

**Submersible
Depth
Transmitter**
INSTRUCTION 45670
AUGUST 1999

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Safety and Equipment Protection

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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.

Safety and Equipment Protection

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.

Safety and Equipment Protection

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.

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.

1 Introduction

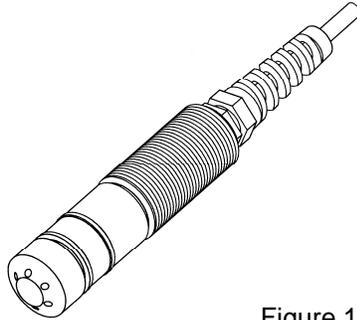


Figure 1. SDT-II

1.1 GENERAL DESCRIPTION

The Stevens Submersible Depth Transmitter II (SDT-II, 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.

1.2 SAFETY INFORMATION

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

1.3 PRINCIPLES OF OPERATION

A stainless steel pressure transducer is used as the primary sensing element, and measures the water depth by sensing pressure above the unit. Internal circuitry within the PVC 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.

1 Introduction

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

Ranges (feet of water at sea level) are shown in Table 1.

1.4 SDT-II SPECIFICATIONS

Power:	12-35 VDC (see Figure 2).
Output:	4-20 mA current signal, linearly corresponding to range (see Table 1).
Operating	33 to 122° F. + 1 to 50° C, calibrated for fresh water at 72° F (22° C).

NOTE: SDT-II SHOULD NOT BE SUBJECTED TO FREEZING WATER CONDITIONS.

Media:	Water, contaminated with any media compatible with 316 stainless steel, PVC, nylon, and polyurethane.
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Accuracy:	<u>Linearity:</u> 1 % of full scale or better Zero: 4.0 ± 0.2 mA at 22° C Span: 20.0 ± 0.5 mA at 22° C <u>Thermal zero drift typical:</u> 0.1 % of span per degree C
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Voltage of external loop supply	See Figure 2 for voltage required as a function of total loop resistance to maintain range of 12-35 VDC at transmitter.
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1 Introduction

Model	Range (feet of water)	Max overpressure (feet of water)
SDT-II 2.5	0 to 2.5	5
SDT-II 5.0	0 to 5.0	10
SDT-II 10.0	0 to 10.0	20
SDT-II 25.0	0 to 25.0	50
SDT-II 35.0	0 to 35.0	70
SDT-II 50.0	0 to 50.0	100
SDT-II 60.0	0 to 60.0	120
SDT-II 75.0	0 to 75.0	150
SDT-II 100.0	0 to 100.0	150

Table 1. SDT-II Ranges and Maximum ratings

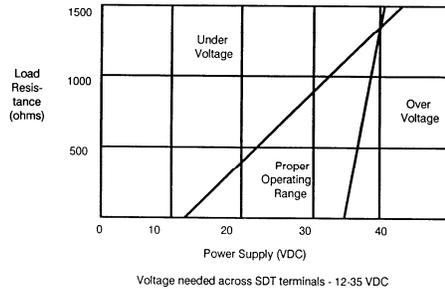
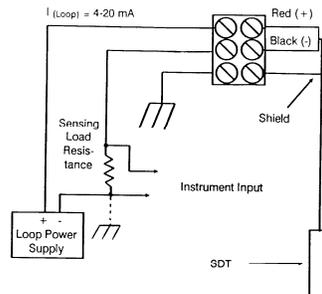


Figure 2. Power Supply Requirements

2 Installation

2.1 GENERAL

The Stevens Submersible Depth Transmitter II (SDT-II) is housed in a sealed PVC unit that is suitable for submersion in water.

2.2 INSTALLING THE SDT-II

CAUTION! The SDT-II is a sensitive instrument. It should not be dropped or allowed to strike against a hard surface. Avoid overpressure for specified range (see Table 1). DO NOT apply excessive twisting force to the cable.

