

Submarine and buried cable test equipment

tinsley
PRECISION INSTRUMENTS

Supporting your surveying,
locating and fault finding requirements





Tinsley Precision Instruments is a leading provider of equipment for survey, location and fault finding of submarine and buried cables supporting the increasing demand for efficient subsea cable maintenance. We provide the tools to locate and identify damage to fibre optic, telephone and power cable systems to ensure that repairs can be performed in a timely manner, maximising the return on your cable system investment.

We offer complete end to end solutions, including equipment for use on board ships for the detection of submarine cables buried or laid on the sea bed and also identifying different faults such as fibre faults, shunt faults and complete breaks. Our portfolio also includes submarine cable survey and tracking systems, devices that aid locating and identifying telephone cables, cable survey systems designed for use by divers working in areas where it may not be practical to use an R.O.V. and several portable devices including those used onshore to identify cables on the beach.

Supporting are extensive range of submarine cable testing equipment, Tinsley provides calibration, service and repair services together with technical support and advice from our in-house experts.

Tinsley – keeping the world connected.

Our product range

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Portable Short-Haul Submarine Cable Test Set Model 5903

The Tinsley 5903 Long Haul Submarine Cable Test Set brings the latest technology to the tried and tested DC methods of cable fault location for both repeatered and un-repeatered systems.



The more common test procedures which are associated with the location of types of cable fault such as 'open circuits' and 'shunt faults' are preprogrammed into the instrument. This allows the procedure to be carried out automatically therefore eliminating operator errors and reducing the uncertainty of the predicted fault position.

The instrument may be set for a wide range of voltage and current limits making it suitable for use with most submarine communication cable systems.

Safety being an important feature, the instrument gives a continuous indication of the state of charge of the cable under test and will automatically disallow current, voltage or polarity changes to be made until any voltage on the cable has fallen to a level which is safe for both the cable and the instrument. To ensure complete operator

safety a number of interlocks operate disconnecting all power before access is allowed to the high voltage areas.

The setting up of the instrument is via the menu driven touch screen display. This display is also used to indicate the progress of a test procedure during its implementation. The Ethernet interface is designed for high speed full duplex communication between modules.

All functions may also be controlled via a computer and data obtained may be stored for future analysis.

This interface may also be used to enable two 5903's to be connected to communicate with each other when carrying out double ended tests such as 'no loss of current.

SPECIFICATIONS

See the tables below for product specifications.

Ohmmeter – Conductor Resistance Measurement		
Resistance Range	Display Resolution	Accuracy*
1Ω to 9.9Ω	0.0001Ω	±2%
10Ω to 99.9Ω	0.001Ω	±1%
100Ω to 999.9Ω	0.01Ω	±0.5%
5000.01Ω to 10000Ω	0.1Ω	±0.05%
Current Control		
Polarity	Selectable positive '+' or negative '-'	
Level	May be set from 100μA to 1A with a resolution of 100μ	
Compliance	Selectable at any value between 10V to 6KV with a resolution of 0.1V. Preset limits 50V, 100V, 500V, 1000V and 5000	
Measurement Range	Display Resolution	Accuracy
20mA	0.001mA	±0.025%
200mA	0.01mA	±0.025%
2A	0.1mA	±0.025%
Voltage Control mode: Level may be set from 10V to 6000V with resolution of 0.1		
10V to 94.999V	0.001V	±0.02%
95V to 949.99V	0.01V	±0.02%
950V to 10KV	0.1V	±0.02%

* Accuracies indicated based on measurement of Standard Resistors and Capacitors

Please note: Because of the technical nature of Submarine Cable Testing Equipment and the use and support requirements across international boundaries, the equipment can only be purchased direct from the manufacturer: - Tinsley Precision Instruments in the UK and not through international agents.

For more information about this product contact Tinsley.

CAPACITANCE METER (CAP OR IC)

Direct reading capacitance measurements between 1μF and 1F. Incorporating automatic compensation for leakage and series resistance evenly distributed along cable length.

