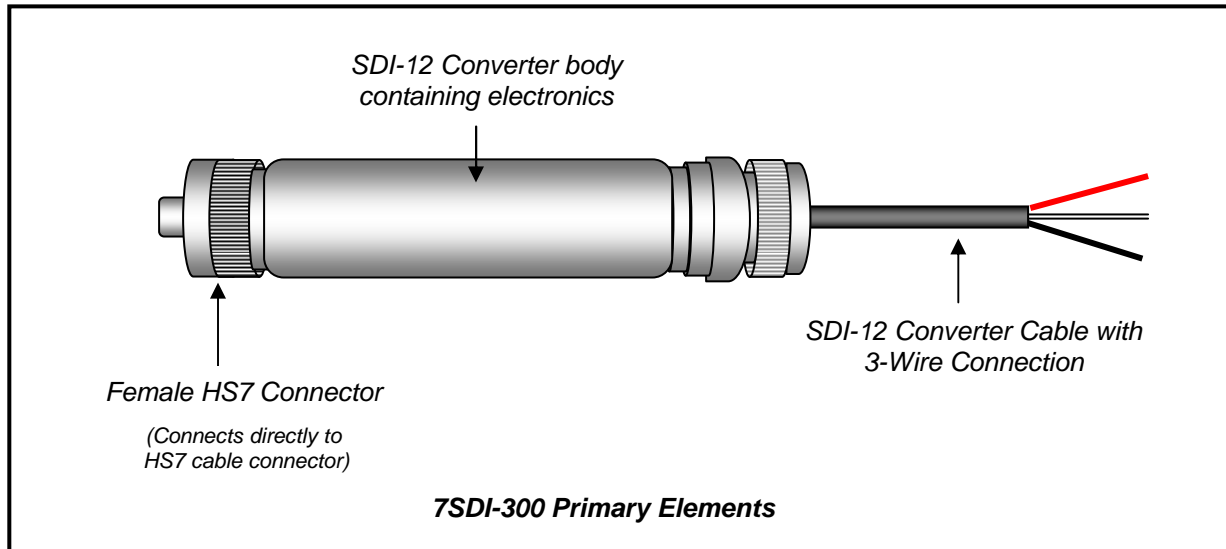
The functions performed by the converter include:

- Support for Version 1.3 SDI12 protocol commands, with the exception of continuous measure (R command).
- Unique hardware serial number returned in the Send Identification command.
- Sensor type identification returned in the Send Identification command, note limited to 6 characters: this means that CTDP300 is returned as CTDP30.
- Field updateable firmware using AVR Bootloader software interface, via sensor port connection (RS232). Contact the Greenspan factory for details.
- Integrated real time operating system for time sliced handling of SDI12 command processing and sensor communications.
- System event code storage and command to read system events.
- Operating voltage range dependant on sensor (typically 9 to 16V DC).

