PURCHASE CONTRACT

No. 084/OVZ/PV/2024

CONTRACTING PARTIES:

BUYER: **Palacký University Olomouc**
Public university established by Act. No. 111/1998 Coll., on Higher Education Institutions and on Amendments to Certain Acts (Act on Higher Education Institutions), as amended
Legal Adress: Křížkovského 511/8, CZ-771 47 Olomouc, Czech Republic
Rector: prof. MUDr. Martin Procházka, Ph.D.
Person authorized to act in technical matters: [redacted]
Identification No.: 61989592
Tax Identification No.: CZ61989592
Bank Name:
Bank Account No.: [redacted]
(hereinafter referred to as „Buyer")

and

SELLER: **Yotta Volt s.r.o.**
Legal Adress: V Kopečku 169/14, 500 03 Hradec Králové
Registration in Companies Register: C 49332 Krajský soud v Hradci Králové
Statutory body: Elias Costopoulos
Person authorized to act in contractual matters: [redacted]
Person authorized to act in technical matters: [redacted]
Identification No.: 09682911
Tax Identification No.: CZ09682911
Bank Name:
Bank Account No.: [redacted]
(hereinafter referred to as „Seller")

are closing on the bellow stated day, month and year according to provision of Section 2079 et seq. of the Act no. 89/2012 Coll., Civil Code, as amended, this purchase contract (hereinafter referred to as „Contract") related to realization of project "Support of doctoral study programmes at Palacký University in Olomouc", reg. no. CZ.02.01.01/00/22_012/0006440, within the Jan Amos Komenský Operational Programme.

The Buyer and the Seller enter into this contract due to the fact, that the Seller was selected by the Buyer in the procurement procedure entitled **„FoS/UPOL – A combined equipment for the development of electronics for analytical applications II“** as the selected economic operator.

I. Subject of the Contract

1. The Seller undertakes under this Contract to deliver to the Buyer **1x Digilent ADP5250 BNC Probe Bundle, PVS630/230/230V Breve Transformator, CT4026 Cal Test Oscope probe X1K 150MHZ 200M** (hereinafter referred to as the „Goods”) in type, quantity, quality and design according to specification, that is an integral part of this Contract as its Annex No. 1. The Seller is not entitled to deliver Goods in larger quantity as stated in Section 2093 of the Civil Code. Both parties to this Contract agreed that Section 2099 (2) of the Civil Code will not be applied.

2. The Seller hereby undertakes to surrender the Goods specified in Annex no. 1 to this Contract to the Buyer and allow him to acquire property rights to it and provide the warranty service under the conditions stipulated by this Contract.

3. The Buyer agrees to take over the Goods and pay the Seller the purchase price in the way and in time agreed to in this Contract.

4. Part of the delivery of the subject of the Contract is transport and delivery of legal documents (Declaration of conformity or CE certificate, user manual in Czech or English).

5. The Seller declares pursuant to Section 2103 Civil Code, that the Goods is without any faults or defects.

6. The Goods shall be fully functional, new, unused, not refurbished, without any additional costs or expenditures necessary to be paid by the Buyer.

II. Term and place of delivery

1. The Seller undertakes to deliver the Goods at the place of delivery, including the delivery of all legal documents to the Goods, no later than 315 calendar days after the effective date of this Contract.

2. Place of delivery:
   Palacký University Olomouc, Faculty of Science, Department of Analytical Chemistry, 17. listopadu 1192/12, 779 00 Olomouc, Czech Republic.
   Person authorised to take over the delivery on the basis of a handover protocol: doc. [redacted] or a person authorised by him to take over the Goods.

3. Both parties agreed, that Section 2126 and Section 2127 Civil Code on self-help sale will be excluded and thus shall not be applicable in the case of delay in take-over of the Goods by the Buyer.

III. Purchase price

1. The purchase price is set in the amount of **86.956,00 CZK without VAT**. The Seller is the payer of VAT.

2. The purchase price covers all the costs related to the supply of the Goods (in particular the transport to the place of delivery, insurance, customs duties, fees, licence fees and copyrights, delivery of all legal documents to the goods, the warranty service).

3. The purchase price is set as a fixed price, the highest acceptable and maximal, covering all the costs related to the supply of the Goods.

4. The Seller takes the responsibility for the fact, that the VAT rate at the time of invoicing is stipulated in compliance with the legislation.

IV. Payment terms and conditions

1. Payment for the delivery of the Goods shall be made on the basis of a duly issued tax document (invoice), including all the prerequisites, within the due date of 30 calendar days from the date of the provable delivery to the Buyer. The invoice will be issued by the Seller at the earliest after delivery of the Goods and legal documents, which will be confirmed by a written signed protocol on the delivery and installation of the Goods.

2. Each invoice issued by the Seller must include all tax document prerequisites in accordance with Act No. 235/2004 Coll., on value added tax, as amended, and the prerequisites of a commercial deed pursuant to Section 435 of the Civil Code as well as identification of the Contract, on the basis of which the fulfilment has been provided. The Seller shall affix the invoice with the signature of the person authorised to issue the invoice. Each invoice issued will bear the number of this Contract and name ang reg. no. of the project.

3. If any invoice issued by the Seller does not contain any of the obligatory particulars or if the Seller incorrectly invoices the price or the VAT, the Buyer is entitled to return such invoice to the Seller before the expiration of its maturity date for the correction, stating the reason of its returning. The Seller shall correct it by issuing a new invoice. The initial maturity date stops running on the day of sending the incorrect invoice to the Seller and a new maturity day starts running on the day of the delivery of a new invoice to the Buyer.

4. The contracting parties agree that the obligation to pay the purchase price is fulfilled on the day when the given sum is sent from the Buyer's account to the Seller's account given above in this Contract.

5. The Seller shall ensure proper and timely fulfillment of financial obligations to its subcontractors, where proper and timely fulfillment is considered full payment of invoices issued by the subcontractor for performances provided to the Seller to fulfill obligations under the Contract, always no later than 15 days after receiving payment from the Buyer for specific performance (if the due date of the invoice issued by the subcontractor has not occurred before). The Seller undertakes to transfer the same obligation to other levels of the supply chain and to oblige its subcontractors to fulfill and spread this obligation also to lower levels of the supply chain. The Buyer is entitled to request the submission of

documents on payments made to subcontractors and contracts concluded between the Seller and subcontractors. Failure to fulfill the obligations of the Seller under this agreement of this Contract is considered a material breach of contract with the possibility of withdrawal by the Buyer from this Contract. Withdrawal from this Contract is in such a case effective by delivery of a written notice of withdrawal from the Contract to the other contractual party.