Range	Resolution	Accuracy*	Measurement Cycle
1μF	0.001μF	±5%	5mA / 1S / 5000V
10μF	0.01μF	±0.6%	5mA / 10S / 2300V
100μF	0.1μF	±0.3%	10mA / 10S / 2500V
1mF	1μF	±0.3%	20mA / 100S / 2500V
10mF	10μF	±0.3%	50mA / 500S / 2500V
100mF	100μF	±0.3%	100mA / 1000S / 2500V
1F	100μF	±0.3%	100mA / 5000S / 5000V

MEGOHMMETER - INSULATION RESISTANCE MEASUREMENT

Polarity selectable positive '+' or negative '-'

Range	Applicable Voltage	Resolution	Accuracy
105Ω	100V to 1000V	100Ω	±0.1%
106Ω	250V to 2500V	1KΩ	±1%
107Ω	300V to 2500V	10KΩ	±1%
108Ω	500V to 2500V	100KΩ	±2%
109Ω	1000V to 2500V	1MΩ	±2%
100mF	100μF	±0.3%	100mA / 1000S / 2500V
1F	100μF	±0.3%	100mA / 5000S / 5000V

Short Haul Submarine Cable Test Set

Model 5910/Model 5910R



The Tinsley 5910 and 5910R (rack mount version) Short Haul Submarine Cable Test Set brings the latest technology to the tried and tested DC methods of cable fault location.

The Tinsley 5910 is a portable Short Haul Submarine Cable Test Set that brings the latest technology to the tried and tested DC methods of cable fault location. The Tinsley 5910R is a rack mount version of the 5910 portable Short Haul Submarine Cable Test Set.

Common test procedures which are associated with the location of cable fault such as 'open circuits' and 'shunt faults' are pre-programmed into the instrument. This allows the procedure to be carried out automatically therefore eliminating operator errors and reducing the uncertainty of fault position prediction.

The instrument may be set for a range of voltages and currents making it suitable for use with most un-repeated submarine communication cable systems.

The RS232 interface is designed for full duplex communication with the instrument. All functions may be controlled via a computer and obtained data may be stored for future analysis. This interface may also be used to enable two 5910's to communicate with each other via a computer when carrying out double ended tests such as 'no loss of current'.

A basic electroding generator function is included which can assist the cable repair vessel in locating the cable on the sea bed prior to retrieval and repair.



SPECIFICATIONS

See the tables below for product specifications.

Ohmmeter – Conductor Resistance Measurement		
Resistance Range	Display Resolution	Accuracy (within compliance of 1V to 140V)
0.2Ω to 100.00Ω	0.01Ω	±0.2 Ω
100.00Ω to 1000.00Ω	0.1Ω	±0.2W up to 200Ω ±0.1% above 200Ω
10kΩ to 10kΩ	1Ω	±0.1% at 1kΩ reducing to ±0.2% at 10kΩ
10kΩ to 100kΩ	10Ω	±0.2% at 10kΩ reducing to ±2% at 100kΩ
Current Control		
Range	Resolution	Accuracy
0.5 to 10.0mA	0.1mA	±2μA
10.1mA to 100mA	0.1mA	±20μA
Polarity	Positive '+' or negative '-' selectable by thumbwheel switch	

ELECTRODING GENERATOR (GEN):

Output polarity either positive to LINE or negative to LINE

Control	Constant current - compliance 0.1 to 50V ±0.005μF 2 secs @ 1μF
Frequency	25Hz or 16.7Hz ±0.2% 2 secs @ 10μF
Output	50mA + 50mA sin wt ±0.2% 20 secs @ 100μF

CAPACITANCE METER (CAP OR IC)

Direct reading capacitance measurements between 1μF and 1F. Incorporating automatic compensation for leakage and series resistance evenly distributed along cable length.

