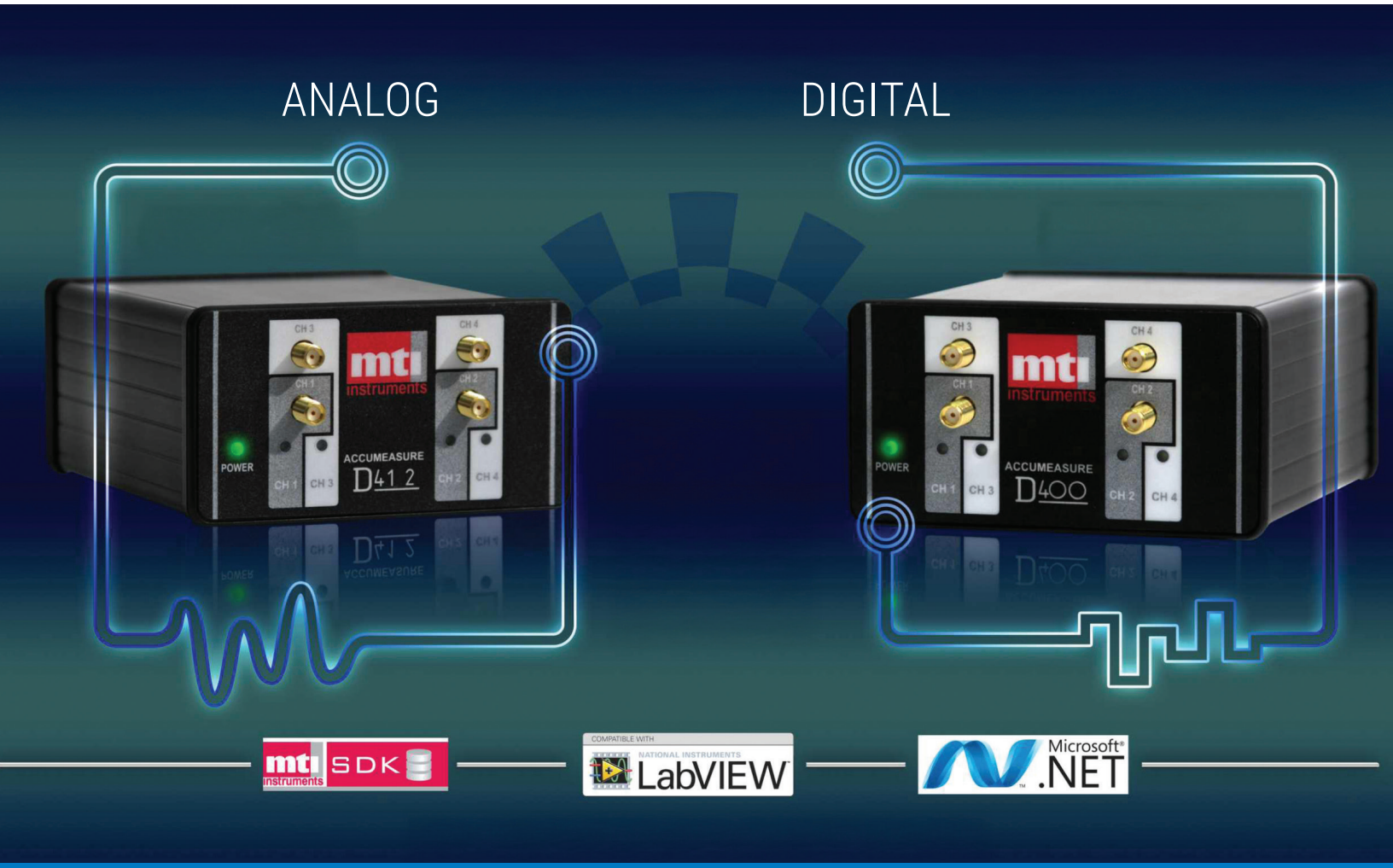
VITREK



mti instruments

Accumeasure D

True Direct Digital Capacitive Displacement Sensor

Highest resolution
0.01% linearity

Core Features

Digitally Controlled (user adjustable):
- Range Extension. One probe - multiple ranges
- Selectable Frequency Filter. 0.1Hz to 5kHz
- Sample Rate. 20kHz

24 bit ADC bit count

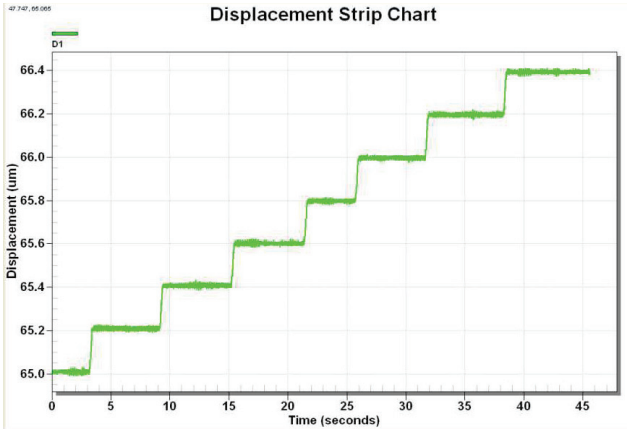
MTI Basic Software included

TM NI LabVIEW Driver Included

.NET (VB, C+, C++) compatible, DLL drivers available

Thickness Mode
- 2 and 4 channel amplifier configuration. A pair of probes needed for thickness.