V. The Seller´s responsibility for defects and warranty

1. The Seller provides a quality warranty for the Goods according to § 2113 et seq. Civil Code, for a period of 12 months from the date of signing the handover protocol pursuant to Article IV (1) of this Contract. The Seller's contact point for reporting defects, at which the Seller is obliged to receive notifications of defects and the Buyer's choice of claims from defective performance on working days between 8 a.m. and 4 p.m., is located at V Kopečku 169/14, 500 03 Hradec Králové, tel.: [redacted], e-mail: [redacted]

2. In the event of a malfunction during the warranty period, the Goods will be sent by the Buyer to the Supplier, who undertakes to provide free service and send the repaired Goods back to the place of delivery of the Buyer within 30 calendar days of delivery of the defective Goods to the Supplier unless otherwise agreed in writing by persons authorised to act in technical matters on behalf of the contracting parties. The Seller does not require that the Goods be handed over for repair in its original packaging. The contracting parties agree that Section 2110 of the Civil Code shall not apply. Therefore, the Buyer is entitled to withdraw from the Contract for defects or to require the delivery of new Goods irrespective of the fact whether the Buyer is allowed to return the Goods to the Seller or, where possible, to return the Goods in the condition as the Goods were received by the Buyer.

3. The costs of performing a full warranty service of the delivered Goods form part of the purchase price.

4. The Buyer is entitled to compensation for the necessary costs incurred in connection with the exercise of liability for defects.

VI. Contractual penalties

1. The contracting parties shall, in the event of a breach of the contractual obligation, agree on contractual penalties in the form provided for in the following paragraphs of the Contract. Neither contracting party considers that the contractual penalties are disproportionate in relation to the value of the individual contractual obligations.

2. The Seller undertakes to pay the Buyer a contractual penalty in the amount of 0,2 % from the purchase price without VAT for each commenced day of delay with the contractually set delivery date as per Article II (1) of this Contract.

3. The Seller undertakes to pay the Buyer a contractual penalty of 0,2 % from the purchase price without VAT for each even commenced day after the expiration of the period for repair defects during the warranty period in accordance with Article V of this Contract, for each individual case.

4. The contracting parties have agreed that § 2050 of the Civil Code shall not apply, ie. contractual penalties are not included in the compensation for any damage incurred, which can be enforced separately in full in addition to the contractual penalty.

5. The maturity date of the charged contractual penalties is 30 calendar days from the day of delivery of their written statement to the given contracting party and the day of payment means the day of debiting the contractual penalty amount from the account of the given contracting party to the account mentioned in the statement of the contractual penalty.

6. The Buyer is entitled to set off the contractual penalties within the meaning of Section 1982 et seq. of the Civil Code against the Seller's outstanding claim for payment of the purchase price under this Contract.

VII. Final provisions

1. With respect to the provision of Section 2 (e) of Act no. 320/2001 Coll., on the Financial Inspection in Public Administration, as amended, the Seller is a person obliged to cooperate during the performance of the financial inspection. These Seller's obligations also apply to his contractual partners involved in the fulfillment of this Contract.

2. The Seller undertakes to ensure the legal employment of persons in the performance of this Contract and to ensure fair and decent working conditions for the employees participating in the performance of the Contract. Fair and decent working conditions are those working conditions that meet at least the minimum standards set by labor and wage regulations. The Seller is obliged to ensure compliance with the requirements of this provision of the contract with its subcontractors. Failure to fulfill the obligations of the Seller under this agreement of this Contract is considered a material breach of Contract with the possibility of withdrawal by the Buyer from this Contract. Withdrawal from this Contract is in such a case effective by delivery of a written notice of withdrawal from the Contract to the other contractual party.

3. The Buyer reserves the right to publish the contents of the Contract.

4. This Agreement is governed by the Civil Code and the legal order of the Czech Republic in matters not expressly regulated in it.

5. The provisions of this Contract are separable. If any part of an obligation under this Contract is or becomes invalid or non-enforceable, this shall not affect the validity and the enforcement of other obligations under this Contract and the contracting parties undertake to replace such invalid or non-enforceable part of obligation with a new, valid and enforceable part of the obligation, the subject of which will correspond at the best to the subject of the original obligation. If the contract does not contain a provision which would be justifiable for the determination of the rights and obligations, the contracting parties will make all the efforts to implement such provision in the Contract.

6. The contracting parties may modify or amend this Contract only in the form of written amendments numbered in the increasing order, expressly declared as amendments to this Contract and signed by the authorized representatives of the contracting parties.

7. The Buyer is entitled in accordance with § Section 2001 of the Civil Code, to withdraw from this Contract in following cases:
   - delay of the Seller with the delivery of Goods longer than 10 calendar days,
   - failure to comply with the technical specification of the Goods set out in the Seller's tender or if the Seller, in the tender submitted in the tendering procedure preceding the conclusion of this Contract, has provided information or submitted documents which do not correspond to reality and have had or could have had an influence on the selection of the Seller to perform the public contract,
   - the Seller's delay with starting to repare defects longer than 10 calendar days,

The withdrawal from the Contract shall be made in a written form and becomes effective on the day of the delivery of the written notice to the other contracting party.

8. The Seller is not entitled to cede his rights and obligations under this Contract to a third party without the Buyer's approval.

9. With regard to the delivery of items relating to the performance of this Contract sent by the Seller using the postal service provider, § 573 of the Civil Code shall not apply

10. The Seller acknowledges that this Contract, including all its Annexes, is subject to mandatory disclosure under Act No. 340/2015 Coll., on special conditions of effectiveness of certain contracts, publication of these contracts and on the register of contracts, as amended.

11. This Contract shall enter into force on the date of its signature by the last participant of this Contract and become effective as of the date of publication of this Contract by Buyer in the Register of contracts pursuant to Act No. 340/2015 Coll., on special conditions of effectiveness of certain contracts, publication of these contracts and on the register of contracts, as amended.