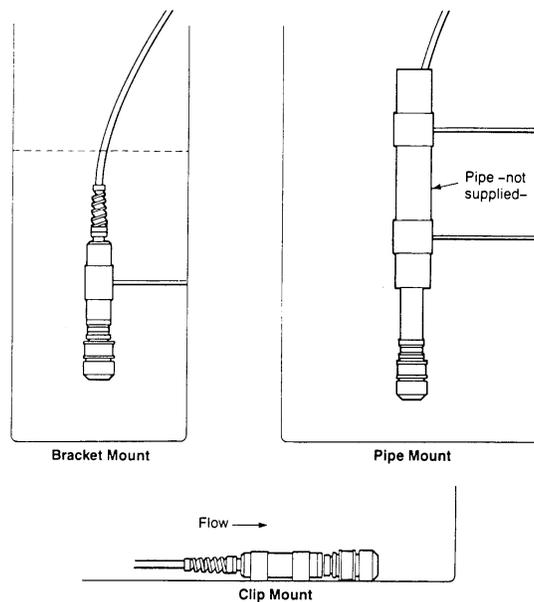


Figure 3. Typical Mountings

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The SDT-II can be installed with several different mountings. Some typical mountings are shown in Figure 3:

Perform the following procedures to install the SDT-II:

1. Carefully inspect the instrument for shipping damage. Remove all packing materials from the SDT-II.
2. Refer to Figure 3. Select appropriate mounting.

2.2.1 Installation in Specially Designed Flumes

To install the SDT-II in specially designed flumes, the SDT-II can be mounted in the bottom in a special cavity. Align the SDT-II 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 SDT-II can be bracket-mounted on the inside of the flume, bulkhead mounted, pipe mounted, suspended, or T-mounted.

1. For bracket mounting, clip the SDT-II into place as shown in Figure 3.
2. For pipe mounting, standard pipe threads are provided on the end of the SDT-II. Route the cable through the pipe, and thread the pipe on to the SDT-II. Then mount the entire assembly. Do not twist the cable.

2.2.3 Installing Downhole

Sometimes it may be desirable to install an SDT-II downhole in a stilling well or groundwater monitoring well. For these applications it is often convenient to add a threaded piece of galvanized or other

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pipe on to the end of the SDT-II to provide additional weight to pull the SDT into the water. Normally, the SDT can be supported simply by its attached cable.

2.2.4 Installing a Tank Mounting Kit

A tank mounting kit is available for connecting to a weir, water tank, or line, using locally available schedule 40 or 80 plastic fittings (see Figure 5). An adapter is included, featuring 3/4-14 straight pipe threads. It is recommended that a union (see Figure 5) be connected to the adapter so that a watertight connection can be made without rotating the SDT-II; this helps avoid twisting or kinking the SDT-II cable.

To install the tank mounting kit, perform the following procedures:

1. Remove the screw-on protective cover from the SDT-II. Avoid damaging the metal face of the sensor.
2. Install the supplied O-ring over the nose of the SDT-II. Screw the adapter ring on firmly to retain the O-ring and seal against the shoulder of the SDT-II body.
3. Install the purchased union on the adapter, using an appropriate plastic pipe thread sealant.
4. Connect the other side of the union to the tank adapter (or a wide variety of available fitting) using plastic pipe thread sealant.

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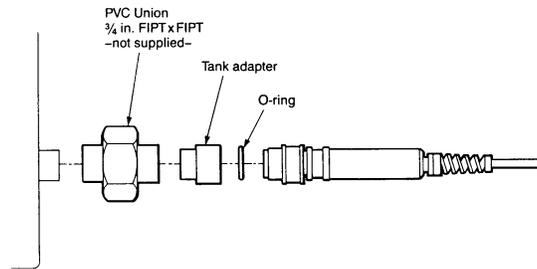


Figure 5. Tank Mounting Kit

2.3 Installing the Wire Termination Enclosure

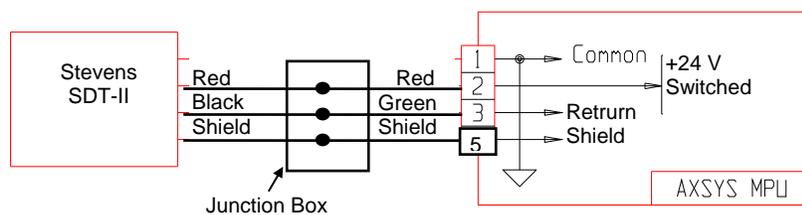
A wire termination enclosure is attached to the free end of the SDT-II cable (see Figure 6). It protects the cable breather tube and vents it to atmospheric pressure through a small hole in the enclosure.

