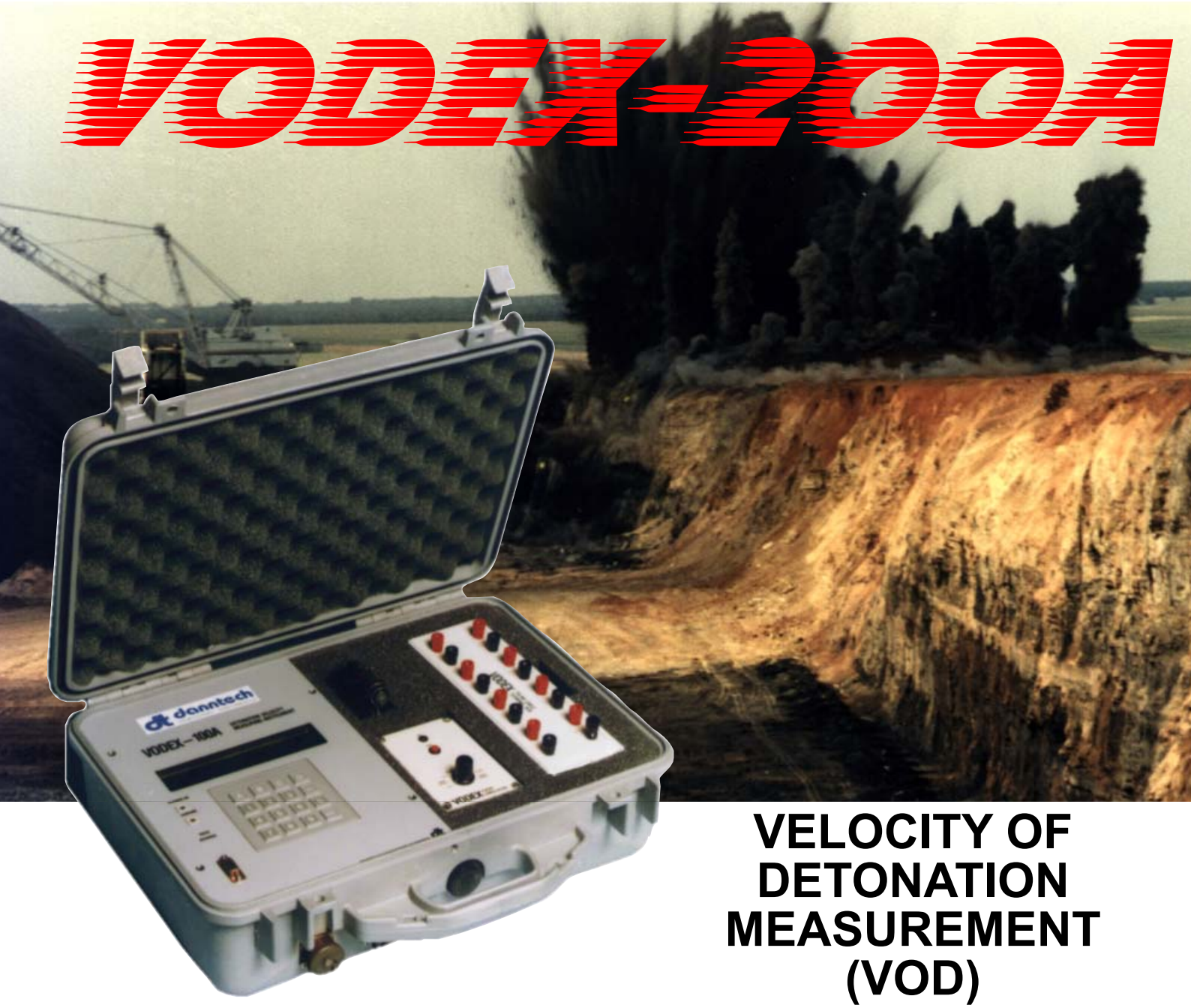
VODEX-200A



VELOCITY OF DETONATION MEASUREMENT (VOD)

Simplify explosive quality control testing in the field.

Measure VOD of confined or unconfined charges of any length or diameter; surface or underground.

Determine minimum primer size, gap sensitivities, performance of decks and the effects of contaminants in explosives.

Evaluate timing of multiple blasts.

Results available immediately after measurement.

Sixteen channels enable VOD measurements of single or multiple holes in a blast.

Does not require the use of expensive fibre optic cables.

