

SENIX TOUGHSONIC MANUAL

For application of supplying ROW Oil spill sensor with water level data

This manual explains how to connect Senix ToughSonic rangefinder to ROW Oil spill sensor, and how to configure hardware and software to enable water level data acquisition by ROW Oil spill sensor.

General information

Senix ToughSonic series is a model row of ultrasonic rangefinders with range of up to 15m (ToughSonic 50).

ROW Oil spill sensor is designed to accept data from Senix rangefinders automatically, in real time. Use of any other rangefinder is not supported by ROW.

Placement

The Senix ToughSonic rangefinder can be attached to ROW directly, by use of mounting brackets, or on a separate fixture.

Connectivity

Senix ToughSonic should be connected with ROW by means of an RS-485 bus.

Multiple ROW devices can use a single rangefinder. However, in this case all ROW devices should be connected to the same RS-485 bus. There can be only one rangefinder on a single RS-485 bus (see Figure 1).

If the design includes multiple ROW clusters on separate RS-485 nets, which are in no direct communication with each other (for example, they are connected to their own Ethernet or GSM modems, or data processing units), then for each net there should be a separate rangefinder.

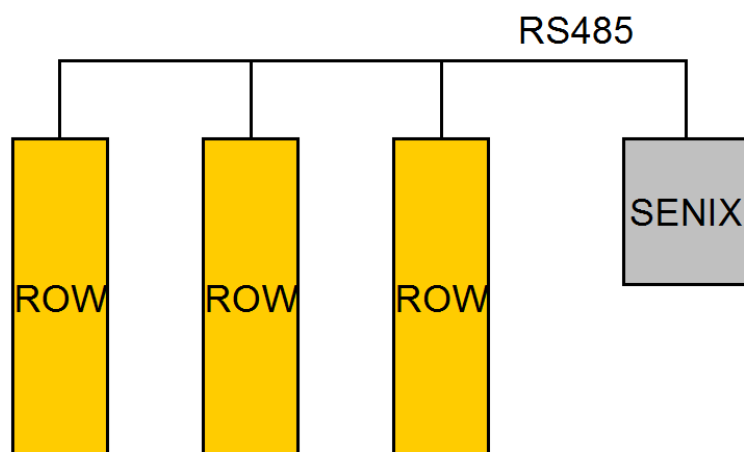


Figure 1. Connecting Senix rangefinder to ROW RS-485 net

Wiring and power supply

Senix ToughSonic is provided with the shielded 9-wire cable which has the following outputs:

Ext. wire	Senix wire color	Designation	Description	ROW wire
1	Brown	Power	10-30 VDC @ 70 mA max *	1
2	Blue	Ground	Power and interface common	2
7	Violet	Vout	<i>Analog Voltage output **</i>	-
5	Green	4-20mA(src)	<i>Current Loop source **</i>	-
6	Orange	4-20mA(snk)	<i>Current Loop sink **</i>	-
-	Black	Switch #1	Irrelevant	-
-	White	Switch #2	Irrelevant	-
3	Yellow	Data+	RS-485+ (B)	3
4	Gray	Data-	RS-485- (A)	4

* Note that according to the manufacturer, sensitivity might be reduced below 15VDC. Recommended supply: 24VDC@45mA, output currents not included

** Optional. See Advanced Functionality – Analog Output for details.

For normal operations following wires are required to be connected:

Power, Ground, Data+, Data-. These may be connected to the corresponding wires on the ROW cable. The rest of the wires are for reference only (see *Advanced Functionality*) and are not to be connected to ROW.

Configuration and setup

Certain parameters should be changed and revised in ROW software to ensure normal operation and data acquisition from Senix rangefinder.

Reference distance

Depending on how ROW and Senix are placed relative to each other, their actual distances to water may differ. That is especially important in case of several ROW devices, which might be placed at different levels above water, serviced by a single rangefinder.

To configure the distance, one should find a reference level (it may be the water level, assuming it is stable enough during the calibration, or some reference point that both altitudes of ROW and Senix rangefinder can be measured from). The distances from the reference level to the rangefinder working end should be taken (further Rangefinder Distance, or RfD), as well as to the **optical window** (NB! Not sunshield end!) of every ROW serviced by this particular rangefinder (further ROW Distance). See *Figure 2*.