12. This Purchase Contract is signed electronically.

13. The Seller is obliged to inform the Buyer if it becomes aware that it or its subcontractors or the performance which is the subject of this contract is subject to international sanctions.

14. The Seller hereby obliges, that all subjects authorized to conduct control of the project, by means of which the subject of this Contract is paid, will be allowed to carry out control of documents related to this subject, during period set by legislation of Czech Republic for their archivation (Act No. 563/1991 Coll., on accountancy, in its effective form and Act No. 235/2004 Coll., on value added tax, as amended).

15. The following Annexes form an integral part of this Contract:

Annex No. 1 – Seller's tender dated 07.02.2024

In Olomouc, on 15.04.2024

……
prof. MUDr. Martin Procházka, Ph.D.
rector of Palacký University Olomouc

In Hradec Králové, on 12.04.2024

……
Elias Costopoulos, Managing director

NABÍDKA

Yotta Volt s.r.o.
V Kopečku 169/14
500 03 Hradec Králové
Česká republika
VAT: CZ09682911
ICO: 09682911

Číslo: **005188**
Datum: **24/01/2024**
Platnost: **29/02/2024**

Pro:
Univerzita Palackého v Olomouci
Křížkovského 511/8
779 00,Olomouc
Czech Republic
CZ61989592

Od:
[redacted]

Všechny ceny v(CZK)

#	Číslo dílu	Popis	EDT*	Množství	Jednotková cena	Net cena
1.	471-058	Digilent ADP5250 BNC Probe Bundle	0	1	61,150.00	61,150.00
2.	PVS630/230/230V	Breve Transformátor: ochranný; 630VA; 230VAC; 230V; IP54; Tř.izolace: II	0	1	7,229.00	7,229.00
3.	CT4026	Cal Test OSCOPE PROBE X1K 150MHZ 200M	0	1	18,577.00	18,577.00

Mezisoučet:	86,956.00
DPH(21%):	18,260.76
Celková cena:	**105,216.76**

Pravidla a podmínky

Všeobecné obchodní podmínky	https://www.yottavolt.com/terms/
Platební podmínky	Net-30
Dodací podmínky (Incoterms 2021)	DDP (Delivered Duty Paid)
EDT*-Předpokládaná doba dodání	Předpokládaná dodací lhůta je uvedena v týdnech a vychází z údajů výrobce v okamžiku vytvoření nabídky. (N/A): Dodací lhůta bude specifikována výrobcem, jakmile bude potvrzena dostupnost komponent dodavatele. Aktualizovaný odhadovaný čas doručení bude uveden v potvrzení prodejní objednávky. Ve výchozím nastavení se dodací lhůta celé objednávky rovná nejdelší dodací lhůtě produktů objednávky. Poznámka: Kvůli narušení globálního dodavatelského řetězce způsobeného pandemií COVID-19 existuje riziko nepředvídatelných zpoždění. Aktuální dodací lhůta bude sdělena na vyžádání.
Záruka	Standardní záruka na produkty NI: Hardwarové produkty 1 rok, software 90 dní, záruční opravy 90 dní. Všichni ostatní výrobci podle standardních záručních podmínek. U určitých produktů je k dispozici prodloužená záruka. Další informace získáte od společnosti Yotta Volt.

Bankovní Spojení [redacted]

Analog Discovery Pro ADP5250: All-In-One 1GS/s 100MHz Mixed Signal Oscilloscope, Function Generator, Power Supply, and DMM

ADP5250 BNC Probe Bundle

What is the ADP5250?

Bolster your benchtop with the biggest, baddest, and boldest Analog Discovery yet.

The ADP5250 brings higher sample rate and bandwidth and a more rugged design to the Analog Discovery Pro family, keeping our free highly rated WaveForms application software at the controls.

Higher Sample Rate and Bandwidth

Designed to combine a complete set of instruments into a flexible and programmable device, the ADP5250 features a mixed-signal oscilloscope with two 100 MHz bandwidth, 1 GS/s analog channels, 34 digital channels, a tri-output power supply capable of up to 25 V, an external trigger, Waveform Generator, and a built-in programmable DMM. This is our first instrument with full DMM capabilities including true current and resistance measurement and a 300 V input range.

The Ultimate All-In-One Test System

Analog Discovery Pro devices feature a variety of advanced triggering options. Instruments within WaveForms can be cross-triggered, for example, by activating an oscilloscope capture based on a received and decoded digital protocol. In addition, external signals can trigger events using the dedicated external trigger input/output. Our free WaveForms software provides these features configurable in the instruments themselves, or for more control or automation in one of the available scripting interfaces.

Those familiar with NI will notice the hardware looks and functions similar to the VirtualBench VB-8012. The ADP5250 is NI quality hardware and connected to our tried-and-true WaveForms software suite for the ultimate test experience.

Note: The ADP5250 is Windows® only.

FEATURES

Analog Inputs:

Used in the Oscilloscope, Data Logger, Network Analyzer, Spectrum Analyzer, and Impedance Analyzer

Two analog input channels accessible via front panel BNC connectors

Channel type: single ended

Analog bandwidth: 100 MHz @ -3 dB

8-bit resolution

Max sampling rate: 1 GS/s single channel

Maximum input range: 40 V peak to peak

AC or DC coupling

Maximum record length: 1 MS per channel

Front panel connector generating a 5 V, 1 kHz, square wave for convenient compensation of BNC oscilloscope probes

Analog Outputs:

Used in the Waveform Generator, Impedance Analyzer, and Network Analyzer

One channel accessible via a front panel BNC connector

14-bit resolution

AC amplitude (max): ±12 V

Maximum analog bandwidth: 5 MHz @ -3 dB

Maximum sampling rate: 125 MS/s

Software-switchable filter: 36 MHz lowpass, 7-pole, elliptical

Power Supplies:

Digital supply: 3.3 V, 20 mA

DC power supplies:

0 to 6 V variable, 1 A max current

0 to 25 V variable, 500 mA max current (isolated)

0 to -25 V variable, 500 mA max current (isolated)

Digital Multimeter:

Used in the DMM instrument

Functions: DC voltage, AC voltage, DC current, AC current, resistance, diode, continuity

Resolution: 5 1/2 digits

Sample rate 5 S/s

Input protection:

Resistance, diode: up to 300 V DC

DC and AC voltage: up to 300 V DC or 265 VAC (rms) 400 V AC (peak)

DMM A current connector fuse: internal ceramic fuse, 10 A 250 V, time-delay, 5 x 20 mm, T 10 A H 250 V

DMM mA current connector fuse: internal ceramic fuse, 1.25 A 250 V, time-delay, 5 x 20 mm, T 1.25 A H 250 V

Maximum common-mode voltage: 300 V DC or AC (rms)

Digital Inputs:

Used in the Logic Analyzer

Channels: 32

Input voltage: 0 V to 5 V

Input threshold: 0 V to 2 V

Max sampling rate: 1 GS/s

Typical record length: 1 MS

Digital Inputs and Outputs:

Used in the Static I/O instrument

Channels: 8

Input logic standard: 5 V compatible TTL

Output logic standard: 3.3 V LVTTL

Advanced Triggering:

Trigger sources: oscilloscope analog channels, function generator start, digital inputs, digital I/O, power line frequency, external trigger

Trigger modes: Normal, auto, force, single

Analog trigger: Edge with hysteresis

Digital trigger: Edge, level, pattern, glitch

External trigger:

5 V compatible TTL input or 3.3V LVTTL output

4 mA drive strength

Connectivity:

Device to computer: USB 2.0 Hi-Speed

Other:

Auxiliary powered

Dimensions: 25.40 cm x 19.05 cm x 7.77 cm (10.00 in x 7.50 in x 3.06 in)

Weight: 2.05 kg (4 lb 8.3 oz)

Shock and vibration tested (details in the specification sheet)

Product Compliance:

HTC: 8471809000

ECCN: 3A992.a

What is included

ADP5250 Probe Bundle:

- 1 ADP5250
- 1 USB A to B cable
- 1 1x14 Digital I/O Screw Terminal Adapter
- 1 1x6 Power Supply Screw Terminal Adapter
- 1 2x18 Logic Analyzer MTE Cable
- 1 US IEC Cable
- 1 EU Adapter
- 1 UK Adapter
- 2 P2150 150MHz Oscilloscope Probe
- 2 BNC to Mini-grabber Cable
- 1 Set of Red and Black DMM Probes

Included is also Digillent Waveforms SW

What is WaveForms?

WaveForms is the free software application for the ADP5250 and enables use of the available analog and digital instruments. The software has been refined by customer feedback for over 10 years and features a computer and laptop friendly user interface that has the feel of traditional benchtop software. The device communicates with WaveForms via a USB connection to your computer, allowing users to capture, record, analyze, and generate mixed signal and mixed domain waveforms. WaveForms can be downloaded and installed in under 60 seconds and can be tested without hardware using its demo mode feature. In addition to the use of instruments in the application, the WaveForms application has a script editor tool, which allows custom scripting of the instrument in JavaScript. WaveForms is designed to be run on a laptop or desktop computer.

The ADP5250 is Windows® only.

For even more customization potential, the WaveForms Software Development Kit (SDK) can be used to create custom applications and scripts in Python®, C, and additional languages.

While not officially supported, the ADP5250 is also compatible with NI's VirtualBench C API and VirtualBench LabVIEW™ VIs.

The following instruments are available in the WaveForms application for the ADP5250:

Oscilloscope

Waveform Generator

Power Supplies

DMM

Logic Analyzer

Static I/O

Spectrum Analyzer

Network Analyzer

Impedance Analyzer

Data Logger

Digilent WaveForms software seamlessly connects to our USB portable oscilloscope, logic analyzer, and function generator products, such as the Analog Discovery Pro family, Analog Discovery 2 & 3, Analog Discovery Studio, and the Digital Discovery, with full Windows, MacOS, and Linux support (on almost all devices). This Digilent software, coupled with the compatible hardware, brings a powerful suite of instruments to enable analog and digital design on your personal computer. Designed with a clean, easy to use graphical interface for each instrument, WaveForms makes it easy to acquire, visualize, store, analyze, produce and reuse analog and digital signals.

Digilent WaveForms SDK (Software Development Kit) downloads automatically with the digital waveform generator software application and provides libraries and examples to write custom applications in C, Python, and more. Third party toolkits are also available for NI LabVIEW and MATLAB (for most devices).

NOTE: WaveForms is FREE to download and use and can also be used without any hardware in demo mode. Download now to test it out! In order to download this software click on the "Download & Try Now" button to be taken to the download form. This Digilent WaveForms download is free, and you'll be able to choose download options for Windows, MacOS, Linux, and ARM. There is no limit on how many times you can download WaveForms or how many Digilent devices you can use it with.

SPECIFICATIONS

VB-8012

2-Channel, 100 MHz Bandwidth VirtualBench All-in-One Instrument

Definitions

Warranted specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

Characteristics describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- *Typical* specifications describe the performance met by a majority of models.
- *Nominal* specifications describe an attribute that is based on design, conformance testing, or supplemental testing.

Specifications are *Typical* unless otherwise noted.

Conditions

Typical specifications are valid under the following conditions unless otherwise noted:

- 25 °C
- 30-minute warm-up time before operation

Warranted specifications are valid at T_{cal} ±5 °C. Temperature coefficients are calculated using the temperature change from last external calibration.

Mixed Signal Oscilloscope

Analog Channels

Vertical System

Number of channels	2 single-ended, non-isolated
Bandwidth (-3 dB)[1]	100 MHz

[1] Bandwidth using the accessory oscilloscope probe in 10X mode.

Resolution	8 bits
Accuracy (warranted)	±2% of input ±1% full scale (V peak-to-peak)
Input coupling	DC, AC
Vertical sensitivity (range)	10 mV/div (100 mV peak-to-peak) 20 mV/div (200 mV peak-to-peak) 50 mV/div (400 mV peak-to-peak) 100 mV/div (1 V peak-to-peak) 200 mV/div (2 V peak-to-peak) 500 mV/div (4 V peak-to-peak) 1 V/div (10 V peak-to-peak) 2 V/div (20 V peak-to-peak) 5 V/div (40 V peak-to-peak)
Input impedance	1 MΩ || 20 pF

Table 1. DC Offset Range

Range	Programmable Offset Range
10 mV/div, 20 mV/div, 50 mV/div	±5 V
100 mV/div, 200 mV/div, 500 mV/div, 1 V/div, 2 V/div, 5 V/div	±20 V

Acquisition modes	Sample, peak detect, averaging

Horizontal System

Maximum sample rate	1 GS/s single channel, 500 MS/s/channel, dual channel
Maximum record length	1 MS/channel

Digital Channels/Logic Analyzer

Vertical System

Number of channels	34
Maximum input frequency	100 MHz

Input voltage	0 V to 5 V
Input current	≤50 µA

Note Mixed signal oscilloscope digital channels are designed to withstand accidental overvoltage from signals on the VB-8012 or similar devices. They are not recommended for use with signals likely to exceed 0 V to 5 V in normal operation.

