The Standard for High-Productivity Multi-Channel Leak Testing...

Blackbelt Pro Spotlight Features

- Available in Benchtop and Wall Mount units
- Configurable to provide up to 4 independent test ports
- Synchronous and asynchronous testing capability
- Sequential and conditional linked test capability
- On-board storage for 1 million test results
- Flexible communication capability
  - Ethernet/Telnet, EtherCAT®, Modbus TCP/IP®, Artix®, Modbus RTU
  - Additional I/O: 50 inputs / 53 outputs
- SmartKey™ technology for 21CFR Part 11 compliance
- 45 million cycle valve manifold

Blackbelt Pro Benchtop Instrument for Medical Industry Applications

Blackbelt Pro Wall Mount Instrument for Industrial Applications

EtherNet/IP Communication

- Leak and flow test system integration made easy
- Simple plug-and-play integration with PLCs
- Provides more I/O
- Configurable with a broad range of pressure parameters beyond the industry standards,
  designed to medical device standards.
- The Sentinel Blackbelt Pro™ is our Next Generation of multi-test, multi-port, multi-channel test instrumentation. It manages and simultaneously executes different stations, all under the control of one Blackbelt Pro instrument.

The Blackbelt Pro sets the bar for productivity, flexibility, and communication. It provides leak, flow, pressure, and vacuum testing in one instrument with simultaneous or sequential test capability.

Blackbelt Pro Wall Mount Instrument for Industrial Applications

Other Sentinel Test Instruments and CTS Products

- TracerMate C20 Edition is a standard line of pneumatic connectors, manual connectors, and bar connectors, as well as custom seals. Our line of connectors and custom seals are designed for ease of use, longevity, and reliability.
- CTS Connect offers a standard line of pneumatic connectors, manual connectors, and bar connectors, as well as custom seals. Our line of connectors and custom seals are designed for ease of use, longevity, and reliability.

Other Sentinel Test Instruments and CTS Products

- TracerMate C20 Edition is a precision benchtop decay leak test instrument that integrates easily with PLCs, providing up to 4 test ports, simultaneous, and configurable with a broad range of pressure parameters supported.

Sensitive
Blackbelt Pro

Multi-Channel Leak, Flow, Pressure and Vacuum Instrument

- Provides world-class leak test and assembly verification solutions to industries around the globe.

Configurable with a broad range of pressure parameters beyond the industry standards, designed to medical device standards. Providing up to 4 test ports, sequential, and configurable with a broad range of pressure parameters supported.

Blackbelt: The Blackbelt Pro sets the bar for productivity, flexibility, and communication. It provides leak, flow, pressure, and vacuum testing in one instrument with simultaneous or sequential test capability.

Blackbelt Pro Benchtop Instrument for Medical Industry Applications

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Blackbelt Pro Spotlight Features

- Available in Benchtop and Wall Mount units
- Configurable to provide up to 4 independent test ports
- Leak and flow test system integration made easy
- Digital I/O - 50 inputs / 53 outputs
- CTS EtherNet/IP™ + ODVA™ Conformance Tested

Blackbelt Pro Benchtop Instrument for Medical Industry Applications

Other Sentinel Test Instruments and CTS Products

- Tracermate CS
- Sentinel I28
- Sentinel C28
- Sentinel C20WE

Blackbelt: A plug-and-play integration with PLCs, with capabilities exceeding industry standards, providing up to 4 test ports, expandable I/O, and a download of 21CFR Part 11 compliance.

Other CTS Connect features help with standard instruments, providing up to 4 test ports, expandable I/O, a download of 21CFR Part 11 compliance.
Instrument Highlights
- Leak, flow, pressure, and vacuum testing in one instrument
- Integrated controls and pneumatics
- Concurrent, sequential, and conditional testing
- Test ports and pressure regulators are located on the bottom of the cabinet for easy access
- Standard ranges: -14.5 psig, 0.2-2 psig, 1-30 psig, 1-100 psig, 2-200 psig
- Replacement control to the CTS legacy M24 instrument
- Complimentary control to the Sentinel E2B

Test port configuration shown.

Benchtop Unit
The Benchtop unit is an advanced small packaged design integrated with controls and pneumatics to simultaneously manage and execute up to 4 independent tests: synchronously or asynchronously. The Benchtop is supplied with the test port connections on the front of the unit for easy connection. Pressure regulators are located on the rear of the unit for manual adjustment; optional electronic pressure regulators are available. As standard, the Blackbelt Pro Benchtop is equipped with 1, 2, 3, or 4 1/8-inch FNPT test port connections.

The Benchtop’s communications panel is located on the rear of the enclosure for connectivity to power, I/O, RS232, Ethernet, and USB.