Records test layout, setups, time and date for each test.

danntech
PROCESS INSTRUMENTATION

danntech cc
Reg. No. 1986/15338/23
Tel: + 27 (0)11 792-1239
Fax: + 27 (0)11 792-4687
P O Box 1023, Fontainebleau, 2032
Republic of South Africa
www.danntech.co.za
www.danntech.com

danntech ltd
Co. No. 6510211
Tel: +44 (0) 75 9069 1824
4 Bettys Lane, Norton Canes,
Cannock, Staffordshire, WS11 9NP,
United Kingdom
www.uk.danntech.com

The VODEX-200A is an intelligent sixteen channel high speed timer that records time intervals between changes in conductivity between each of the sixteen channels and converts these to Velocity of Detonation (VOD). It is a battery powered, robust, quality instrument that will give many years of reliable service with a minimum of care and maintenance.

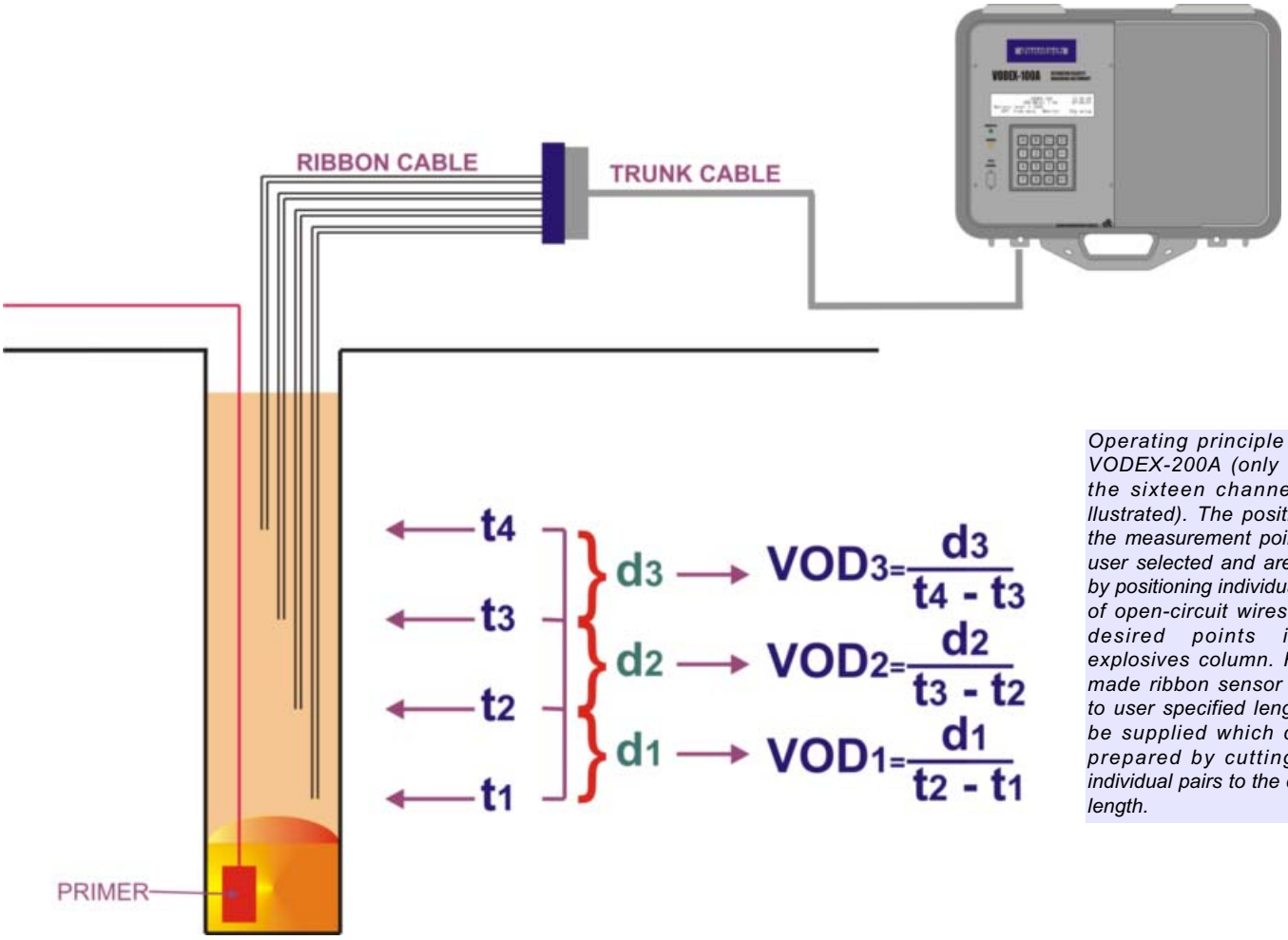
The Vodex-200A relies on the highly charged plasma generated within the explosion detonation front to sequentially increase the electrical conductivity at the ends of a series of wire pairs located at desired positions (sensor positions) in the charge. Normally ribbon cable is used as the sensor cable, with individual pairs cut back to the desired sensor positions. The VODEX-200A does not rely on small resistance changes in the probe and thus is not affected by electrical noise generated by the detonation front. Galvanic isolation between the sensing circuitry and the microprocessor ensures reliable operation.