Range	Resolution	Accuracy (using standard caps)	Measurement Cycle
0.05 to 2μF	0.001μF	±0.005μF	2 secs @ 1μF
2 to 20μF	0.001μF	±0.2%	2 secs @ 10μF
20 to 200μF	0.01μF	±0.2%	20 secs @ 100μF
200 to 2000μF	0.1μF	±0.2%	200 secs @ 1000μF

MEGOhmmeter - INSULATION RESISTANCE MEASUREMENT

Voltage settings +50V, 100V, 250V, 500V, or 1000V
Polarity selectable positive '+' or negative '-'

Range	Applicable Voltage	Accuracy
10 ⁵ Ω to 10 ⁹ Ω	50V, 100V	±1dB (105 to 108 Ω) using Standard Resistors
10 ⁶ Ω to 10 ¹⁰ Ω	250V	±1dB (106 to 109 Ω) using Standard Resistors
10 ⁷ Ω to 10 ¹¹ Ω	500V, 1000V	±1dB (107 to 1010 Ω) using Standard Resistors

Electroding Generator Model 5915

The Tinsley Electroding Generator, type 5915, has been developed with British Telecom to locate submarine telephone cables. The method employed is the well-established electroding technique.



The unit is self-contained, desktop mounting, enabling tests to be carried out without the power feed connected to the cable under test.

The 5915 Tinsley Electroding Generator is intended as an aid to cable repair ships in locating and identifying telephone cables. The Electroding Generator energises the submarine cable with a low frequency sine wave signal of up to 500mA at 500 Volts peak to peak.

The Electroding Generator is located in the terminal station normally nearest to the fault area and connected to the cable under test by means of two safety probes built in the instrument.

Principle of operation

The Electroding Generator is a low frequency oscillator with a sine wave output capable of delivering up to 500mA at 500 Volts peak to peak at any frequency from 5Hz to 99.9Hz. The frequency is selected by digital thumbwheel switches, and peak current is set via a front panel rotary control. The current and voltage levels are clearly displayed on Front Panel Precision Analogue Meters.

The current waveform is controlled to be sinusoidal. The test current has a DC bias to improve the sensitivity detection over longer distance. The test current can be applied in either the forward direction only or in the reverse or forward bias, as required. Longer cable can normally be electroded by energising in the reverse direction.

A crystal controlled oscillator ensures that the frequency does not drift while testing is in progress. Output connections are made by permanently connected probes, which are fully shrouded. A safety circuit disables the generator output whilst the probes are being applied to the cable under test.

A special compartment on the rear of the instrument is provided for stowing the output probes when not in use. A frequency monitor point (square wave at signal frequency) is provided on the rear on the instrument. Output level is TTL compatible.

SPECIFICATIONS

See the tables below for product specifications.

Output	Continuously adjustable current regulated DC – sine wave modulated
Current Range	Minimum 75mA modulated at ± 25 mA (50mA - 100mA pk-pk). Maximum 275mA modulated at ± 225 mA (50mA - 500mA pk-pk)
Current Control	Continuously adjustable by 10-turn potentiometer
Mains Switching	Key operated. The key is removable only in the off position
Voltage	500V peak max
Polarity	Output polarity is selected by means of a 3-position key switch (Positive, Off, Negative) The key is removable in any position
Monitoring	Both current and voltage are continuously monitored by individual front panel meters of accuracy 3% F.S.D.

Weight and dimensions	
Size	300H x 512D x 470W (mm) approx.
Weight	26.5kg approx.

Modulation Frequency	
Range	5Hz to 99.9Hz, selected in 0.1Hz steps.
Accuracy	± 0.01 Hz
Stability	0.03% Long term (12hr). 0.003% Short term (10min).
Output distortion	THD 5%
Controls	Adjustable by thumbwheel edge switches.

Power requirements

105V to 125V or 210V to 250V; 50Hz to 60Hz, (selected via rear panel). Power applied by operation of a key switch. Key is removable in the 'Off' position only. Mains input circuit is fused. Input is via I.E.C. socket.

Electroding Detector

Model 5916



The Tinsley 5916 Electroding Detector is the ideal equipment for use on board ship when the electroding method is being employed for the detection of submarine cables buried or laid on the sea bed.