Input threshold	Programmable, 0 V to 2.0 V
Threshold accuracy	350 mV
Input impedance	100 kΩ || 7.5 pF pulled to -2.0 V to +6.5 V, varies with the input threshold setting
Additional/internal channels	Digital I/O lines, function generator start, external trigger (TRIG), power line frequency

Horizontal System

Timing mode sample rate (warranted)	1 GS/s (down to ~15 kS/s)
Maximum external sample clock rate	100 MHz
Record length	
Typical	1 MS
Minimum[2]	4 kS
Decimation	External Sample Clock, 1:1, 2:1, and n*4:1 where n is an integer
Maximum sample compression	2^{15} to 1

Triggering

Trigger modes	Normal, Auto, Force, Single[3]
Trigger sources	Oscilloscope analog channels, oscilloscope digital channels, function generator start, digital I/O lines, external trigger (TRIG), power line frequency
Trigger types	
Analog	Edge with hysteresis, pulse width
Digital	Edge, pulse width, pattern, glitch[4]

[2] Under most conditions, the logic analyzer can acquire 1 MS of data. Under some conditions with very high sustained activity on multiple inputs, the logic analyzer may only capture 4 kS of data.

[3] Single trigger mode is only available in the VirtualBench application. For feature differences between the VirtualBench application for Windows and iPad, go to *ni.com/info* and enter `vbfeatures`.

[4] Glitch triggers are only available with the NI VirtualBench driver.

Trigger resolution	
Analog/oscilloscope	1 ns
Digital/logic analyzer	1 ns
Trigger export	Available through external trigger (TRIG)

Waveform Measurements

Oscilloscope time[5]	Period, frequency, positive duty cycle, negative duty cycle, positive pulse width, negative pulse width, rise time, fall time, rise rate, fall rate
Oscilloscope voltage[5]	High, low, amplitude, maximum, minimum, peak-to-peak, overshoot, undershoot, RMS, mean, cycle RMS, cycle mean
Logic analyzer time[5]	Period, frequency, positive duty cycle, negative duty cycle, positive pulse width, negative pulse width

Waveform Math

Operations[6]	A + B, A - B, A * B, A/B, FFT

Function Generator (FGEN)

Waveforms	Sine, square, ramp/triangle, DC, arbitrary
Update rate	125 MS/s
Resolution	14 bits
Number of channels	1
Output impedance	50 Ω
Switchable filter[7]	36 MHz lowpass, 7-pole, elliptical

[5] Waveform measurements are only available in the VirtualBench application.
[6] Waveform math is only available in the VirtualBench application.
[7] Switchable filters are only available with the NI VirtualBench driver. The VirtualBench application automatically enables the lowpass filter in sine mode.

Sine	
Maximum frequency	20 MHz
Total Harmonic Distortion (THD)	
1 MHz	-55 dBc
10 MHz	-50 dBc
Spurious Free Dynamic Range (SFDR)	-70 dB at 1 MHz (non-harmonic)
Phase noise (1 MHz)	-115 dBc/Hz at 10 kHz offset
Square	
Maximum frequency	5 MHz
Rise/fall time	<20 ns (10% to 90%)
Overshoot	<5%
Jitter	8 ns cycle-to-cycle
Ramp/triangle maximum frequency	1 MHz
Accuracy (with >10 kΩ load)	
Amplitude (1 kHz sine)	±(1% of output value ± 5 mV)
DC	±(1% of output value ± 7.5 mV)
Output range	
50 Ω	±6 V
Hi-Z (>10 kΩ)	±12 V
DC offset	
50 Ω	±6 V
Hi-Z (>10 kΩ)	±12 V

Note The combination of signal amplitude and DC offset cannot exceed the output range specifications. The impedances listed are the loads applied by the user to the FGEN output.

Frequency	
Accuracy	≤100 ppm
Resolution	1 µHz
Arbitrary waveform	
Points	1 MS
Sample rate	125 MS/s

Flatness	±0.3 dB to 20 MHz
Protection	Short-circuit protected

Triggering

Trigger types	Start of buffer[8]
Trigger resolution	8 ns
Trigger export	Available through external trigger (TRIG)

Digital I/O

Number of channels	8
Direction control	Input or output, software-selectable
Logic level	5 V compatible TTL input, 3.3 V LVTTL output
Drive strength	4 mA
Input voltage	0 V to 5 V

Note Digital I/O lines are designed to withstand accidental overvoltage from signals on the VB-8012 or similar devices. They are not recommended for use with signals likely to exceed 0 V to 5 V in normal operation.

DIO channel pull resistors	
dig/<0..5>	10 kΩ, pull-down to 0 V
dig/<6,7>	10 kΩ, configurable pull-up to 3.3 V or 10 kΩ, pull-down to 0 V

External Power

3.3 V output	
Voltage	3.3 V ±10%
Current	20 mA

[8] The function generator can only produce a trigger.

Digital Multimeter

Functions	DC voltage, AC voltage, DC current, AC current, resistance, diode, continuity[9]
Resolution	5½ digits
Sample rate	5 S/s

Caution Do not use this device for connection to signals or for measurements within Measurement Categories III or IV. For more information about Measurement Categories, refer to the *Safety Voltages* section.