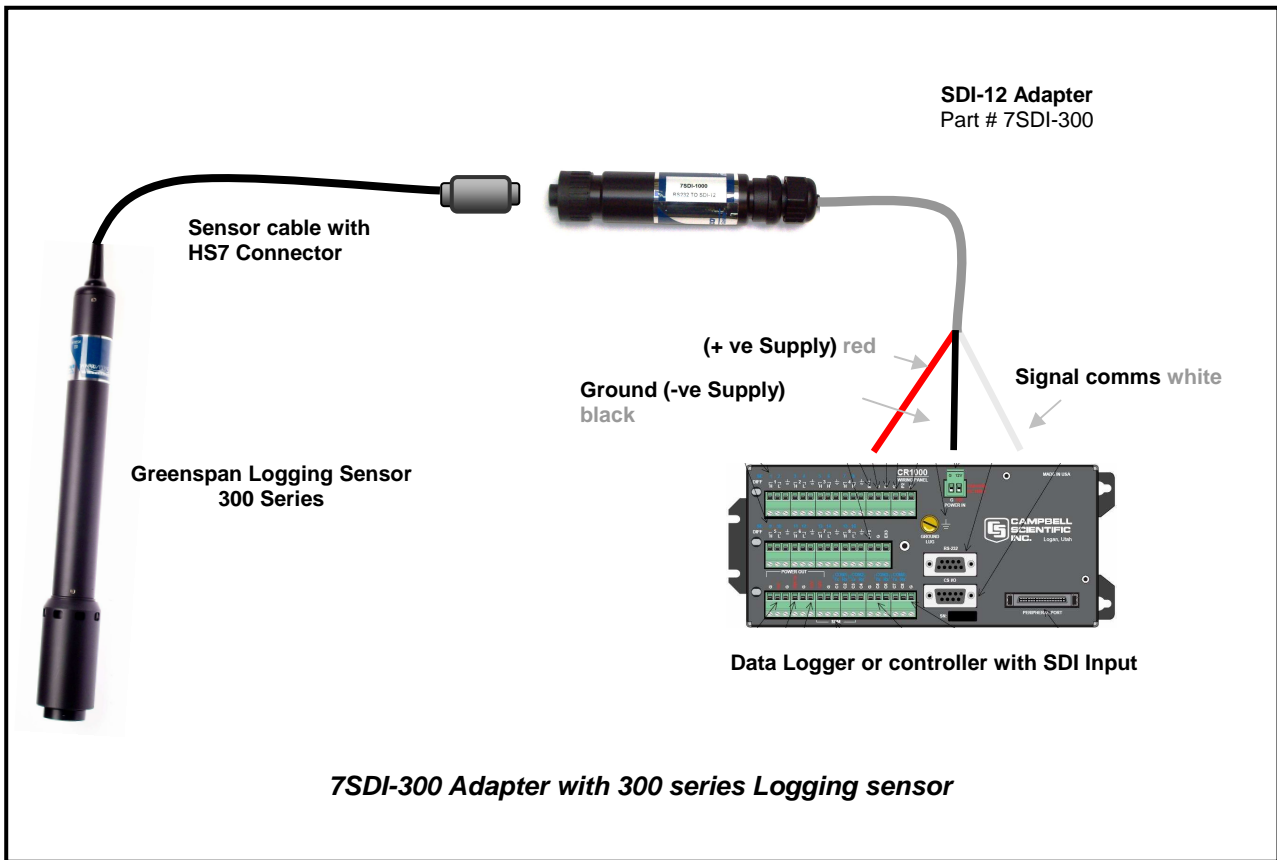
1.4 Instrument Details

The Greenspan 7SDI-300 consists of the following elements:

- Female HS7 Connector
- SDI-12 Converter body (houses adaptor electronics)
- SDI-12 Converter cable with 3-wire connection (Red, White & Black wires)



2. Wiring & Connection



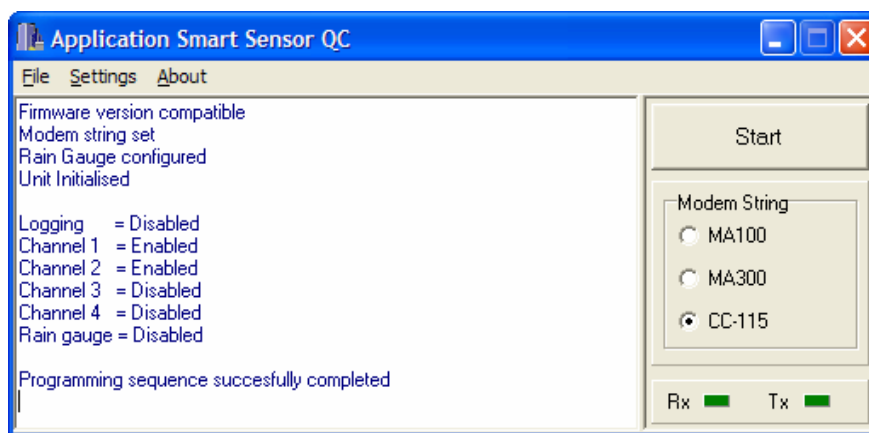
Signal Name	HS7 Pin #
DTR	4 via series 1k resistor (White)
TXD	2 (Yellow)
RXD	3 (Violet)
+12V	1 (Red)
Ground	5 (Green)

2.1 Quick Set Up

Sensor

The sensor must be set-up with all data channels enabled and the rain channels disabled. The easiest way to do this is to run the Application Smart Sensor QC. The sensor needs to be connected to a PC in the same way as if SmartCom is to be used.

- Connect the sensor to the PC using 5CC-700 communication cable.
- Provide power to the sensor.
- Copy the Application (ASSQC.exe) on to your hard drive. This can be found in the support area of the SmartCom CD or the Greenspan Analytical website.
- Open the application ASSQC.exe
- Go to settings and select the appropriate com port.
- Press Start. The application will set up the sensor so that it is ready for use with the 7SDI-300 (See below).



7SDI-300

As the different models of 300 series sensors have unique characteristics (eg. Number of channels, sensor turn on times etc.), the 7SDI-300 must be set to the appropriate sensor model. This is done by sending commands via a SDI-12 communication device or datalogger.

- Plug the sensor cable into the HS7 connector on the 7SDI-300.
- Connect the 3 wires into the SDI input of the datalogger or controller.
- Open a terminal that allows SDI-12 commands to be sent and received.
- Set model type.
- Set data channel output order if required
- Set data precision if required

3. Special User Commands

The 7SDI-300 supports standard SDI commands and some additional special user commands to allow for the easy set-up of the sensor and converter set.

All special user commands begin with an 'X' character, which follows the address (a in table below), for example 0XMB! will send a command to configure the converter for operation with a PS310 sensor. Command details are listed below: please reference to the SDI12 protocol specification command/response syntax:

Name	Command	Response
Set model number to m ¹	aXMm!	atttn<CR><LF>
Set data channel output order ²	aXCcccc!	a<CR><LF>
Read sensor status ³	aXS!	attt0<CR><LF>
Set time to respond at M command, s seconds ⁴	aXTsss!	a<CR><LF>
Set decimal precision, c n where c = channel number (0 to 9), n = precision (0 to 5)	aXDcn!	a<CR><LF>

Note 1: See section 3.1 for further information.

