

STARLOG

Capacitive Water Depth Probe

Model 6521

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1. INTRODUCTION

The Capacitive Water Depth Probes (model 6521) are designed for high resolution measurement of small water depths using the dielectric characteristics of water. The probes are factory calibrated to standard ranges.

The Capacitive Water Depth Probes can be cleaned easily in the field and have been designed to measure water depths in most environmental conditions. They are not affected by algae or sewage but consideration should be given to the use of capacitive water depth probes in situations where the dielectric constant of water may have been lowered significantly. Salt water and highly ionic water raise the dielectric constant only slightly and do not affect the accuracy of the water depth probe. These probes are not designed for measuring the depths of non-ionic liquids such as hydrocarbons (for instance, petroleum).

The probes available from UNIDATA are:

- Model 6521J – 0 to 0.5 metre
- Model 6521K – 0 to 1.0 metre
- Model 6521L – 0 to 2.0 metres



Model 6521L Capacitive Depth Probe

2. USING THE PROBE IN A STARLOG SCHEME

UNIDATA's Capacitive Water Depth Probes are designed for automatic monitoring and collection of water depth in a STARLOG Data Logging System. When the probes are connected to a STARLOG Data Logger, data sensed by the probes is logged and stored according to a program you define using STARLOG Software.

STARLOG Software runs on a computer compatible with IBM systems (PC/XT/AT, PS/2). This package includes a menu-driven program so that you can easily generate a data logging program – called a Scheme – then load the Scheme into a Data Logger. To discover how to use this program see the STARLOG Users Manual (supplement 6203 or 6245).

This section provides you with information you will find helpful in creating and executing a Water Depth Monitoring Scheme using the current version of STARLOG Software, Version 3.

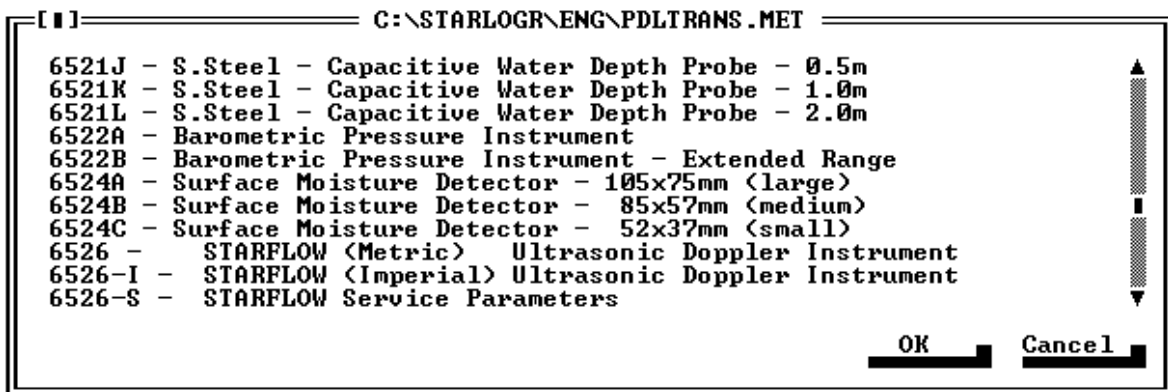
2.1. Choosing a Logger

Any of the STARLOG range of Data Loggers can be used with this instrument to record water depth and temperature. Each Logger offers Analog channels with sufficient resolution to record data sent by the instrument. In fact, an 8-bit channel is sufficient for most water depth & temperature monitoring projects.

When connecting the instrument to a STARLOGGER (Model 6004) or MACRO Data Logger (Model 7000) you will want to program the Logger for *PDL compatibility mode* which will configure Analog channels for 8-bit resolution. This is automatic via Version 3 Software. When using Version 2 Software, consult the Users Manual 6203.