Each of the VODEX-200A's sixteen timers can be triggered by either a short circuit or an open circuit. It can, therefore, also be used as a general purpose timer to accurately record other types of dynamic phenomena, for example ballistics.

The VODEX-200A consists of specialized electronic circuitry housed in a rugged polycarbonate enclosure with an integral 16 key keypad and a forty character by four line liquid crystal display (LCD). It is powered by an internal rechargeable battery. The sensor cable is connected to the unit via a re-usable trunk cable and a robust plug mounted on the side of the unit. Internally, the VODEX-200A uses sixteen high speed timer circuits which measure the time intervals between the change in conductivity at each sensor. A supervising microprocessor circuit controls the counting operation and calculates VODs, stores recorded data and provides the means to communicate with external devices.

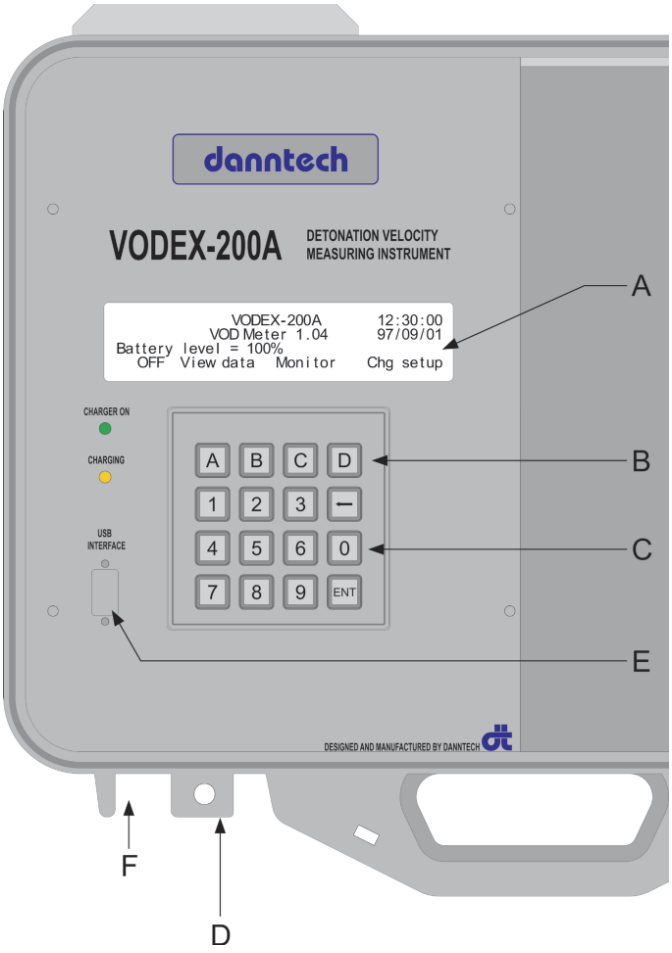
Up to 250 VOD tests can be recorded by the Vodex-200A without overwriting previously recorded data. The test results are held in non-volatile memory so they are retained when the unit is switched off. The date and time of each test is automatically recorded from the built-in real time clock. Data can be downloaded in CSV format for analysis, graphical presentation and permanent storage.

The built-in firmware in the VODEX-200A is designed for easy use in the field with simple menus to guide the user through the different operations and settings.



Operating principle of the VODEX-200A (only four of the sixteen channels are Ilustrated). The positions of the measurement points are user selected and are made by positioning individual pairs of open-circuit wires at the desired points in an explosives column. Ready-made ribbon sensor cables to user specified length can be supplied which can be prepared by cutting back individual pairs to the desired length.