This lightweight and portable instrument can be mains powered or can operate for several hours from its own internal, rechargeable battery pack. Ideally suited for use with the Tinsley Electroding Generators, the 5916 will also operate with any generator operating in the frequency range 4 to 40Hz.

The Electroding Detector is a high gain low frequency selective amplifier to detect the electric field from a submarine cable powered by the Tinsley 5915 Electroding Generator or similar.

The detector amplifies, filters, indicates and records signals of the selected frequency in the range 4Hz to 40Hz. At the highest gain setting a 1µV RMS input signal of the correct frequency will give a full scale reading on the analogue front panel meter and the optional chart recorder. The detector is completely self-contained in a splash-proof IP65 portable case. Rechargeable batteries are included in the case and also a mains power supply which will recharge them. External batteries may also be used. A clock/timer is incorporated on the front panel to help synchronise detected events.

To use the detector the signal input terminals are connected to the customer's receiving probes, the exact operating frequency is selected on the thumbwheel switches and the gain switch is adjusted to obtain a useful indication of the signal.

Principle of operation

The detector is used to locate submarine cables in water up to 180 metres (100 fathoms) in depth. A signal in the range of 4Hz to 40Hz is transmitted down the submarine cable by an Electroding Generator such as the Tinsley type 5915 unit. This signal is picked up by a set of trailed probes connected to the detector. The detector and receiving probes are normally aboard the repair ship. However, as they are portable, the detector may be operated from any locally available ship or launch. The received signal is processed and passed to the analogue front panel meter and, if fitted, chart recorder.

Normally, the Electroding Generator, Tinsley type 5915, is located in the submarine cable terminal nearest to the fault area. The Electroding Detector, Tinsley type 5916 is aboard the ship. When the ship is in the vicinity of the cable area, the 5915 Electroding Generator is powered, thus applying the low frequency signal to the cable under test. At these frequencies, the field of the signal extends into the water surrounding the cable for a considerable distance. The ship would normally steer a course to cross the cable on the landward side of the expected fault position. Before this position is reached, the ship launches the receiving probe(s) which will then connect to the detector.

The detector is set (by thumbwheel switch) to the frequency being transmitted by the electroding generator on shore. As the ship crosses the cable, the field of the signal current on the cable induces a voltage into the probe(s). This signal is then processed by the electroding detector and a deflection on the meter is registered. This may be recorded by the optional built-in chart recorder.



For identification purposes, the electroding generator may be keyed on and off periodically. Once the cable signal has been identified and confirmed, the ship then follows the cable on a zigzag course until the signal disappears. When this happens, the fault or break has been located. Use of NAVSAT on a marker buoy would mark the point where the signal was last detected. Further probe runs may be made for a more precise fix of the fault position.

SPECIFICATIONS

See the table below for product specifications.

Frequency	4Hz to 40Hz in increments of 0.1Hz thumbwheel selection. Built-in test oscillator
Detector Bandwidth	0.5Hz
Sensitivity	1µV RMS for full scale deflection
Input Impedance	Balanced low impedance inputs via 4mm terminals
Auxiliary Input	Socket for external probes
Power	Built-in rechargeable batteries having life of over 5 hours of continuous use
	External batteries, +12V and -12V
	Mains supply, single phase, 230V or 115V AC
Display	Analogue meter with battery and signal test
Event Timing	Front panel Digital Elapsed Timer and Clock
Recorder	Optional chart recorder
Event Marker	Event marker button is incorporated on the front panel for marking the recording chart and relay closure for external Event signal
Depth Range	Typically 180 metres (100 fathoms) but depths of up to 300 metres could be possible. However, this is limited by external factors:- Signal to noise ratio and attenuation of cable and the lateral distance at which the ship is operating away from the cable
Size	Portable self-contained splash-proof IP65 case 470 x 360 x 175mm
Weight	Approximately 15kg.