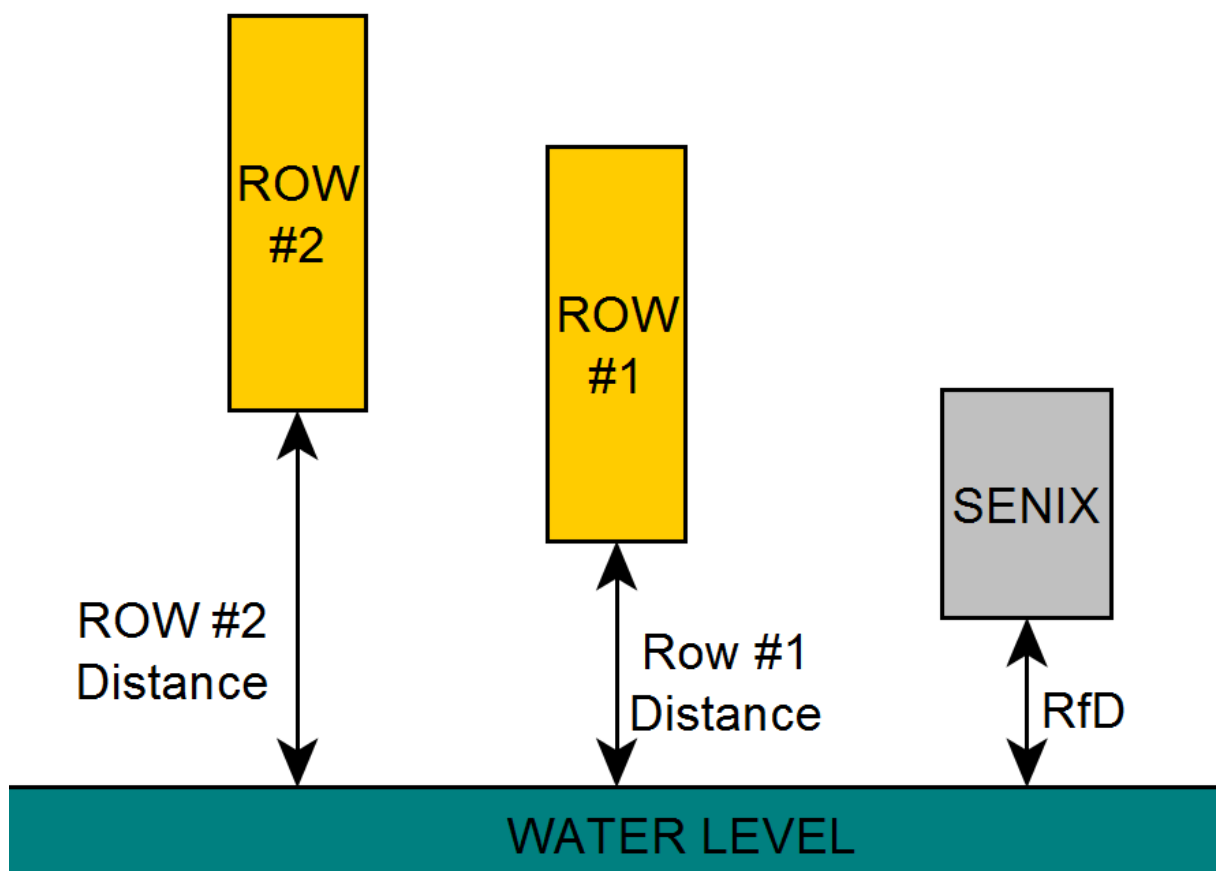
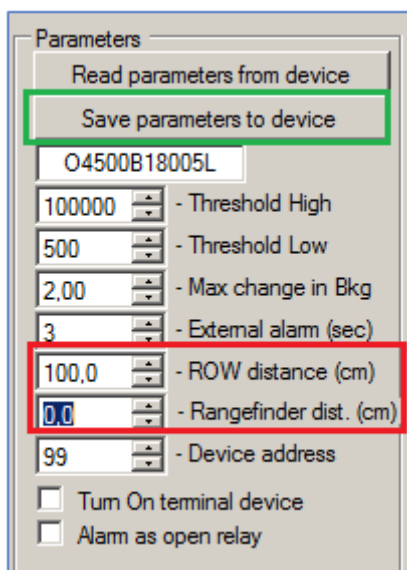


Figure 2. Configuring Distances

To set these parameters, open **Row Configurator** in *Advanced Mode* and connect to ROW device. If there are several of ROW devices serviced by a rangefinder, this procedure should be repeated for every device.