Flexible Communications
- Ethernet/Telnet
- Ethernet™ communications
- RS232 connections (two ports)
- USB – 3 ports
- Digital Hardware I/O - 18 inputs, 18 outputs with Tuning Control Algorithm
- Additional Ethernet/I/O - 14 inputs, 14 outputs pre-defined, or user-programmable
- Program selection: Touchscreen, digital I/O, and RS232 download
- System backup and cloning

Operator Interface
- Large 9 inch touch screen with 800 x 480 LCD display with graphics to display custom charts and XY graphs
- Touchscreen menu selection technology
- Two operation modes: Basic and Advanced
- Language menu interface
- Dolly security
- Multi-lingual password access
- “SmartKey” technology

Certified Performance
Cincinnati Test Systems supplies each standard Blackbelt Pro instrument with a N.I.S.T. Traceable Certificate of Calibration identifying multiple pressure and flow measurement points for its full range of operation.

Available Test Types
Pressure or Vacuum Testing
- Ramp to proof event
- Ramp to input event
- Ramp to pressure event
- Ramp to leak standard
- Pressure decay - ∆P
- Pressure decay over time - ∆P/∆T
- Pressure or vacuum testing
- Pressure decay to leak standard
- Calibration leak masters
- Environmental drift correction

Three test port system shown.

Wall Mount Unit
The Blackbelt Pro Wall Mount is our newest industrial test instrument designed for leak, flow, pressure, and vacuum testing. Its small footprint cabinet provides room for multi-station hardware, wiring, and connections designed for easy installation and maintenance.

Easy access manual pressure regulators are located on the bottom of each cabinet for its 1 to 4 independent test ports.

As an option, the instrument can be equipped with electronic pressure regulators and electrical connections are integrated with controls and pneumatics to simultaneously manage and execute up to 4 independent tests: synchronously or asynchronously.

The Blackbelt Pro Wall Mount is our newest industrial test instrument designed for leak, flow, pressure, and vacuum testing. Its small footprint cabinet provides room for multi-station hardware, wiring, and connections designed for easy installation and maintenance.

The communications panel for the Wall Mount instrument is located on the left side of the instrument and provides connectivity to power, I/O, RS232, Ethernet, and USB.

Test port integrated controls and pneumatics to simultaneously manage and execute up to 4 independent tests: synchronously or asynchronously. The Benchtop is supplied with the test port connections on the front of the unit for easy connection. Pressure regulators are located on the rear of the unit for manual adjustment; optional electronic pressure regulators are available. As standard, the Blackbelt Pro Benchtop is equipped with 1, 2, 3, or 4 1/8-inch FNPT test port connections.

The Benchtop’s communications panel is located on the rear of the enclosure for connectivity to power, I/O, RS232, Ethernet, and USB, and up to 8 pneumatic actuation circuits for sealing actuators.

One Blackbelt Pro instrument can replace 4 single station test instruments.

Leak, Flow, Pressure and Vacuum Testing in One Integrated Unit

Independent Four Port Integrated Testing
**Blackbelt Pro... the next Generation of Multi-Part Test Instruments**

**Wall Mount Unit**
The Blackbelt Pro Wall Mount is our newest industrial test instrument designed for leak, flow, pressure and vacuum testing. Its small footprint cabinet provides room for multi-station hardware, wiring, and connections designed for easy installation and maintenance.

Easy access manual pressure regulators are located on the bottom of each cabinet for its 1 to 4 independent test ports. As an option, the instrument can be equipped with electronic pressure regulators for programmable test pressure control. The communications panel for the Wall Mount instrument is located on the left side of the instrument and provides connectivity to power, I/O, RS232, Ethernet and USB.

**Instrument Highlights**
- Leak, flow, pressure, and vacuum testing in one instrument
- Small footprint multi-station instrument: 16.9 W x 16.6 H x 10.3 D (inches)
- Integrated controls and pneumatics
- Concurrent, sequential and conditional testing
- Test ports and pressure regulators are located on the bottom of the cabinet for easy access
- Standard ranges: -14.5 psig, 0.2-2 psig, 1-30 psig, 1-100 psig, 2-200 psig, 4-400 psig and 5-500 psig
- Replacement control to the CTS Legacy L44 instrument
- Complimentary control to the Sentinel E2i

**Benchtop Unit**
The Benchtop unit is an advanced small packaged design integrated with controls and pneumatics to simultaneously manage and execute up to 4 independent tests, synchronously or asynchronously. The Benchtop is supplied with the test port connections on the front of the unit for easy connection.

Pressure regulators are located on the rear of the unit for manual adjustment; optional electronic pressure regulators are available. As standard, the Blackbelt Pro Benchtop is equipped with 1, 2, 3, or 4 1/8-inch FNPT test port connections.

The Benchtop's communications panel is located on the rear of the enclosure for connectivity to power, USB, RS232, Ethernet, and up to 8 pneumatic actuation circuits for sealing actuators.