Beach Probe and Battery Powered Portable Electroding Detector Models 5917D/5918

The Electroding Probe and Detector system is a high gain low frequency selective Receiver/Amplifier to detect the electromagnetic field from a submarine cable energised by the Tinsley 5915 Electroding generator or similar.

The 5917 Beach Probe and 5917D Divers Probe are inductive probes suitable for receiving 15 to 30Hz signals emanating from a suitably energised submarine cable.

The 5918 detector amplifies, filters, and indicates the signal received at the selected frequency. At the highest gain setting a 10 μ V RMS input signal at the correct frequency will give a full scale reading on the analogue front panel meter.

The 5918 electroding detector is completely self-contained in a portable carry case with shoulder strap. Integral rechargeable batteries are included and a separate mains power module is supplied to recharge them.

In use the 5918 detector is connected to the receiving probe, either a Tinsley type 5917 Beach probe or 5917D Divers Probe. The exact operating frequency is selected on the thumbwheel switches and the gain switch is adjusted to obtain a useful indication of the signal.

A frequency of either 16.7Hz or 25Hz is recommended when using the 5917 Probes. An audible output signal is available which can be heard by using the plug-in headphones supplied.

The larger the signal received the higher the frequency heard. A volume control is provided for adjustment of loudness.

Principle of operation

- The 5917/5918 Probe and Detector System is used either on land, or on the beach. The 5917D Divers Probe can also be used in up to 50-metre water to locate submarine cables.

- A tone in the range of 16 Hz to 25 Hz is transmitted down the submarine cable by an Electroding Generator such as the Tinsley type 5915 unit. This signal is picked up by a Tinsley 5917 or 5917D Probe connected to the 5918 Detector.

The 5918 Detector and 5917 Beach Receiving Probe would normally be held by a person walking along the beach. However, as they are portable, the detector may be operated from any small boat or launch to search over shallow water.

The 5917D would normally be held by a diver and would be connected to the 5918 in a boat/ship via an umbilical cable. It is suitable for use in depths of up to 50 metres. The received signal is processed and passed to the analogue front panel meter and headphones audio output.



Normally, the Electroding Generator, Tinsley type 5915, is located in the submarine cable Terminal Station nearest to the search area. When the Electroding Detector System is in the vicinity of the cable, the 5915 Electroding Generator is powered, thus applying the low frequency signal to the cable under test. At these frequencies, the field of the signal extends into the land and water surrounding the cable for a considerable distance.

The person holding the 5917 Probe would normally walk/swim a course to cross the cable on the landward side of any expected cable fault position with the probe in its horizontal position at right angles to the cable.

The Detector is set (by thumbwheel switch) to the frequency being transmitted by the Electroding Generator. A frequency of either 16.7Hz or 25Hz is recommended. As the detector crosses the cable, the field from the signal current in the cable induces a voltage into the probe. This signal is then processed by the Electroding Detector and a deflection on the meter is registered. This may be heard by the operator as a high-pitch frequency from the headphones.

For identification purposes, the Electroding Generator may be keyed on and off periodically. Once the cable signal has been identified and confirmed, the person then follows the cable on a zigzag course to plot the position of the cable, or until the signal disappears. When this happens, a fault or break has been located.

Further tests may be made for a more precise fix of the cable position by using the probe in a vertical orientation. In this case a null is registered when the probe passes exactly above the cable.



SPECIFICATIONS

See the tables below for product specifications.

5917 Beach Probe Specifications	
Sensitivity	Suitable for detecting the electromagnetic field from a submarine cable carrying 20mA current at a distance of 10 metres from the cable
Frequency Range	Suitable for 15 to 30 Hz (16.7 or 25Hz recommended)
ON/OFF Switch	In handle to conserve battery power on 5918
Size	110cm long handle 40cm long probe
Weight	6kg