In Parameters tab of the Advanced Mode of Row Configurator, set the parameter Rangefinder dist. (cm) to the Rangefinder Distance (RfD) as measured before. Set the parameter ROW distance (cm) to the ROW Distance (distance from the optical window of ROW to the reference level) measured for this particular device. To apply the changes, press „Save parameters to device“ button (see *Figure 3*).



In RowConfigurator, the rangefinder will manifest itself by writing out the Sealevel value (Located in „Last technical information“ in the bottom of the window). This value represents the water level deviation from the reference level set in Rangefinder Distance (will be negative if the actual water level is below reference level, and positive otherwise).

Figure 3. Setting parameters for rangefinder

Rangefinder polling

To transmit data, rangefinder should be polled by either the software installed on a computer, or ROW device itself.

When using **ROW Configurator**, rangefinder will be polled automatically, provided that the *Rangefinder dist.* parameter is non-zero (see above).

When using **ROW Manager**, rangefinder polling should be enabled.

In Row Manager, go to *Help -> Advanced Mode*. Then select one of the devices that is in the same RS-485 net as the Senix rangefinder, and press Device Settings button.

In the device settings pop-up window, check the Act as range finder commander box (see Figure 4).

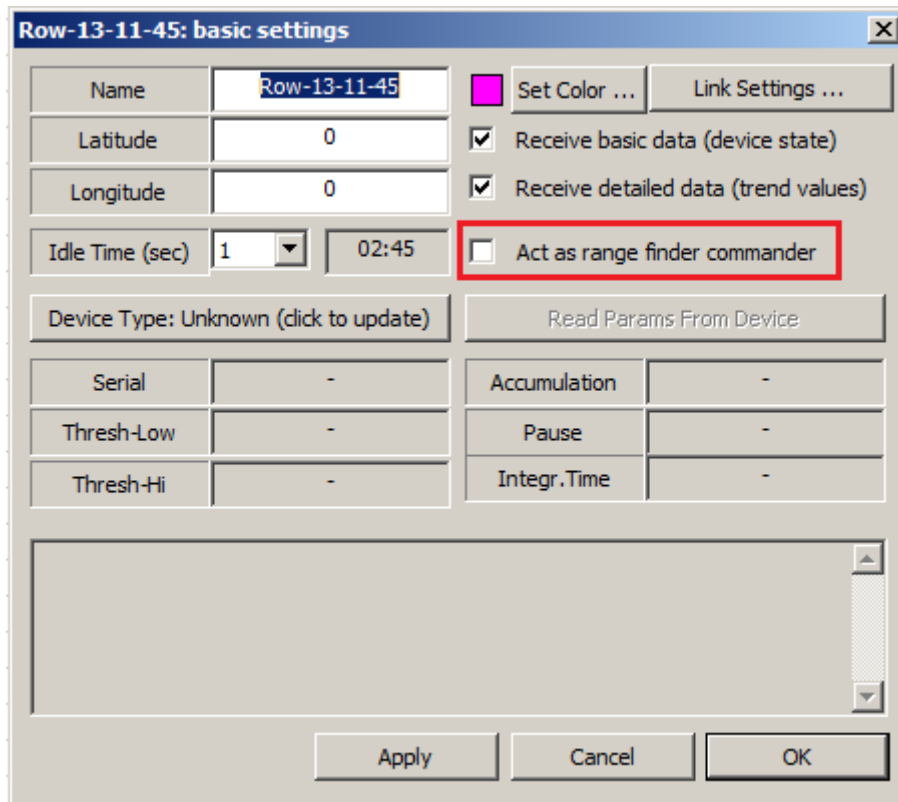


Figure 4. Activating rangefinder polling in ROW Manager

If using either ROW Manager or ROW Configurator to poll the rangefinder is not possible or not desired, ROW Oil spill sensor can perform this task. Whenever there is a device with an **address 1** in the net, it will poll the rangefinder automatically unless it is polled by the software.

Device address can be set in *Parameters* tab of ROW Configurator Advanced mode (see Figure 3). **NB! Changing the device address will mean that communication settings are to be updated in ROW Manager or ROW Configurator to connect to the device!**

Advanced functionality

Following functionality of Senix Toughsonic rangefinder is not required for normal operations and might be applicable in non-standard use cases.