To install the wire termination enclosure, perform the following procedures:

1. Connect the cable from the associated instrument and loop power supply as shown in Figure 2. Use appropriate instrument cable, diameter range 0.090 to 0.265 inch; suitable two-conductor shielded cables are Belden 9462, Alpha 2401, or equivalent.
2. Being careful to avoid damage to the conductor insulation, strip back and remove four inches of the user cable outer insulation.
3. Strip each conductor insulation 1/4-inch. Twist the conductors,

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4. Insert the cable through the smaller strain relief bushing, and connect to the terminal strip (see Figure 6), user current loop (+) to red, negative (-) to black, and shield to shield of the SDT II cable.
5. Tighten the terminal strip screws firmly to retain the conductors.
6. Tighten the user cable clamping nut firmly on the liquid-tight bushing.
7. Remove the plastic envelope from the desiccant, and place in the bottom of the enclosure; immediately replace the enclosure lid.
8. The SDT-II is an isolated (floating) electrical device. Connect the SDT-II, 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.
9. Refer to Table 1 for proper operating ranges. When used with the Stevens AxSys MPU, refer to the diagram below, and Technical Instruction 90769.



3 Maintenance

3.1 GENERAL INFORMATION

The Stevens Submersible Depth Transmitter II (SDT-II) was designed and assembled to assure low maintenance and long life. With the exception of cleaning out under the protective cap to the unit's stilling chamber, the SDT-II contains no user-serviceable parts. If the SDT-II fails to operate correctly, it must be returned to Stevens for factory repair.

3.2 PERIODIC MAINTENANCE

Replace (or dry out) the desiccant cartridge when the indicating desiccant has turned from blue to pink..

The cartridge may be cleaned by wiping with a damp or soapy rag (NO SOLVENTS!). The breather hole must be open to atmospheric pressure at all times; do not allow contaminants to clog the hole.

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

CAUTION! The SDT-II contains a pressure-sensitive sensor. NEVER direct a high-pressure fluid stream at the SDT-II; damage may occur.

If there is an accumulation of silt or other contamination, the SDT-II will need to be cleaned. Remove the screw-on cover and carefully clean the unit. Swish the SDT-II gently from side to side in warm, not hot, soapy water.

CAUTION! DO NOT pump the SDT-II up and down when cleaning or sensor damage may occur.

Rinse in clear water, then replace the cap and re-install the unit.

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3.3 FACTORY SERVICE

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

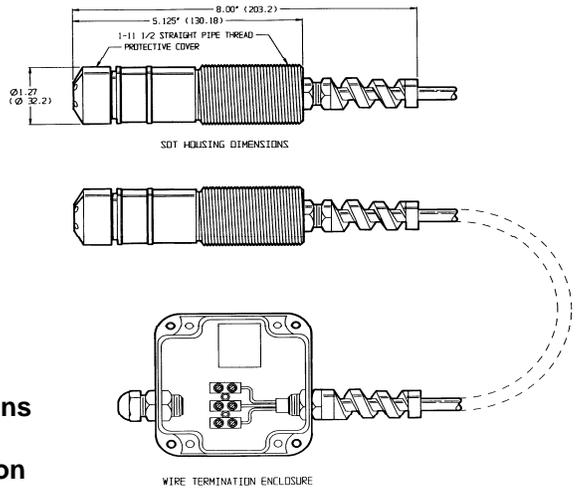


Figure 6.
Dimensions
and wire
termination
enclosure



**Newer SDT-IIs will have a desiccant cartridge
In place of the wire termination enclosure.**