

# Technical data

## VT900A + VAPOR

The Fluke Biomedical VT900A + VAPOR is designed to efficiently and reliably perform a full anesthesia machine PM, from ventilators to vaporizers.

### One Solution

VT900A + VAPOR is a comprehensive test setup that can be used to test anesthesia machine ventilators and vaporizers. All flow, concentration and pressure parameters are accurately measured without any additional equipment, allowing you to lighten your load and simplify your test procedure. Calibration and servicing is made easy with one manufacturer for all anesthesia test equipment. Streamline anesthesia machine testing and improve efficiency with one test setup to meet all your needs.

### Auto-detection to Ensure Patient Safety

VT900A + VAPOR automatically detects and identifies CO<sub>2</sub>, N<sub>2</sub>O, sevoflurane, isoflurane, desflurane, halothane and enflurane. Two agents can be displayed simultaneously to comprehensively analyze any anesthesia flow stream making sure that only one agent is being delivered. Automatic agent identification reduces the risk of error and ensures patient safety by eliminating the need for user input and providing a means to test interlock systems and vaporizer contents. Keep patient safety the priority by testing anesthesia machines with equipment you can trust.



### Key benefits and features

- Streamline your testing procedure by performing a complete anesthesia machine PM with one test setup
- Avoid confusion and improve efficiency with auto-detection of anesthetic agents and color-matched gas identification
- Reduce bulk and improve ease of transport with a convenient carrying case for the lightweight accessory and gas flow module
- Operate on-the-go with durable, robust design
- Simplify calibration and servicing with one manufacturer for all anesthesia test equipment
- Reduce testing time with 7-in. color touch screen, quick-connect fitting and complete anesthesia hosing accessory kit
- Confidently test with accuracy that meets vaporizer manufacturer recommendations
- Ensure patient safety with automatic detection and measurement of CO<sub>2</sub>, N<sub>2</sub>O and five commonly used anesthetic agents



### Easy-to-Use

VAPOR seamlessly integrates with the VT900A test system, allowing you to quickly and easily transition from ventilator to vaporizer testing. Set up test procedures easily and read results from up to 6' (1.8m) away with the 7" (17.8 cm) touchscreen display. Reduce risk of error with auto detection and color-matched agent identification. Increase efficiency and reduce test complexity with the intuitive user interface and simple equipment setup. Anesthesia testing made easy.

### Reliable Testing Anywhere

VT900A + VAPOR is a versatile, portable test solution equipped for use in a wide range of environments. Thorough drop testing and a 5-hour (minimum) battery life ensure it will continue to perform during rigorous field service. With best-in-class temperature, pressure, and humidity operating ranges and a convenient carrying case, VT900A + VAPOR can go wherever you do, continuing to perform accurate measurements that meet vaporizer manufacturer recommendations. Trust your results no matter where you test.

| Features                               |   |
|--|---|
| Weight                                 | 0.5 kg  |
| Measured Gases                         | CO <sub>2</sub> , N <sub>2</sub> O, HAL, ISO, ENF, SEV, DES |
| Gas Corrections                        | Pressure and temperature                                    |
| Size                                   | 191 x 96 x 57 mm  |
| Interface                              | RS-232  |
| Measurement Technology                 | NDIR side stream  |
| Warmup Time ISO, full spec             | 45 sec / 10 minutes   |
| Measurement Time                       | < 20 sec  |
| Concentration (full accuracy*)         |   |
| CO <sub>2</sub> % ABS range, accuracy  | 0-1, 0.1  |
|  | 1-5, 0.2  |
|  | 5-7, 0.3  |
|  | 7-10, 0.5   |
| N <sub>2</sub> O % ABS range, accuracy | 0-20, 2   |
|  | 20-100, 3   |
| HAL % ABS range, accuracy              | 0-1, 0.15   |
|  | 1-5, 0.2  |
| SEV % ABS range, accuracy              | 0-1, 0.15   |
|  | 1-5, 0.2  |
|  | 5-8, 0.4  |
| DES % ABS range, accuracy              | 0-1, 0.15   |
|  | 1-5, 0.2  |
|  | 5-10, 0.4   |
|  | 10-15, 0.6  |
| ISO % ABS range, accuracy              | 15-18, 1  |
|  | 0-1, 0.15   |
| ENF % ABS range, accuracy              | 1-5, 0.2  |
|  | 0-1, 0.15   |
|  | 1-5, 0.2  |
|  |   |
| Environmental                          |   |
| Operating temperature                  | 10-40 °C  |
| Operating humidity                     | 10-90%  |