Analog Output

Senix Toughsonic rangefinder contains following analog output interfaces:

- Voltage output
 - Will output voltage on Violet wire from 0 to 10 V (relative to Ground/Blue wire) as a linear function of distance measured by rangefinder (ie. Voltage @Min distance, ca. 30cm = 0V, Voltage @ max distance = 10V)
- Current output
 - 4-20mA current loop, with 4mA corresponding to min distance, and 20mA corresponding to max distance. Available as current source (Green wire) and current sink (Orange wire). Please refer to the ToughSonic Series manual, section Analog Outputs for further instructions.

NB! Senix rangefinder analog output is for reference only, and is not compatible with ROW Analog output!

Serial Communications

Senix ToughSonic series use standard Modbus protocol. Refer to ToughSonic Series manual for further information on communications.

Senix ToughSonic rangefinder uses following serial communication parameters:

- Network address: 101
- Baudrate: 57600 bps

These parameters come pre-set from LDI. Changing them will make communication between Senix rangefinder and ROW oil spill sensor impossible.

SenixVIEW software

A software pack SenixVIEW is available from Senix website for download. This software allows custom configuration of Senix Rangefinder. Refer to the Senix ToughSonic manual for further instructions.

NB! Changing certain parameters of Senix rangefinder may hinder performance or render the device inoperable. Use at your own risk!

Rangefinder: wiring and power supply

The Rangefinder is provided with the shielded 9-wire cable which has the following outputs:

Ext. wire *	Senix wire color	Designation	ROW wire
Brown	Brown	Power	1
Blue	Blue	Ground	2
Violet	Violet	Vout	-
Green	Green	4-20mA(src)	-
Red	Orange	4-20mA(snk)	-
-	Black		-
-	White		-
Yellow	Yellow	Data+	3
Black	Gray	Data-	4

***An extension wire is used if the cable length exceeds 2 meters**

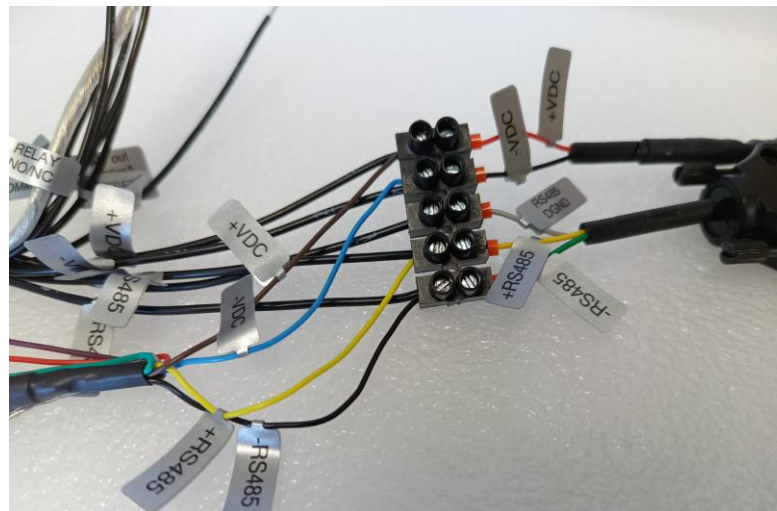


Figure 1. Connecting the Rangefinder cable to the ROW cable

NB! The Rangefinder is shipped pre-assembled and wired!

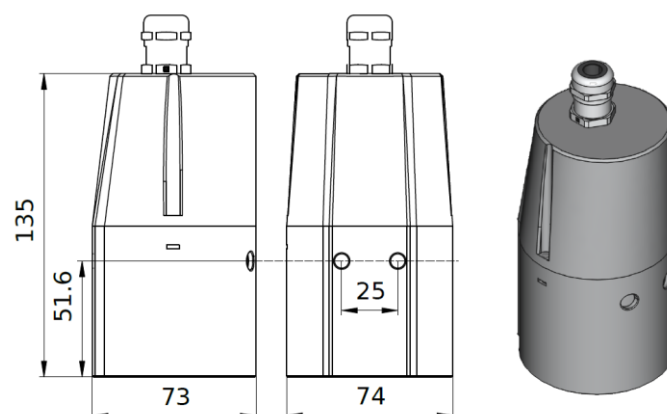


Figure 2. Rangefinder enclosure dimensions

Connecting the Rangefinder to an aluminum ROW

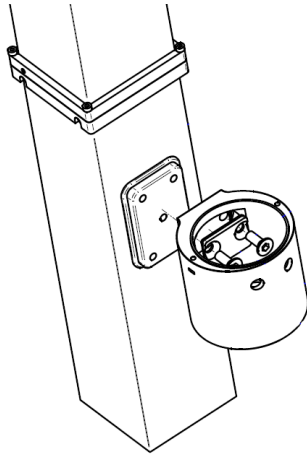


Figure 3. Connecting to the ROW (mechanics)



