



SDX Submersible Depth Transmitter User Manual

July 2017

USER INFORMATION

Stevens makes no warranty as to the information furnished in these instructions and the reader assumes all risk in the use thereof. No liability is assumed for damages resulting from the use of these instructions. We reserve the right to make changes to products and/or publications without prior notice.



WARNING!

ELECTRICAL POWER CAN RESULT IN DEATH, PERSONAL INJURY OR CAN CAUSE DAMAGE TO EQUIPMENT.

If the instrument is driven by an external power source, disconnect the instrument from that power source before attempting any repairs.

WARNING!

BATTERIES ARE DANGEROUS. IF HANDLED IMPROPERLY, THEY CAN RESULT IN DEATH, PERSONAL INJURY OR CAN CAUSE DAMAGE TO EQUIPMENT.

Batteries can be hazardous when misused, mishandled, or disposed of improperly. Batteries contain potential energy, even when partially discharged.

WARNING!

ELECTRICAL SHOCK CAN RESULT IN DEATH OR PERSONAL INJURY.

Use extreme caution when handling cables, connectors, or terminals; they may yield hazardous currents if inadvertently brought into contact with conductive materials, including water and the human body.

CAUTION!

Be aware of protective measures against environmentally caused electric current surges

In addition to the previous warnings and cautions, the following safety activities should be carefully observed.

Children, Adolescents

NEVER give batteries to young people who may not be aware of the hazards associated with batteries and their improper use or disposal.

Jewelry, Watches, Metal Tags

To avoid severe burns, NEVER wear rings, necklaces, metal watch bands, bracelets, or metal identification tags near exposed battery terminals.

Heat, Fire

NEVER dispose of batteries in fire or locate them in excessively heated spaces. Observe the temperature limit listed in the instrument specifications.

Charging

NEVER charge "dry" cells or lithium batteries that are not designed to be charged.

NEVER charge rechargeable batteries at currents higher than recommended ratings.

NEVER recharge a frozen battery. Thaw it completely at room temperature before connecting charger.

Unvented Container

NEVER store or charge batteries in a gas-tight container. Doing so may lead to pressure buildup and explosive concentrations of hydrogen.

Short circuits

NEVER short circuit batteries. High current flow may cause internal battery heating and/or explosion.

Damaged Batteries

Personal injury may result from contact with hazardous materials from a damaged or open battery. NEVER attempt to open a battery enclosure. Wear appropriate protective clothing, and handle damaged batteries carefully.

Disposal

ALWAYS dispose of batteries in a responsible manner. Observe all applicable federal, state, and local regulations for disposal of the specific type of battery involved.

NOTICE

Stevens makes no claims as to the immunity of its equipment against lightning strikes, either direct or nearby.

The following statement is required by the Federal Communications Commission:

WARNING - This equipment generates, uses, and can radiate radio frequency energy, and, if not installed in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.



Stevens SDX
Figure 1

1.1 GENERAL DESCRIPTION

The Stevens SDX (Figure 1) is a sensing device designed for water-level measurement applications. It is totally sealed for direct insertion into the media to be monitored, and offers multiple applications. Low range units are ideal for open channel flow applications. Higher range units are suitable for ground water, storage tank, or other similar applications. The SDX can also be frozen in ice without damage to sensor.

1.2 SAFETY INFORMATION

Before performing any procedure in this manual, read all applicable warnings and cautions.

1.3 PRINCIPLES OF OPERATION

A pressure transducer is used as the primary sensing element, and measures the water depth by sensing pressure above the unit. Internal circuitry within the SDX housing converts the signal to a 4-20 milliampere (mA) output, with 4 mA corresponding to zero depth (atmospheric pressure) and 20 mA to rated depth for selected range. Power for the two-wire current loop is derived from an external power supply.

The unit is equalized for atmospheric pressure changes, and is insensitive to cable parameters. The unit offers low electrical noise pickup.

1.4 SDX SPECIFICATIONS

Power Requirements

9 - 26 VDC

Output

4-20 mA current signal, linearly corresponding to range

Operating Temperature

-40° F to 185° F (-40° C to 85° C)

Compensated Temperature

32° F to 122° F (0° C to 50° C)

Linearity

0-2.5 ft range: 0.2% max.

0-10 ft range: 0.2% max

0-35 ft range: 0.3% max

0-50 ft range: 0.3% max

(0.1% typical for all ranges)

Repeatability & Hysteresis

Typical: $\pm 0.2\%$ span

Overpressure

0-2.5 ft: 20 psi max.