5917D Divers Probe Specifications	
5917D consists of	1 5932 Detector 1 5931C1/50m Underwater Cable 50 metre length 1 5917D-301 Tuning Box for 16.7/25Hz 1 5917D-302 Leads from tuning box to 5918
Sensitivity	Suitable for detecting the electromagnetic field from a submarine cable carrying 100mA current at a distance of 10 metres from the cable
Frequency Range	Suitable for 15 to 30 Hz (16.7 or 25Hz recommended)
ON/OFF Switch	Mounted on 5917D-301 Tuning Box Assembly
Size	5932 Probe 380 x 150 x 35mm 5931C/50m Cable - 50m length 5917D-301 - 145 x 120 x 90mm 5917D-302 curly cable 0.9m coiled 2.2m stretched
Weight	5932 2kgm in air 5931C/50m 7kg 5917D-301 0.55kg 5917D-302 0.20kg

5918 Detector Specifications	
Frequency	4Hz to 40Hz in increments of 0.1Hz thumbwheel selection. Built-in test oscillator. However, when using the 5917 Probe use either 16.7Hz or 25Hz
Detector Bandwidth	0.5Hz
Sensitivity - max	10uV RMS for full-scale deflection on range 7
Input	7 Way DIN Socket for external probe
Power	Built-in rechargeable batteries having life of over 5 hours of continuous use. 12V 1.2 AH Lead Acid
Charger	Mains powered, single phase, 90 to 260V AC 50/60Hz
Display	Analogue meter with battery and signal test
Range of location/depth	Typically 10 metres. However, using 5917 Probes this is limited by external factors:- e.g. Signal to noise ratio and attenuation along cable i.e. the distance at which the detector is operating away from the generator
Size	Portable self-contained unit in a carrying case 250 x 250 x 150mm
Weight	Approximately 5kg
Recorder	Optional chart recorder
Event Marker	Event marker button is incorporated on the front panel for marking the recording chart and relay closure for external Event signal
Depth Range	Typically 180 metres (100 fathoms) but depths of up to 300 metres could be possible. However, this is limited by external factors:- Signal to noise ratio and attenuation of cable and the lateral distance at which the ship is operating away from the cable
Size	Portable self-contained splash-proof IP65 case 470 x 360 x 175mm
Weight	Approximately 15kg

Cable Termination Unit

Model 5941

The Tinsley 5941 CTU is the ideal termination unit for non-repeated submarine cables. It offers a simple method of selecting an open or short circuit condition and a safe means of discharging the cable.



It offers a simple method of selecting an open or short circuit condition and a safe means of discharging the cable. The unit is designed to enable the Test Engineer to safely and simply connect other Tinsley test instruments to the system for fault location and electroding.

The Tinsley 5941 CTU also incorporates a Cable Condition Monitor. Any changes in the Submarine Cable electrical characteristics are automatically detected and an alarm is triggered. An output from the alarm is also available for connection to outside devices.

The unit can be connected to the cable via a dedicated cable connected to the fibre optic cable metallic conductor.

Alternatively, the fibre optic cable can be routed into the CTU with a direct path through the unit for the optical fibres. Options that can be set at the time of installation enable the unit to be used with a wide range of cable lengths and types.

SPECIFICATIONS

See the tables below for product specifications.

Input Supply Voltage	36V to 60V DC
Maximum Supply Current	1.5A
Open Circuit Output Voltage (Input 48V)	-100V
Output Voltage Stability (max. load & supply variation)	± 1V
Short Circuit Current - Normal Drive	213 ± 13 mA
Short Circuit Current - Hard Drive	297 ± 35 mA
Alarm Level Range	-333 mA to + 333 mA
Alarm Level Stability (with load, supply and temperature variation)	± 2.5%
Alarm Contacts Rating	100V 0.5A DC
Maximum Allowable Cable Power	600V Peak Voltage
4A Current	Optional chart recorder
Operating Temperature Range	0°C to 40°C

Surge Arrestor Rating	
Max. Surge Current	20kA
DC Spark Over Voltage	700V
Impulse Spark Over Voltage	1400V

Submarine Cable Survey & Tracking System

Model 5930 Mk II

The Tinsley Submarine Cable Survey System is designed for use by divers working in areas where it may not be practical to use an ROV.