2.2. Notes About a Water Depth Monitoring Scheme

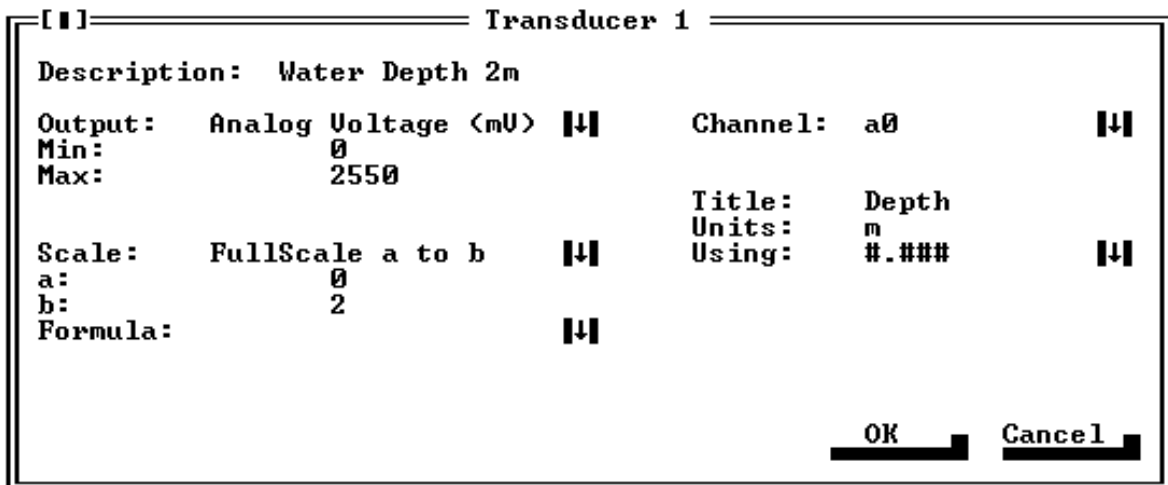
This section describes the probe's attributes and suggests how you might want to use data gathered.



2.2.1. Adding an Instrument

To create a Water Depth Monitoring Scheme, select a Probe from the Instrument List to add it to the Scheme.

If the model you have does not appear in this list, you will want to add it. (Use the **Instrument Editor** in Version 3 or **Maintain Instruments** in Version 2.)



Once you add the instrument to the Scheme, check to see which channel is allocated, scaling factors, format of data shown in reports, etc. The default settings are:

Whether you create a new instrument for this list or edit one of the existing instruments, you will want to ensure that the transducer has the appropriate attributes. You can check this when you add the instrument to a Scheme. An instrument's input channel can be changed at this time.

2.2.2. What to Log

For the Capacitive Water Depth Probe, you are most likely to want to log raw, minimum or maximum data or an average over the log interval or an average over a sub interval.

You could also trigger logging by an event, for instance, you could log the average depth over a 30 minute interval every time water rises above 1 metre.

3. INSTALLATION

3.1. Cabling

The recommended cable is three core low voltage data cable. See the section below for connection details.

The cable length, from the instrument to a STARLOG Data Logger, should be kept to a minimum to avoid electrical noise and signal fading. A maximum of 30 metres is recommended.

3.2. Connections

The Capacitive Water Depth Probes are connected to analog channels of the STARLOG data loggers. Connection details for the default channel, Analog 0, are as follows:

Wire Colour	Function	STARLOGGER & PDL		MACRO Data Logger	
		Pin	Term	Pin	Term
Red	5V output power from logger	13	17	18	49
White	analogue input channel (a0) or (A0) of Macro	1	39	20	39
Black	logger common (ground)	23	41	1	40

In the table above, *Pin* refers to the pins of the INPUT SIGNALS connector on a Data Logger, while *Term* is an abbreviation for numbered screw terminals on a Field Termination Strip. Information in the *Term* columns appears in bold type as this is the connection method you are most likely to use. Refer to the Supplement included with your Logger or Field Termination Strip for more information about these connections.

Note: This table also shows connection details for h0 hi-res 0 of the Macro Data Logger (i.e., the same as A0).