The distances between measurement positions are entered into the VODEX-200A by the user prior to measurement. The entered distances are retained in the non-volatile memory and come into effect whenever the unit is switched on. This helps to simplify and streamline operation when the same sensor spacings are used for several successive tests. Distances between measurement points need not be the same, and the smallest distance between points is limited only by the desired accuracy of the readings.



A Forty character by four line liquid crystal display (LCD). Lines 1 to 3 are reserved for providing information to the user such as recorded data, instrument set-ups and details about the mode of operation. Line 4 is allocated to user prompts for the various menu selections. Desired operations are activated by pressing the corresponding function key on the keypad. The function keys which activate the menu commands on line 4 are [A], [B], [C] and [D]. In the main menu these correspond to {Off}, {View Data}, {Monitor} and {Chg Setup} respectively.

B Function keys for activating the various instrument functions. Four function commands are displayed on the bottom line of the LCD display. These vary according to the position within the setup menu. A command is activated by depressing the corresponding function key.

C Numeric keypad with Enter Key [ENT] and Delete Key [ ]. Used for entering information into the VODEX-200A such as measurement point intervals and date and time. The [ENT] key also serves to turn the instrument on.

D Signal input plug. An eight-pair re-usable trunk cable is connected to this point. The opposite end of the trunk cable has a 37 pin D-type plug to which the VOD probe is attached. Longer cables can be obtained to ensure that the instrument is sufficiently remote from a large blast to avoid damage by fly-rock.

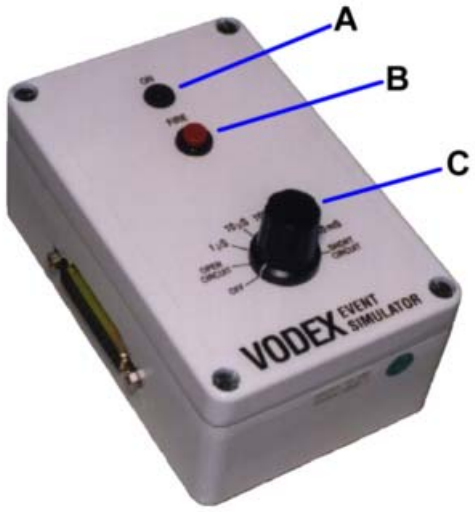
E USB port. For data transfer to a computer.

F Battery charging plug point. The charger supplied with the unit is plugged into this point for charging the internal battery.

Part No.	Description
VDX -VODEX-200A	Vodex-200A VOD Measuring Instrument

Accessories:

The VODEX-200A is fully operational as supplied. The following optional accessories, however, enhance the usefulness of the unit and the reliability of measurements.



A LED to indicate the unit is on.

B Trigger button to simulate an event.

C Rotary selector switch to select time durations between signal pulses.

VODEX EVENT SIMULATOR

The Vodex Event Simulator is used to provide sixteen sequential conductivity changes at accurately defined time intervals to simulate an event similar to a VOD measurement. This unit is used for checking the VODEX-200A system prior to initiating a blast to ensure that the entire system, including trunk cable is operating properly. This reduces the risk of missed readings due to faulty cabling or connections.

The Vodex Event Simulator is self contained and battery powered. It is plugged into the Vodex Trunk Cable Connector and switched on. The time interval between successive conductivity changes is set using the rotary selector switch. The trigger button is then depressed to simulate the event.

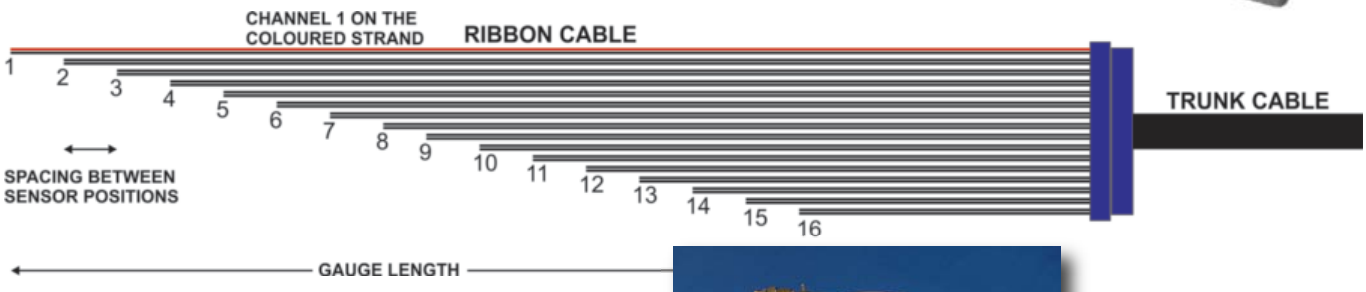
The Vodex Event Simulator is crystal controlled and the accuracy is better than 0.05 µS.