With a low frequency electroding tone applied to the cable, the system can be used to locate cables buried beneath the sea bed and to establish their burial depth.

The system consists of a hand-held Sensing Unit (type 5931) that is designed to be easily manoeuvred whilst under water. An audio output to the diver allows the Sensing Unit to be positioned at a point with the highest signal level. This corresponds to a point directly over the cable being surveyed. Once the cable is precisely located the Sensing Unit is placed on the sea bed at that point and a measurement of burial depth made.

The Sensing Unit is connected to the shipboard Display Unit (Type 5930) via an umbilical cable. The Display Unit uses microprocessor technology to compute the data received from the sensor and to display the information as the burial depth of the cable.

Many special functions are incorporated within the Display Unit. It features a Spectrum Analyser that is used to identify any areas of the frequency range for the Survey System that exhibit a particularly high level of electromagnetic interference. The use of this frequency can then be avoided whilst cable surveying in that particular geographical location.

Digital filtering of the input signal is used to ensure that the instrument displays clear and unambiguous results.

Electronic tuning enables the system to precisely detect the frequency of the tone applied to the cable. The Single Sensor probe Model 5932 is used for fast location of cables. It does not give burial depth measurement.

Any standard Electroding Generator operating within the frequency range 16 to 100Hz may be used with the system. Typically the Tinsley Model 5915 or the electroding function of the Tinsley Model 5910 Submarine Cable Test Set could be used to energise the cable.

Features

- Accurate Cable Burial Depth Measurement
- Computer Interface with Touch Screen control
- Integral Test Function
- Surface and Divers Audio Output of Signal Strength
- Dedicated GPS Data Input
- Wide Frequency Range
- Spectrum Analyser Function
- Oscilloscope Function
- Rated to 50 metres water depth
- Two Probe Inputs

SPECIFICATIONS

See the tables below for product specifications.

Burial Depth Accuracy : Basic Accuracy ±5% of measurement		Burial Depth Range : 0.1 to 3 metres	
Temperature Range: In use: 0°C to 45°C / In storage: -10°C to 60°C		Temperature Coefficient: 0.5% / °C	
Dimension and Weight	Triple Sensor Unit	50cm x 40cm base x 50cm high / 7kg in air 5kg in water	
	Display Unit	56cm wide x 46cm depth x 24cm high / 14.5kg	
Description	Sea Cable 5931 C1/50m – C1/100m	Deck Cable 5931 C2/5m – C2/10m	Bone Conducting Earphone 5931E/2m
Length	50 metres or 100 metres	5 metres or 10 metres	2 metres
Diameter	10.5 mm	10.5 mm	5 mm
Colour	Yellow	Yellow	Black
Mechanical Strength	Up to 100kg peak	Up to 100kg peak	Up to 10kg peak
Connectors	Underwater mating moulded both ends	Underwater mating moulded one end. IP63 type fitted at the other	Moulded underwater mating
Display Unit 5930 – Special Features			
Computer Interface	RS232 – RS485 – USB		
GPS Data Input	Ship's GPS data can be input and recorded with burial depth measurements		
Data Recording	Burial depth information can be stored to a file for later downloading		
Test Oscillator	An integral Test Oscillator allows the system to be tested before immersion		
Display	Daylight readable TFT colour touch screen		
Diver Audio Mute	Audio signal to diver can be muted from the Display Unit in an emergency		
Ordering Information			
5930	Dual input Surface Display Unit	5931C2/5	5 metre Deck Cable
5931	Triple Sensor Frame for Cable Detection and Burial Depth Measurement	5931C2/10	10 metre Deck Cable
5931C1/50	50 metre Underwater Umbilical Cable	5931E/2	Bone Conductor Earphone with 2 metre Lead
5931C1/100	100 metre Underwater Umbilical Cable	5932	Single Sensor for Cable Detection

**Supporting your
surveying, locating
and fault finding
requirements**

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