0-10 ft: 20 psi max

0-35 ft: 45 psi max

0-50 ft: 45 psi max

Reverse polarity protection

Built into sensor

Shock

Qualification tested to 150 g

Wiring

Red: power

Black: 4-20 mA return

Silver: drain wire

Pipe threading

1/2-14 straight pipe thread (back of sensor housing near cable)
3/8-18 straight pipe thread (under removable copper nose-cone)

Physical Size (L x D)

4.00" L x 0.84" dia. (101.6 mm L x 21.33 mm dia.)

Weight (approximate)

Probe: 2.37 oz (61.19 g)
Cable: 0.43 oz (12.19 g) per foot (.4 g per cm)
(weights are approximate)

2.1 GENERAL

The Stevens SDX is a sealed unit that is suitable for submersion in water. The SDX is an isolated (floating) electrical device. Connect the SDX, an appropriate direct current loop power supply, and the receiving device (recorder, etc.) in a series loop. The system should be grounded at one point only, usually near the receiving device.

2.2 INSTALLING THE SDX

CAUTION! The SDX is a sensitive instrument. It should not be dropped or allowed to strike against a hard surface. Avoid overpressure for specified range (see specifications). **DO NOT** apply excessive twisting force to the cable.

The SDX can be installed with several different mountings.

Perform the following procedures to install the SDX:

1. Carefully inspect the instrument for shipping damage. Remove all packing materials from the SDX.
2. Select appropriate mounting.

2.2.1 Installation in Specially Designed Flumes

To install the SDX in specially designed flumes, the SDX can be mounted in the bottom in a special cavity. Align the SDX and clip into place.

2.2.2 Installation in Standard Flumes, Monitoring Wells, or Chambers

On standard flumes or other monitoring wells or chambers, the SDX can be bracket-mounted on the inside of the flume, bulkhead mounted, pipe mounted, suspended, or T-mounted.

1. For bracket mounting, clip the SDX into place.
2. For pipe mounting, route the cable through the pipe, then mount the entire assembly. Do not twist the cable.

2.2.3 Installing Downhole

Sometimes it may be desirable to install an SDX downhole in a stilling well or groundwater monitoring well. Normally, the SDX can be supported simply by its attached cable.

3.1 GENERAL INFORMATION

The Stevens SDX was designed and assembled to assure low maintenance and long life. The SDX contains no user-serviceable parts. If the SDX fails to operate correctly, it must be returned to Stevens for factory repair or replacement.

3.2 PERIODIC MAINTENANCE



Optional Desiccant Cartridge

Figure 3

The pressure transducer used is a “Wet-Wet” device. While it is important to keep the SDX cable’s vent tube unobstructed for barometric pressure compensation, this feature results in neither the pressure transducer nor internal electronics becoming damaged by condensation or moisture entering the SDX cable’s vent tube. However, it is possible for vapor to condense into water which could create an offset in the transducer output. Therefore, Stevens recommends the desiccant cartridge with vent tube adapter be installed to prevent moisture from entering the vent tube.

Replace the desiccant cartridge when the indicating crystals have turned from blue to pink.

If used with a flume, weir, or stilling well, it should be kept clear of obstructions, debris, or silt. When cleaning, the SDX should be removed prior to hosing out the channel, tank, or well.

CAUTION: The SDX contains a pressure-sensitive sensor. NEVER direct a high-pressure fluid stream at the SDX; damage may occur. If there is an accumulation of silt or other contamination, the SDX will need to be cleaned. Swish the SDX gently from side to side in warm, not hot, soapy water.

3.3 FACTORY SERVICE

When contacting the factory about an instrument, include all nameplate data.

3.4 Ordering

Manufacturer Part #	Description
93720-102	SDX Pressure sensor, 9-26VDC,Temp.Compensated, 2.5 ft. range, without cable.
93720-105	SDX Pressure sensor, 9-26VDC,Temp.Compensated, 5 ft. range, without cable.
93720-110	SDX Pressure sensor, 9-26VDC,Temp.Compensated, 10 ft. range, without cable.
93720-135	SDX Pressure Sensor, 9-26VDC,Temp.Compensated, 35 ft. range, without cable.
93720-150	SDX Pressure Sensor, 9-26VDC,Temp.Compensated, 50 ft. range, without cable.
44049	Cable, Vented, for SDX sensor, Price per foot.
93030-001	Desiccant Cartridge, for SDX, 20 cm (7.8 in) length
93030-001	Desiccant Cartridge, for SDX, 10 cm (3.9 in) length