Part No.	Description
VDX -VES	Vodex Event Simulator

VODEX CABLE TERMINAL BOX

The terminal box is attached to the end of the trunk cable and is used for splitting the sensor cable into a number of separate pairs that can be inserted into different holes. This is useful when timing measurements between holes are required or if VODs in more than one hole are measured with one instrument.

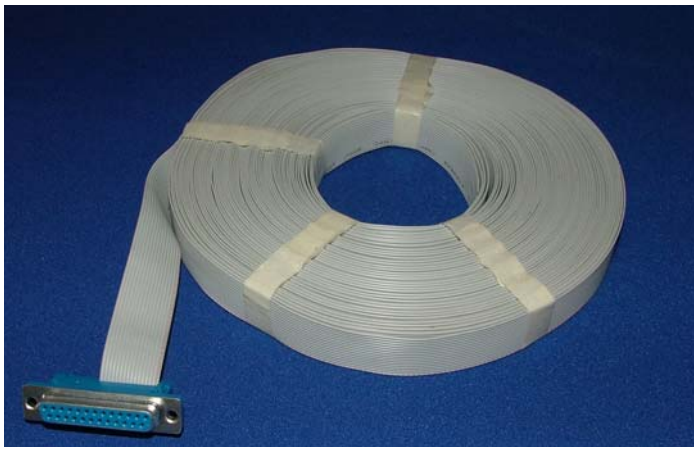
Part No.	Description
VDX -TBOX/A	Vodex-200 Trunk Cable Terminal Box



VODEX TRUNK CABLE

The VODEX-200A is supplied with a 30 m long trunk cable. The cable is used between the VODEX-200A and the sensor cable to ensure that the instrument is located at a safe distance from the blast. The Trunk Cable is reusable. The standard trunk cable length is 30 m. Optional trunk cable lengths are 1, 10, 50, and 100 metres, and can be ordered using the part numbers indicated. The very short 1 metre cable is only used for demonstrations and specialized test work. VODEX Trunk Cable Reels are optional and can be ordered to accommodate cable lengths of 30, 50 and 100 metres.

Part No.	Description
VDX -TRUNK1	Vodex Trunk Cable 1 Metre
VDX -TRUNK30	Vodex Trunk Cable 30 Metres
VDX -TRUNK50	Vodex Trunk Cable 50 Metres
VDX -TRUNK100	Vodex Trunk Cable 100 Metres
VDX -CABRL/30	Vodex Trunk Cable Reel 30 Metres
VDX -CABRL/50	Vodex Trunk Cable Reel 50 Metres
VDX -CABRL/100	Vodex Trunk Cable Reel 100 Metres



VODEX SENSOR CABLES

Made up sensor cables can be ordered using the above codes. Standard lengths are 5, 10, 20, 30 and 60 m. The type A cables have no precut sensor positions which can be prepared to suit the customer on request. A re-useable 30 metre sensor extension cable is also available.

Part No.	Description
VDX -CAB05/A	Vodex Sensor Cable 5 Metres Type A
VDX -CAB10/A	Vodex Sensor Cable 10 Metres Type A
VDX -CAB20/A	Vodex Sensor Cable 20 Metres Type A
VDX -CAB30/A	Vodex Sensor Cable 30 Metres Type A
VDX -CAB60/A	Vodex Sensor Cable 60 Metres Type A
VDX -EXT30/A	Vodex Sensor Extension Cable 30 Metres

VODEX CHARGING

The VODEX-200A uses a standard Dell type of charger which is supplied with the instrument.

Part No.	Description
VDX -CHARGER	Vodex Charger

danntech PROCESS INSTRUMENTATION

danntech cc
Reg. No. 1986/15338/23
Tel: + 27 (0)11 792-1239
Fax: + 27 (0)11 792-4687
P O Box 1023, Fontainebleau, 2032
Republic of South Africa
www.danntech.co.za
www.danntech.com

danntech ltd
Co. No. 6510211
Tel: +44 (0) 75 9069 1824
4 Bettys Lane, Norton Canes,
Cannock, Staffordshire, WS11 9NP,
United Kingdom
www.uk.danntech.com