Figure 4. Connecting to the ROW using sunshield

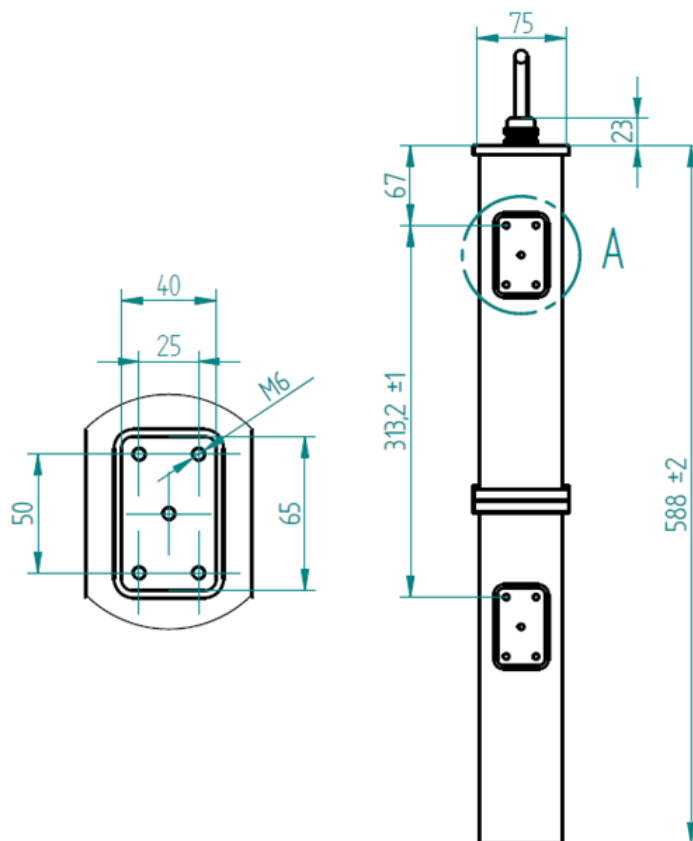


Figure 5. Mounting plate dimensions

Connecting the Rangefinder to a stainless-steel ROW

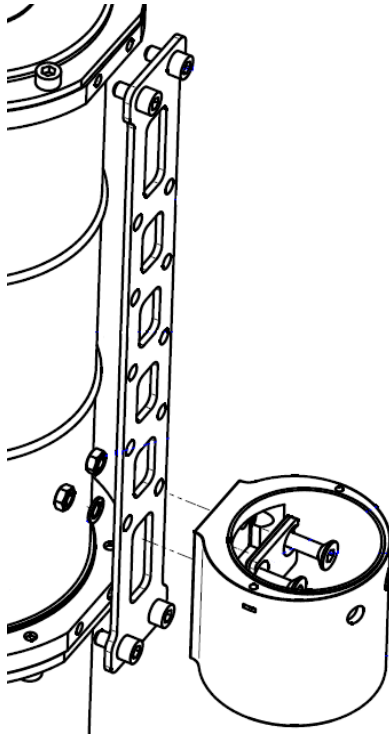


Figure 6. Connecting to the ROW (mechanics)



Figure 7. Connecting to the ROW using bracket

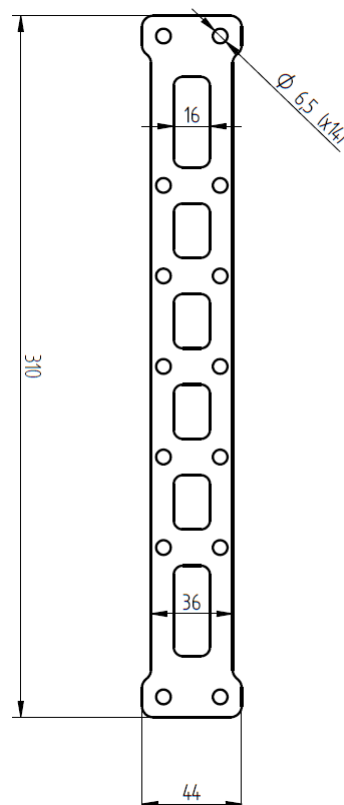


Figure 8. Mounting bracket dimensions