Input protection	
Resistance, diode	Up to 300 V DC
DC and AC voltage	Up to 300 V DC or 265 V AC RMS, 400 V AC peak
DC and AC current	
DMM A current connector fuse	Internal ceramic fuse, 10 A 250 V, time-delay, 5 × 20 mm, T 10A H 250V (Bussmann part number S505H-10-R at `www.cooperindustries.com`)
DMM mA current connector fuse	Internal ceramic fuse, 1.25 A 250 V, time-delay, 5 × 20 mm, T 1.25A H 250V (Bussmann part number S505H-1.25-R at `www.cooperindustries.com`)

Warning Fuses are located on the bottom of the device underneath the door. Use Phillips #1 screwdriver for removal. Ensure all hazardous voltages are disconnected from the device prior to removal of door. When the fuse symbol is marked on a device, take proper precautions.

Maximum common-mode voltage	300 V DC or AC RMS

[9] Continuity is only available in the VirtualBench application.

DC

Table 2. DC Voltage Accuracy

Range	Input Impedance	1-Year Accuracy ± (% of Reading + % of Range) (warranted)	Temperature Coefficient ± (% of Reading + % of Range)/°C (warranted)
100 mV*	>10 GΩ, 10 MΩ	0.015 + 0.005	0.001 + 0.0005
1 V	>10 GΩ, 10 MΩ	0.015 + 0.005	0.001 + 0.0005
10 V	>10 GΩ, 10 MΩ	0.015 + 0.005	0.001 + 0.0005
100 V	10 MΩ	0.035 + 0.005	0.005 + 0.0005
300 V	10 MΩ	0.035 + 0.005	0.005 + 0.0005
* Add 15 µV if not immediately following offset null.			

Table 3. DC Current Accuracy

Range	Burden Voltage	1-Year Accuracy ± (% of Reading + % of Range) (warranted)	Temperature Coefficient ± (% of Reading + % of Range)/°C (warranted)
10 mA	<0.03 V	0.070 + 0.020	0.0035 + 0.0010
100 mA	<0.3 V	0.070 + 0.003	0.0020 + 0.0010
1 A	<0.03 V	0.130 + 0.025	0.0065 + 0.0010
10 A*	<0.3 V	0.130 + 0.004	0.0045 + 0.0010
* 30 seconds on, 30 seconds off. Add 300 ppm/A for currents >2.2 A. After measuring >5 A, wait two minutes to get full accuracy in the 1 A range.			

Table 4. DC Resistance Accuracy (2-Wire)*, 1 V Open Circuit Voltage

Range	Short-Circuit Current	1-Year Accuracy ± (% of Reading + % of Range) (warranted)	Temperature Coefficient ± (% of Reading + % of Range)/°C (warranted)
100 Ω	170 µA	0.018 + 0.050	0.0010 + 0.0005
1 kΩ	170 µA	0.018 + 0.005	0.0010 + 0.0005
10 kΩ	70 µA	0.018 + 0.005	0.0010 + 0.0005

Table 4. DC Resistance Accuracy (2-Wire)*, 1 V Open Circuit Voltage (Continued)

Range	Short-Circuit Current	1-Year Accuracy ± (% of Reading + % of Range) (warranted)	Temperature Coefficient ± (% of Reading + % of Range)/°C (warranted)
100 kΩ	10 µA	0.018 + 0.005	0.0010 + 0.0005
1 MΩ	1.1 µA	0.035 + 0.005	0.0040 + 0.0005
10 MΩ	1.1 µA	0.150 + 0.005	0.0100 + 0.0005
100 MΩ	1.1 µA	1.3 + 0.005	0.1000 + 0.0005
* Perform offset nulling.			

Caution The input terminals of the DMM are not protected for electromagnetic interference. As a result, the DMM may experience reduced measurement accuracy or other temporary performance degradation when connected to unshielded test leads in an environment with radiated or conducted radio frequency electromagnetic interference.

DC continuity accuracy range[10]	100 Ω
DC diode test range	2 V
Effective Common-Mode Rejection Ratio (CMRR), 1 kΩ resistance in LO lead	>100 dB
Normal-Mode Rejection Ratio (NMRR), 50/60 Hz ±0.1%	>100 dB
Overrange	105% of range except 300 V

[10] DC continuity is only available in the VirtualBench application.

AC

Table 5. AC Voltage Accuracy

Range (rms)	Peak Voltage	Frequency	1-Year Accuracy ± (% of Reading + % of Range) (warranted)	Temperature Coefficient ± (% of Reading + % of Range)/°C (warranted)
100 mV, 1 V, 10 V, 100 V, 265 V	±210 mV, ±2.1 V, ±21 V, ±210 V, ±400 V	20 Hz to 45 Hz	0.91 + 0.10	0.01 + 0.005
		45 Hz to 65 Hz	0.30 + 0.05	0.01 + 0.005
		65 Hz to 1 kHz	0.21 + 0.05	0.01 + 0.005
		1 kHz to 5 kHz	0.12 + 0.05	0.01 + 0.005
		5 kHz to 20 kHz	0.35 + 0.05	0.01 + 0.005

Table 6. AC Current Accuracy

Range (rms)	Peak Current	Burden Voltage (rms)	Frequency	1-Year Accuracy ± (% of Reading + % of Range) (warranted)	Temperature Coefficient ± (% of Reading + % of Range)/°C (warranted)
5 mA	±10.5 mA	<0.02 V	20 Hz to 1 kHz	0.20 + 0.01	0.01 + 0.005
			1 kHz to 5 kHz	0.60 + 0.01	
50 mA	±105 mA	<0.2 V	20 Hz to 1 kHz	0.20 + 0.01	0.01 + 0.005
			1 kHz to 5 kHz	0.50 + 0.01	
500 mA	±1.05 A	<0.02 V	20 Hz to 1 kHz	0.15 + 0.01	0.01 + 0.005
			1 kHz to 5 kHz	0.50 + 0.01	
5 A	±10.5 A	<0.2 V	20 Hz to 1 kHz	0.25 + 0.03	0.01 + 0.005
			1 kHz to 5 kHz	0.60 + 0.03	

Caution The input terminals of the DMM are not protected for electromagnetic interference. As a result, the DMM may experience reduced measurement accuracy or other temporary performance degradation when connected to unshielded test leads

in an environment with radiated or conducted radio frequency electromagnetic interference.

Input impedance	10 MΩ || 200 pF
CMRR, 1 kΩ resistance in LO lead	>70 dB (DC to 60 Hz)

DC Power Supply

Outputs	0 V to +6 V/0 A to 1 A, 0 V to +25 V/0 mA to 500 mA (isolated), 0 V to -25 V/0 mA to 500 mA (isolated)

Note The +25 V and -25 V channels are bank isolated from ground but not from each other.

