

Model
H-3611

SDI-12 Radar Water Level Sensor



Owner's Manual
Version 1.0



Chapter 1

Introduction

1.0 Introduction

The **WATERLOG**® H-3611 is a time-of-flight microwave radar level sensor. Typical applications include non-contact measurement of river, lake and reservoir water level. The sensor makes multiple distance measurements, averages the results and converts the measurement data into *Stage* in units of Feet, Meters or other engineering units.



Figure 3 Model H-3611i Radar sensor with internal SDI-12 interface

The H-3611 is easy to use and works with any data recorder/logger with a SDI-12 interface. The H-3611 is powered from the +12V wire of the 3-wire SDI-12 bus. The Serial-Digital Interface (SDI-12) is ideal for data logging applications with the following requirements:

- Battery powered operation with minimal current drain
- Measurement data is transmitted digitally over long cable lengths without error
- Multiple sensors on a simple three-wire cable
- Up to 250 feet of cable between a sensor and the data recorder (Use of a H-423, SDI-12 to RS485 or H-4500 fiberoptic media converter extends the range to 1000's of feet)

The H-3611 has the following features:

- Simple to install, use, and maintain
- Non-contact level measurement eliminates the need for stilling wells and other infrastructure.
- Undamaged by ice, logs or debris
- $\pm 3.0\text{mm}$ accuracy
- -40°C to $+80^{\circ}\text{C}$ operation
- NEMA 4x enclosure is suitable for outdoor installations
- Stainless steel horn
- Frequency range - approx 26 Ghz
- No FCC licence required
- Built-in LCD screen for monitor and setup
- Free *TofTool* (Time-of-Flight) Windows™ based graphic configuration and diagnostic tool. The graphic user interface aids documentation, maintenance and setup of the radar unit.
- Low current operation (8.0 mA typical standby)
- Continuous operation, no warmup or “lock on” needed
- Extended SDI-12 commands for setting the *Stage* to the current water elevation.

1.1 Description

The H-3611 Radar Level gauge consists of an integrated microwave *transmitter* and *sensor* together with a horn antenna. The horn antenna serves to focus the transmitted signal as well as to receive the reflected echo. A built-in SDI-12 interface provides low power operation, data processing and SDI-12 communications with the data logger.

1.2 Built-in LCD Display

The radar sensor has a built-in LCD display which normally displays *Distance* (distance from the radar unit to the water). The display has three buttons and can be used to monitor and edit the radar unit configuration. The LCD display has a short cord and can be detached from the radar housing for convenience.



1.3 Internal vs External SDI-12 Interface

The TofTool is a powerful Windows™ based graphic configuration and diagnostic tool which aids documentation, maintenance and setup of the radar unit. The H-3611i (*internal SDI-12*) radar sensor has a RS-232 cable and connector for communicating with the TofTool PC. For installations on a bridge or dam where it is inconvenient or dangerous to take a PC, the H-3611e (*external SDI-12*) sensor configuration has an external SDI-12 interface module which allows the installer to operate the TofTool in a protected location remote from the radar sensor.

1.4 H-3611i Internal SDI-12 Option

The H-3611i sensor is a stand-alone instrument and has a SDI-12 interface installed internally in the radar housing. The sensor is supplied with a liquid-tight fitting and two 6-foot cables. One cable is convenient for making connections to your data logger, the second cable used to connect to a laptop computer when using the TofTool configuration and diagnostic program.

1.5 H-3611e External SDI-12 Option

The H-3611e radar system includes two components, the radar unit and an external SDI-12 gateway. With this configuration the radar sensor has a HART field-bus interface with a 2-conductor cable routed from the radar unit to a nearby gauge station or other protected location. In the gauge station, the 2-wire cable is connected to the SDI-12 gateway which has a standard SDI-12 interface for making connections to your data logger. No extra power supplies are needed, the gateway internally generates the proper voltage for the sensor. The radar unit and the gateway communicate with the HART field-bus protocol. HART is an industry standard field-bus and communication protocol which employs a frequency modulated AC carrier superimposed on the 2-wire DC power loop. The SDI-12 gateway has a 9-pin RS-232 connector for making a connection to a laptop computer when using the TofTool configuration and diagnostic program.

1.6 FCC Approval

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.