4. CLEANING

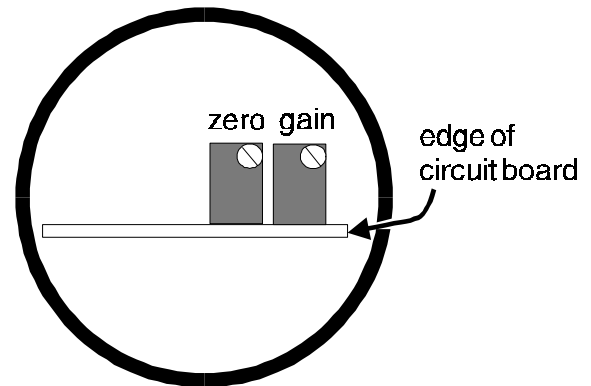
The inner conductor should be kept clean to ensure optimum performance and it is recommended that it be cleaned every three months when used under normal conditions. More frequent cleaning is required under less ideal conditions.

4.1. STAINLESS STEEL PROBES

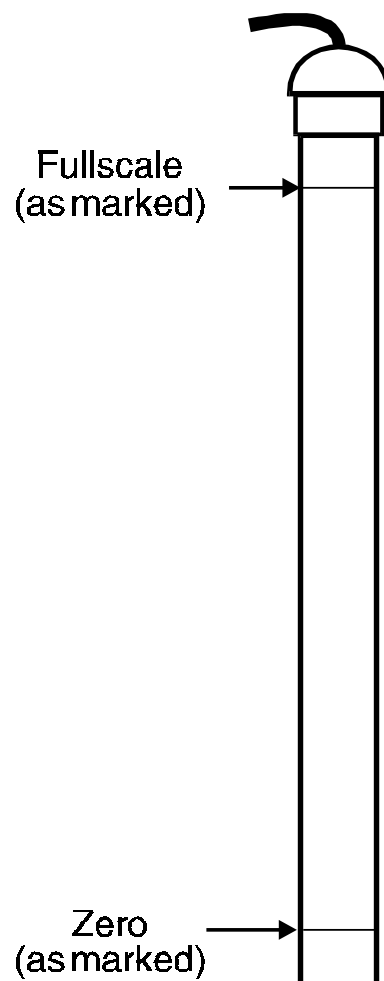
A quick method of cleaning is to fill the tube with methylated spirit and shake the probe to loosen any sedimentary build-up. If the build-up is not great, water may be as effective.

A more thorough cleaning may be achieved by the removal of the probe's inner conductor. It can be removed with the following steps:

1. The teflon wire which is lightly tensioned is attached to a spacer at the bottom of the sensor tube. To free the wire carefully pull, slide the metal ring off the spacer.
2. Remove the set of screws just below the plastic housing. The housing can now be twisted and removed.
3. The teflon wire can now be cleaned using soaps and gentle rubbing. The inside of the stainless steel tube should also be inspected for refuse and cleaned if required.
4. To replace reverse the procedure taking care not to scrape the



Top View



Range Markings of Probes

teflon wire along the sharp edge of the stainless steel tube.
The metal ring located at the bottom of the wire slips back into
the bottom spacer.

5. The calibration should not be affected by this operation providing care is taken and the top cover is not removed.

5. CALIBRATION

The instrument has been factory calibrated. The two concentric grooves on the stainless steel tube represent the effective calibrated length of the sensor. The lower mark represents a water depth of 0m and the upper 0.5m, 1.0m or 2.0m.

This instrument can be field calibrated. Zero and fullscale are located on the probes as shown below.

You can adjust the offset and the gain of this instrument via two trimmers (trimming potentiometers) inside the housing.

1. To access the trimmers, unscrew the plastic top cap.

The Gain and Offset trimmers are visible inside the tube.

2. Adjust the offset to read 0 when probe is submerged to the Zero mark of the probe.
3. Adjust the Gain to read fullscale when probe is submerged to the fullscale mark.
4. Repeat at least once to confirm the readings.
5. Reassemble the probe when calibration is complete by reversing this procedure.

6. SPECIFICATIONS

Range:	0 to 0.5 metre	model 6521J
	0 to 1.0 metre	model 6521K
	0 to 2.0 metres	model 6521L
Power Consumption:	5V DC, 3.5 mA (3.5% of battery life)	
Output Signal:	0 to 2.55 V DC full scale	
Accuracy:	0.5% of full scale reading	
Linearity:	0.1% of full scale reading	
Resolution:	continuous	
Diameter:	40 mm main body	
	65 mm at widest point	

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