Table 7. DC Accuracy/Resolution

Output	Type	+6 V	+25 V	-25 V
DC output (warranted)	Voltage	0 V to +6 V	0 V to +25 V	0 V to -25 V
	Current [11]	1 A	500 mA	500 mA
Programming accuracy [11]± (% of reading + offset) (warranted)	Voltage	0.1% + 5 mV	0.15% + 20 mV	0.15% + 20 mV
	Current	0.2% + 10 mA	0.15% + 4 mA	0.15% + 4 mA
Readback accuracy[12] ± (% of reading + offset) (warranted)	Voltage	0.1% + 5 mV	0.15% + 20 mV	0.15% + 20 mV
	Current	0.2% + 10 mA	0.15% + 4 mA	0.15% + 4 mA
Programming resolution	Voltage	1.7 mV	6.5 mV	6.5 mV
	Current	0.30 mA	0.15 mA	0.15 mA

[11] Minimum programmable current limit is 1% of range.
[12] Programming and readback accuracy specified at no load.

Table 7. DC Accuracy/Resolution (Continued)

Output	Type	+6 V	+25 V	-25 V
Readback resolution	Voltage	0.41 mV	1.7 mV	1.7 mV
	Current	70 µA	35 µA	35 µA
Load regulation[13] ± (% of reading + offset)	Voltage	0.01% + 25 mV	0.03% + 5 mV	0.03% + 5 mV

Overvoltage protection	30 V (25 V channels) and 10 V (6 V channel)
Reverse voltage protection	Reverse clamp diode, protected by self-resetting fuse

External Trigger (TRIG)

Direction control	Input or output, software-selectable
Logic level	5 V compatible TTL input, 3.3 V LVTTL output
Drive strength	4 mA
Input voltage	0 V to 5 V

Note The external trigger line is designed to withstand accidental overvoltage from signals on the VB-8012 or similar devices. It is not recommended for use with signals likely to exceed 0 V to 5 V in normal operation.

Connectivity

Wired USB Interface

USB specification	USB 2.0 Hi-Speed

[13] Change in output voltage for any load within range.

Wireless Interface

Table 8. Network Protocols and Ports Used

Port	Protocol	Function
Port 80/TCP	HTTP	Device configuration (web, MAX)
Port 443/TCP	HTTP	Device configuration (web, MAX)
Port 3580/TCP	Service locator	Device configuration (web, MAX)
Port 9090/TCP	Configuration only	VirtualBench instrument protocol
Port 5353/UDP	Multicast DNS	Device discovery

Network IP configuration	IPv4, DHCP Client/Server
Radio mode	IEEE 802.11 b,g,n
Wireless modes	AP mode (default), client mode
Frequency band	2.4 GHz ISM
Channel width	20 MHz
Channels	USA 1-11, International 1-13 (12 and 13 client mode only)
TX power	+10 dBm maximum (10 mW)
Security	Open, WPA, WPA2, WPA2-Enterprise
Enterprise security EAP types	EAP-TLS, EAP-TTLS/MS-CHAPv2, PEAPv0/MS-CHAPv2
Antenna	External RP-SMA omnidirectional dipole

Software Compatibility

For information about operating system support for Windows and iPad, go to *ni.com/info* and enter `vbfeatures`.

Power Requirements

Caution The protection provided by the VirtualBench hardware can be impaired if it is used in a manner not described in the *NI VB-8012 Safety, Environmental, and Regulatory Information* document.

Voltage input range	100 V AC to 240 V AC, 50/60 Hz
Power consumption	100 W maximum
Power input connector	IEC C13 power connector
Power disconnect	The AC power cable provides main power disconnect. Do not position the equipment so that it is difficult to disconnect the power cable. Depressing the front panel power button does not inhibit the internal power supply.

Calibration

Calibration cycle (digital multimeter, mixed signal oscilloscope, function generator, DC power supply)	1 year
Specified temperature	T_{cal} ± 5 °C
Warmup time	30 minutes

Physical Characteristics

Dimensions	
Enclosure	25.40 cm × 19.05 cm × 7.77 cm (10.00 in. × 7.50 in. × 3.06 in.)
Enclosure with connectors and antenna	25.40 cm × 23.37 cm × 14.40 cm (10.00 in. × 9.20 in. × 5.67 in.)

Note Use the VirtualBench instrument in a horizontal orientation. Allow at least 10.16 cm (4.0 in.) of clearance in front and behind the VirtualBench instrument for USB, power, and common connector cabling.

Weight	2.05 kg (4 lb 8.3 oz)
Connectivity	
Mixed signal oscilloscope	BNC
Logic analyzer	2x20 shrouded IDC header

External trigger	BNC
Function generator	BNC
Digital I/O	
Type	Pluggable screw terminal, 3.5 mm (14 position)
Screw terminal wiring	0.1 to 2.0 mm^2 (30 to 14 AWG)
Torque	0.25 N · m (2.2 lb · in.)
Digital multimeter	4 mm banana jacks
DC power supply	
Type	Pluggable screw terminal, 3.81 mm (6 position)
Screw terminal wiring	0.1 to 2.0 mm^2 (30 to 14 AWG)
Torque	0.25 N · m (2.2 lb · in.)
Security cable slot	1, complies with Kensington security slot dimensions

If you need to clean the device, wipe it with a dry towel.

Safety Voltages

Connect only voltages that are within these limits.

DMM Isolation Voltages

Hazardous Voltage This icon denotes a warning advising you to take precautions to avoid electrical shock.

Channel-to-earth ground	
Continuous	300 V, Measurement Category II
Withstand	3,000 V RMS, verified by a 5 s dielectric withstand test

Measurement Category II is for measurements performed on circuits directly connected to the electrical distribution system. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet, for example, 115 V for U.S. or 230 V for Europe.

Caution Do not connect the VirtualBench hardware to signals or use for measurements within Measurement Categories III or IV.

DC Power Supply Isolation Voltages

+25 V and -25 V-to-earth ground, continuous	60 V DC, Measurement Category I

Note Measurement Categories CAT I and CAT O are equivalent. These test and measurement circuits are for other circuits not intended for direct connection to the MAINS building installations of Measurement Categories CAT II, CAT III, or CAT IV.