**Available Test Types**
- Pressure or Vacuum Testing
- Pressure or Mass Flow Testing
- Ramp to input event
- Ramp to proof event
- Mass flow to leak standard
- Pressure verify over time - ΔP/ΔT
- Pressure decay over time - ΔP
- Environmental drift correction
- Manual adjustment; optional electronic pressure regulators
- Standard Blackbelt Pro Benchtop instrument designed for leak, flow, pressure and vacuum testing in one instrument
- Small footprint multi-station instrument: 16.9 W x 16.6 H x 10.3 D (inches)
- Integrated controls and pneumatics
- Test ports on the front with LED operator lights
- Concurrent, sequential and conditional testing
- Pressure regulators and electrical connections are located on the rear of the unit.
- Standard ranges: -14.5 psig, 0.2-2 psig, 1-30 psig, 1-100 psig, 2-200 psig, 4-400 psig and 5-500 psig

**Sentinel Blackbelt®**
The Sentinel Blackbelt benchtop instrument is the sister control to the new Blackbelt Pro. The Blackbelt Pro provides up to 4-port sequential part testing in a single instrument.

CTS pneumatic manifold rated for 40 million cycle life

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CTS pneumatic manifold rated for 40 million cycle life

**Certified Performance**
Cincinnati Test Systems supplies each standard Blackbelt Pro instrument with a N.I.S.T. Traceable Certificate of Calibration identifying multiple pressure and flow measurement points for its full range of operation.

**Flexible Communications**
- Ethernet/Telnet
- Ethernet™ communications
- RS232 connections (two ports)
- USB 3 ports
- Digital Hardware I/O
- 18 inputs, 12 outputs with Tuning Control Algorithm
- Additional Ethernet/RJ-11 connectors
- Digital I/O - 16 inputs, 10 outputs programmable
- Program selection - Touchscreen digital UI and RS232 download
- System backup and cloning

**Operator Interface**
Large 9 inch touch screen high resolution LCD display with graphics to display custom charts and XY graphs
- Touchscreen menu selection technology
- Two operation modes: Basic and Advanced
- Language neutral interface
- Data security
- Multi-user password access
- Sentinel™ technology

**Instruments and Computers**
- Instrument self-test
- Quick test
- Event instruction
- Absolute pressure transducer
- Broad range of functional test types
- Program linking
- Choice of dual add-on boxes
- Auto calibration
- Calibration leak markers
- Dynamic leak calibration
- Test port connection fittings
- External leak test ports
- Auto calibration to leak std.
- Electronic pressure regulators
- Global language friendly

**Independent Four Port Integrated Testing**
One Blackbelt Pro instrument can replace 4 single station test instruments. One Blackbelt Pro instrument can replace 4 single station test instruments.

**Four test port configuration shown.**

Three test port system shown.
Leak, Flow, Pressure and Vacuum Testing in One Instrument

**Programmer**

- Test port self-test
- Quick test
- Environmental shift correction
- Absolute pressure transducers
- Broad range of functional test types

**Data Security**

- Program linking
- Channelized data backup
- Calibration leak monitors
- Touchscreen calibration

**Electronic Pressure**

- Test port connection fittings
- External leak test ports
- Auto calibration to leak test
- Electronic pressure regulators
- Global language friendly

**Connection to Power, I/O, RS232, Ethernet, and USB.**

- Integrated controls and pneumatics
- Concurrent, sequential, and conditional testing
- Test ports and pressure regulators are located on the bottom of the cabinet for easy access
- Standard ranges: -14.5 psig, 0.2-2 psig, 1-30 psig, 1, 2, 3, or 4 independent test ports
- Replacement control to the CTS legacy M24 instrument
- Complementary control to the Sentinel Blackbelt®

**Port Integrated Testing**

- Four test port configuration shown
- Tooling connections are I/O with LED operator lights
- Mass flow to leak standard
- Pressure or Vacuum Testing
- Ramp to proof event
- Pressure verify
- Ramp to input event
- Ramp to proof event

**Use of Calibration identifying multiple pressure and flow measurement points**

- Mass Flow to leak standard
- Ramp decay to leak standard
- Ramp decay over time - ∆P/∆T
- Pressure transducers
- Pressure regulators and electrical connections are located on the rear of the unit
- Standard ranges: -14 psig, 0.2-2 psig, 1-30 psig.

**Certified Performance**

Cincinnati Test Systems supplies each instrument with a N.I.S.T Traceable Certificate of Calibration identifying multiple pressure and flow measurement points for its full range of operation.