Multiple Unit Synchronization
- Synchronizes several units together for multiple point measurement, such as sheet metal thickness, semiconductor measurements, etc.



Quadrature Encoder Input

Provides probe positional information simultaneously with its displacement signal. Capacitance displacement amplifiers synchronize displacement measurements to the probe position to provide accurate surface profiles of various target types.

Our software allows user to scale, calibrate and visually display the encoder position(see right).

DLL(Dynamic Link Library) allows encoder calibration to be setup in customized programs.

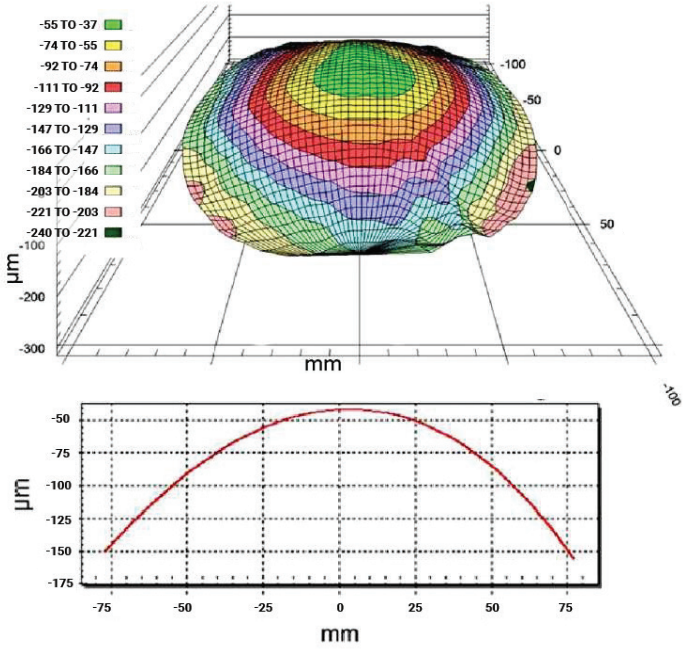
Synchronized Probe Position and Probe Displacement Measurements

Accepts A Quad B

Digital TTL type inputs up to 24VDC encoder input

200kHz Speed

Up to 2 encoder channels



Digital and Analog Output Available

0.1 nanometer resolution (24 bit)

Connects to PLC or PC

Total System Solution
- No external ADC or DAC needed
- Ethernet or 24 bit USB Digital Output

User-Adjustable Analog Output Ranges

User-Adjustable Low Pass Filter

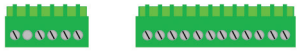
The analog output model includes the analog output in addition to the standard digital output. Both may be used simultaneously. This is ideal for closed loop applications or integration into systems that require analog output.

The analog output models allow users to select 0-5V, 0-10V, -5 to +5V or -10 to +10V output range/span. They feature fast 20(symbol) and a fixed 5 pole, 5kHz filter-- critical features for analog closed-loop applications.

What's in the Box

1, 2, 3, or 4-channel amplifier

DIN rail mount



Detachable terminal blocks

USB flash drive with

- MTI Basic Software
- Users Manual
- Drivers

Ethernet cable (2 m)

- Cat 6 network cable

USB cable

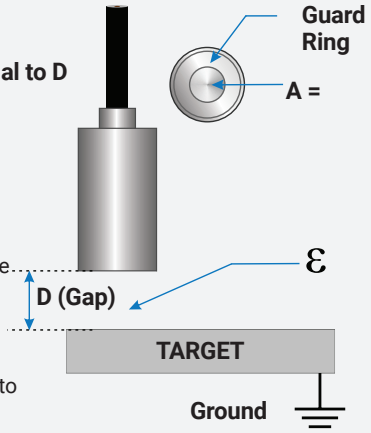
- Type A to Micro-B

The Digital Accumeasure amplifier uses the latest technology to convert highly reliable capacitive electric field measurements (displacement) directly into highly precise 24 bit digital readings.

Where
C = Capacitance
ε = Dielectric constant of the gap medium, typically air
D = Gap distance between the probe and grounded target
A = Probe sensing area

C = Aε/D

C is proportional to D



Our capacitance amplifier converts the probe capacitance directly to target gap (distance). This direct conversion approach eliminates traditional analog amplifier errors due to analog filtering, linearization, range extension and the summing of channels to obtain thickness or step measurements.

Filter frequency response, sample rate, linearization and probe range are all controlled with the Digital Accumeasure to ensure the most accurate data capture, lossless processing and the freedom from having to purchase additional acquisition hardware.