Environmental

Operating temperature	0 °C to 40 °C
Storage temperature	-20 °C to 70 °C
Operating humidity	10% to 90% RH, noncondensing DMM full accuracy at 10% to 80%
Storage humidity	5% to 95% RH, noncondensing
Cooling	Forced air circulation (positive pressurization) through a fan. Fan speed automatically adjusts according to operating conditions. Intake and exhaust locations are on rear of device. Ensure that the intake and exhaust locations are not obstructed.
Pollution Degree	2
Maximum altitude	2,000 m

Indoor use only.

Shock and Vibration

Operational shock	30 g peak, half-sine, 11 ms pulse
Random vibration	
Operating	5 Hz to 500 Hz, 0.3 g_{rms}
Nonoperating	5 Hz to 500 Hz, 2.4 g_{rms}

Safety Compliance Standards

This product is designed to meet the requirements of the following electrical equipment safety standards for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- IEC 61010-2-030, EN 61010-2-030
- UL 61010-1, CSA C22.2 No. 61010-1
- UL 61010-2-030, CSA C22.2 No. 61010-2-030

Note For safety certifications, refer to the product label or the *Product Certifications and Declarations* section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use; for radio equipment; and for telecommunication terminal equipment:

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- ETSI EN 301 489-1: Common Technical Requirements for Radio Equipment
- ETSI EN 301 489-17: Specific Conditions for Broadband Data Transmission Systems
- AS/NZS CISPR 11: Group 1, Class A emissions
- ICES-001: Class A emissions

Note In Europe, Australia, New Zealand, and Canada (per CISPR 11) Class A equipment is intended for use in non-residential locations.

Note Group 1 equipment is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

Note For EMC declarations and certifications, and additional information, refer to the *Product Certifications and Declarations* section.

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit *ni.com/product-certifications*, search by model number, and click the appropriate link.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Commitment to the Environment* web page at *ni.com/environment*. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

EU and UK Customers

- **Waste Electrical and Electronic Equipment (WEEE)**—At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit *ni.com/environment/weee*.

电子信息产品污染控制管理办法（中国 RoHS）

- **中国 RoHS**—NI 符合中国电子信息产品中限制使用某些有害物质指令（RoHS）。关于 NI 中国 RoHS 合规性信息，请登录 `ni.com/environment/rohs_china`。（For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.）

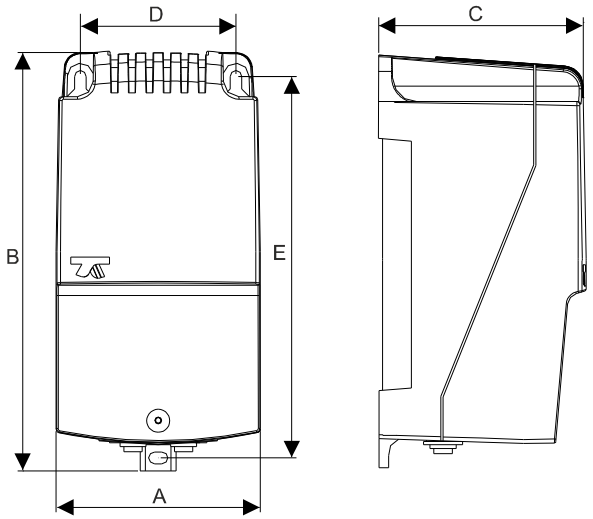
371527E-01 November 17, 2021

ENCASED TRANSFORMER

PVS

Encased protective transformers suited mainly for applications requiring protection against electric shock and high IP grade. PVS is a stationary version, free-standing or wall mounted. The transformers are made with Class II insulation and protection grade IP54, maximum ambient temperature 40°C, thermal class of insulation B (130°C). Manufactured in compliance with EN 61558-2-4 and EN 61558-2-6.

Rated power: 100 - 1000 VA
Rated voltage PRI: 110 - 500 V 50/60 Hz
Rated voltage SEC: 6 - 250 V



Type	Power [VA]	Dimensions [mm] A	B	C	D	E	Mounting	Weight [kg]
PVS 100	100	90	175	90	71	160	M4	2,00
PVS 160	160	105	200	105	80	165	M5	3,10
PVS 250	250	105	200	105	80	165	M5	3,80
PVS 301	300	105	200	105	80	165	M5	3,90
PVS 320	320	123	240	125	105	220	M6	5,50
PVS 630	630	146	272	138	113	255	M5	9,50
PVS 800	800	146	272	138	113	255	M5	10,30
PVS 1000	1000	146	272	138	113	255	M5	10,50

As a result of constant development of product construction and changes concerning technical requirements, Breve Tufvassons reserves the right to change the parameters mentioned above.

BREVE®
ul. Postępowa 25/27, 93-347 Łódź, Polska / Tel. [redacted] / [redacted] / www.breve.pl

CT4026
18 kV High Voltage Probe

Datasheet

Specifications

Operating Parameters	
Maximum Input Voltage (CAT I)	18 kV (DC + ACpk) 12 kVrms AC
Maximum Loading Current	90 µA
Division Ratio	1000:1
Bandwidth	DC to 150 MHz
Compensation Range	10 pF to 35 pF
Temperature Coefficient	≤200 ppm/°C
Input Resistance	200 MΩ
Input Capacitance	1.5 pF
Rise Time	2.4 ns
Signal/Noise	>60 dB @ 1 KHz >50 dB @1 MHz
Accuracy	
DC Volts	≤3%
AC Volts	≤3% at 1 kHz
General	
Cable Length	6.6 ft (2 m)
Designed for Use in	Pollution Degree 2
Operating Environment	14°F to 131°F (-10°C to 55°C)
Storage Temperature	-4°F to 158°F (-20°C to 70°C)
Humidity	≤85% relative humidity at 95°F (35°C)
Dimensions	3.1 x 3.1 x 12.6 in (8 x 8 x 32 cm)
Weight	1.0 lbs (460 g)
Warranty	One-year warranty

Overview:

The Elditest CT4026 is a 18 kV high voltage divider probe for use with both digital and analog oscilloscopes.

Features:

- Input voltage of 18 kV (DC+ACpk)
- 150 MHz bandwidth
- Voltage dividing of 1000:1
- Frequency compensation