**Operator Interface**

- Large 9” touch screen with res 800 x 480 LCD display with graphics to display custom charts and XY graphs.
- Touchscreen menu selection technology
- Two operation modes: Basic and Advanced
- Language neutral interface
- Daily security
- Multi-level password access
- SmartKey™ technology

**Flexible Communications**

- Ethernet/Tristate
- Ethernet/IP communications
- RS232 connections (two ports)
- USB: 3 ports
- Digital Hardwire I/O: 18 inputs, 18 outputs with True-Logic control I/O programmable
- Additional Ethernet(R)/I/O: 16 inputs – 21 outputs pre-defined - True-Logic I/O programmable
- Program selection: Touchscreen, digital I/O, and RS232 download
- System backup and cloning

**Instrument Highlights**

- Leak, flow, pressure, and vacuum testing in one instrument
- Small footprint multi-port configuration
- Integrated controls and pneumatics
- Concurrent, sequential, and conditional testing
- Test ports and pressure regulators are located on the front of the unit for easy connection
- Pressure regulators are located on the rear of the unit for manual adjustment; optional electronic pressure regulators are available. As standard, the Blackbelt Pro Benchtop is equipped with 1, 2, 3 or 4 1/8-inch HFPT test port connections.
- The Benchtop’s communications panel is located on the rear of the enclosure for connectivity to power, I/O, RS232, Ethernet and USB
- Integrated with controls and pneumatics to simultaneously manage and execute up to 4 independent tests; synchronously or asynchronously. The Benchtop is supplied with the test port connections on the front of the unit for easy connection.
- The communications panel for the Wall Mount instrument is located on the left side of the instrument and provides connectivity to power, I/O, RS232, Ethernet, and USB.

**Benchtop Unit**

- Large 9 inch touch screen hi-res Instrument self-test
- Additional EtherNet/IP I/O - 3 ports
- Mass flow to leak standard
- Pressure verify
- Ramp to input event
- Ramp to proof event

**Available Test Types**

- Pressure or Vacuum Testing
- Ramp to proof event
- Ramp to input event
- Ramp to pressure event
- Ramp to leak standard
- Pressure verify
- Mass flow
- Mass flow to leak standard
- Pressure or Vacuum Testing

**Wall Mount Unit**

The Blackbelt Pro Benchtop is our newest industrial test instrument designed for leak, flow, pressure, and vacuum testing. Its small footprint cabinet provides room for multi-station hardware, wiring, and connections designed for easy installation and maintenance.
The Standard for High-Productivity Multi-Channel Leak Testing...

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Blackbelt Pro Spotlight Features

- Available in Benchtop and Wall Mount units
- Configurable to provide up to 4 independent test ports
- Synchronous and asynchronous testing capability
- Sequential and conditional linked test capability
- On-board storage for 999 programs and test configurations
- On-board storage for 1 million test results
- Flexible communication capability
  - EtherCAT, EtherCAT™, EtherCAT®™, Modbus TCP/IP™, MQTT, OPC-UA™, USB, RS-232, RS-485
- Digital I/O
  - Discrete instrument I/O, 18 I/O and Tooling Control
  - EtherCAT® - Additional 10 inputs / 10 outputs
- Blackbelt™ technology for 21CFR Part 11 compliance
- 45 million cycle valve manifold
- Leak and flow test system integration made easy
- Simple 'plug-and-play' integration with PLCs
- Provides more I/O
- Additional 50 inputs / 53 outputs
- EtherNet/IP™ is ODVA™ Conformance Tested
- For wireless operation and verified data exchange
- EtherNet/IP™ is certified to work with EtherCAT®™, MQTT, OPC-UA™, USB, RS-232, RS-485

Applications

- Medical Industry
  - Provides more I/O
  - Sensitive and configurable with a broad range of pressure and differential pressure decay leak test instruments
  - Designed to medical industry standards, with capabilities exceeding Class 1, and is designed for use in the medical field.

- Industrial Industry
  - The Sentinel Blackbelt Pro™ is our Next Generation of multi-test, multi-port, multi-channel test instrumentation.
  - The Sentinel TracerMate CS is a precision benchtop evacuation and charge instrument designed for use in the medical field.
  - The Sentinel C28 World Edition is a low cost, high-performance, pressure and vacuum test instrument designed for use in the medical field.
  - The Sentinel I28 World Edition is the most advanced multi-port, sequential testing, and configurable with a broad range of pressure and vacuum parameters beyond the capabilities of any other test instrument.

- Specialized Instrumentation
  - The Sentinel I28 World Edition comes with over 40,000,000 cycles of online reliability, ensuring longevity and dependability.
  - The Sentinel TracerMate CS is designed with additional features that are not included in the basic model.
  - The Sentinel I28 World Edition is equipped with additional options, I/O and Tooling Control.
  - Specialized test solutions for special applications.

For more information, please visit our website at www.cincinnati-test.com

Providing world-class leak test and assembly verification solutions to industries around the globe.