Three Configurations

Grounded Target Measurement

1) SINGLE-ENDED

The Digital Accumeasure accepts from 1 to 4 single electrode probes working against a grounded target for 4 independent displacement readings.

It also includes 2 quadrature encoder Inputs that can be used to track up to two separate probe positions or an X-Y input for two dimensional tracking of a probe position.

Sample Application: To monitor a rotating shaft run out signal (Amplitude versus shaft position) where the shaft also had a rotary encoder attached.

Floating Target Mode of Operation
For targets that are not grounded

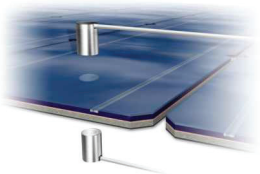
2) 180°

Requires two single - ended capacitance probes that work in tandem. Each is operated 180° out of phase with each other. One probe injects current the other drains it.

This allows either displacement or thickness mode of operation when the target cannot be grounded.

Ideal for measuring thickness of floating targets either conductive or insulating.

For use with 2 and 4 channel systems.



3) PUSH/PULL

Each probe consists of two capacitance sensors, built into one probe body. The sensors are driven at the same voltage but 180 degree phase shift between signals. These probes have fewer operational restrictions when measuring to floating targets as capacitive fringing effects are canceled as the two probes have identical characteristics.

One Push/Pull probe is ideal for displacement measurement, and two Push/Pull Probes for accurate thickness measurement.

For use with 2 or 4 channel systems.

Tip for Accurate Ordering Process

Amplifier Main Product Code

8000-6454-XXX

Probe Configuration

0 = Single-ended probe(s)
*1 = Push/Pull configuration
*2 = 180° configuration

* Applicable to 2 or 4 channels only

# of Channels

Choose from 1 to 4 channels amplifier

Output Type

0 =standard digital output
1 = add analog output

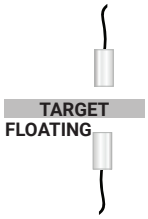
Sample Product Code:

8000-6234-411

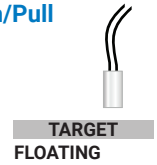
Code means you ordered:
A 4-channel digital Accumeasure with an analog output and with a push/pull configuration

Single-ended

180°



Push/Pull



Specifications

Measurement Range	0 to 12.5mm[1]
Noise	0.000001√Hz FSR
Repeatability	0.000085% FSR (at a fixed point, 1 Hz bandwidth)[2]
Minimum System Resolution	0.100 nm[2]
Long Term Stability/Drift	20ppm /month or better at (±1° C)
Linearity Accuracy	±0.01% FSR[2]
Frequency Response	5kHz
Output Data Rate	100 min. to 20,000 max. (samples per second)
Temperature Stability	100 ppm digital (over 0 to 40°C)
Butterworth Filter	50, 100, 500, 1kHz, or 5kHz
Range Extension	1x and 2x Default. Up to 10X max. optional (see probe charts for max probe range extension permissible)
ADC Bit Count	24-bits
Exponential Filter	No Filtering, 0.1 , 1 or 10 Hz
Basic Interface	Command-Response, ASCII commands
Digital Output	Micro USB or RJ-45 Ethernet 10/100/1000
Analog Output Span	0-5V (14 bit resolution), 0-10V(15 bit resolution), -10V to +10V (16 bit resolution), -5V to +5V (15 bit resolution)
Analog Output Impedance	50 Ω, 5kHz, 5 pole Butterworth Low Pass Filter Limited
Encoder Input	0-24VDC max, Threshold ~1.2 V, 32 bit, Z input/ reset input
Included Software	MTI Basic Software, LabVIEW, .NET, and DLL Drivers
Operating Temperature	0 – 40°C, 95% non-condensing (designed) 20°C, 100kPa, 50%RH (nominal)
Operating Environment	IP40 (particles to 1mm/ no water protection)
Power Requirements	24VDC±1V 50mV ripple, switching speed >60kHz. <8W estimated
Target Ground Return	Integrated with Power Connector
Input Protection	Reverse Polarity (Over Volt to 35VDC)
ESD Protection	±4kV Contact and ±8kV Air
Case Dimensions	2” (53mm) H × 4” (103mm) W × 4.7” (120mm) D
Case Mount	DIN Mount Kit
Probe Connectors	SMA Female

[1] Measurement range is determined by probe selected and amplifier gain (Range Extension)
[2] actual resolution is a function of measurement range and frequency response (please refer to probe brochure for specifications

Features of Included Software

Easy user interface allows exporting data to image files or Excel® CSV files or data logging for data analysis and reports. The user settings tab allows adjustment of range, filter, data rate and other items.

Refer to Accumeasure probe brochures for probe choices.

Vitrek offers a wide variety of standard capacitance probes. Many of our probes also operate at multiple ranges through digital range extension. Consult the probe brochures to determine the maximum range a probe may be extended.

VITREK

vitrek.com

A2LA ACCREDITED CERT #3678.01

MADE IN USA