Note 2: See section 3.2 for further instruction.

Note 3: Results are returned using the D command – see section 3.3.

Note 4: Format of time must be the same as that returned by the M command, and must comprise 3 characters. For example for a sensor at address zero and for 10 seconds, enter 0XT010!

3.1 Changing Sensor Model Type using XM Command

The different models of 300 series sensors have unique characteristics (e.g. number of channels, sensor turn on times); the 7SDI-300 must be set to the appropriate sensor model. The following list of codes is to be used for setting the model number using the XM command. (Refer to table). For example, to set the 7SDI-300 for use with a CS304, send 0XMJ!

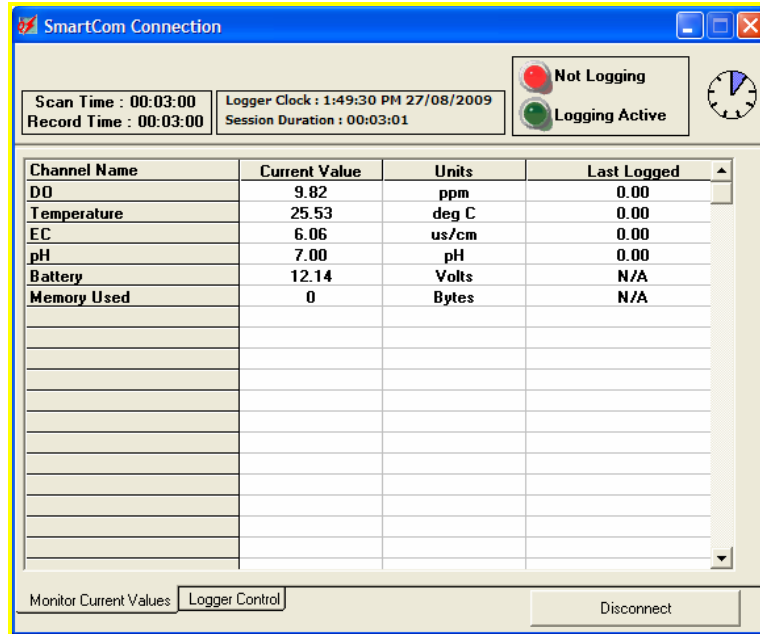
The sensor model set in the 7SDI-300 can be displayed by sending the SDI-12 Identification command. For example:

```
0!
013GREENSPNCS304 2.600001100B597
```

Code	Model	Model number displayed by I command	Default measurement time setting (see XT command)
0	No sensor connected	XXXXXX	Undefined
B	PS310	PS310	010
C	EC350	EC350	010
D	PH300	PH300	010
E	ORP300	ORP300	010
F	TS300	TS300	010
G	DO300	DO300	010
H	CTD350	CTD350	010
I	CTDP300	CTDP30	010
J	CS304	CS304	010
K	CS305	CS305	010

3.2 Set data channel output order using XC command

Connect the sensor to SmartCom and monitor the current values. Make note of the values that correspond to the different channels. Note – Memory used is not a channel.



The default order of the data that is returned via SDI-12 is Battery, followed by the other parameters in the same order as they appear in the SmartCom monitor e.g. For a CS304 the output order will be (Battery, DO, Temperature, EC and pH).

Connect the 7SDI-300 and sensor to a SDI-12 device and open a terminal emulator that allows the manual input of SDI-12 commands. Comparing the data from the Smartcom screen to data returned via SDI-12 (M command followed by the D command) will allow the determination of the Channel output order. The example shown is for a CS304 which has 5 channels and a SDI-12 address of 0. Note - The channel numbering starts at 0.

```

OM!
00105
0
OD0!
0+12.14+9.80+25.52+6.90+7.00
    
```

Channel #	Data Via SDI-12	Data from SmartCom	Channel name (from SmartCom)
0	12.14	12.14	Battery
1	9.80	9.82	DO
2	25.52	25.53	Temperature
3	6.90	6.06	EC
4	7.00	7.00	pH

To change the output order, send the special command followed by the channel numbers in the desired output order. All channel numbers must be included. E.g. if the desired output for this example sensor is 0-battery, 2-temperature, 1-DO, 3-EC and 4-pH send:

**0XC02134!
0**

Sensor responds with the address number if the input is accepted. Data will now be returned in this order:

**0M!
00105
0
0D0!
0+12.14+25.53+9.77+6.69+7.00**

The new output order will be saved in the 7SDI-300 converter. The output order can be reset by changing the model type (see 3.1).

3.3 Read Sensor Status using XS command

The read sensor status command will cause the converter to issue a Get Logger Status command to the sensor and to store the results in a buffer for the SDI12 D command.

E.g. The result returned by the D command for a PS310 is as follows:

Greenspan Series 2 Pressure Logger + Rainfall Event 2C148