\* warm-up accuracy is lower than full accuracy



Accessory Tee

## Specifications

| Features                  |  |
|---------------------------|--|
| Battery life hours        | 8 hrs  |
| Charge time in hours      | 5 hrs, typical   |
| Memory                    | internal memory  |
| Connection type           | USB, Micro-B device port                               |
| Weight                    | 3.6 lb (1.6 kg)  |
| Display                   | 7 in (17.8 cm)   |
| Single full-range channel | ✓  |
| Ultra-low flow ports      | ±750 ml/min  |
| Ultra-low pressure port   | 0 to 10 mbar   |
| Flow                      |  |
| Full range flow channel   |  |
| Range                     | ±300 slpm  |
| Accuracy (air)            | 1.7 % or 0.04 slpm                                     |
| Ultra-low flow channel    |  |
| Range                     | ±750 ml/min  |
| Accuracy (air)            | ±1.7 % or 0.01 slpm                                    |
| Volume                    |  |
| Range                     | ±100 l   |
| Accuracy                  | ±1.75 % or 0.02 l                                      |
| Pressure                  |  |
| High pressure             |  |
| Range                     | -0.8 to 10 bar   |
| Accuracy                  | ±1 % or ±0.007 bar                                     |
| Differential low pressure |  |
| Range                     | ±160 mbar  |
| Accuracy                  | ±0.5 % or ±0.1 mbar                                    |
| Ultra-low pressure        |  |
| Range                     | 0 to 10 mbar   |
| Accuracy                  | ±1 % or ±0.01 mbar                                     |
| Airway pressure           |  |
| Range                     | ±160 mbar  |
| Accuracy                  | ±0.5 % or ±0.1 mbar                                    |
| Barometric pressure       |  |
| Range                     | 550 to 1240 mbar                                       |
| Accuracy                  | ±1 % or ±5 mbar  |
| Other                     |  |
| Temperature               |  |
| Range                     | 0 to 50 °C   |
| Accuracy                  | ±0.5 °C  |
| Resolution                | 0.1 °C   |
| Humidity                  |  |
| Range                     | 0 to 100 % RH  |
| Accuracy                  | ±3 % RH (20 to 80 % RH)<br>±5 % RH (20 < or > 80 % RH) |
| Oxygen                    |  |
| Range                     | 0 to 100 %   |
| Accuracy                  | ±1 %   |

| Breath parameters   |                           |
|---|---------------------------|
| Inspiratory tidal volume range                              | 0 to 60 l                 |
| Inspiratory tidal volume accuracy                           | ±1.75 % or 0.5 ml         |
| Expiratory tidal volume range                               | 0 to 60 l                 |
| Expiratory tidal volume accuracy                            | ±1.75 % or 0.5 ml         |
| Minute volume range   | 0 to 100 l                |
| Minute volume accuracy                                      | ±1.75 % or 0.5 ml         |
| Breath rate range   | 1 to 1500 bpm             |
| Breath rate accuracy  | ±1 %                      |
| Inspiratory to expiratory time ratio (I:E) range            | 1:300 to 300:1            |
| Inspiratory to expiratory time ratio (I:E) accuracy         | ±2 % or 0.1               |
| Peak inspiratory pressure (PIP) range                       | ±160 mbar                 |
| Peak inspiratory pressure (PIP) accuracy                    | ±0.75 % or 0.1 mbar       |
| Inspiratory pause pressure range                            | ±160 mbar                 |
| Inspiratory pause pressure                                  | ±0.75 % or 0.1 mbar       |
| Mean airway pressure range                                  | ±160 mbar                 |
| Mean airway pressure accuracy                               | ±0.75 % or 0.1 mbar       |
| Positive end expiratory pressure (PEEP) range               | ±160 mbar                 |
| Positive end expiratory pressure (PEEP) accuracy            | ±0.75 % or 0.1 mbar       |
| Lung compliance range                                       | 0 to 1000 ml/mbar         |
| Lung compliance accuracy                                    | ±3 % or 0.1 ml/mbar       |
| Inspiratory time range                                      | 0 to 60 s                 |
| Inspiratory time accuracy                                   | 0.02 s                    |
| Inspiratory hold time range                                 | 0 to 60 s                 |
| Inspiratory hold time accuracy                              | 1 % or 0.1 s              |
| Expiratory time range                                       | 0 to 90 s                 |
| Expiratory time accuracy                                    | 0.5 % or 0.01 s           |
| Expiratory hold time range                                  | 0 to 90 s                 |
| Expiratory hold time accuracy                               | 0.02 s                    |
| Peak expiratory flow range                                  | ±300 lpm                  |
| Peak expiratory flow accuracy                               | ±1.7 % or 0.04 lpm        |
| Peak inspiratory flow range                                 | ±300 lpm                  |
| Peak inspiratory flow accuracy                              | ±1.7 % or 0.04 lpm        |
| Environmental   |                           |
| Operating temp  | 10 °C to 40 °C            |
| Storage temp  | -20 °C to 60 °C           |
| Operating humidity  | 10 to 90 % non-condensing |
| Storage humidity  | 5 to 95 % non-condensing  |
| Gas corrections   |                           |
|   | Gas types                 |
| ATP (ambient temp/pressure, actual humidity)                | Air                       |
| ATPD (ambient temp/pressure, dry)                           | Nitrogen (N2)             |
| ATPS (ambient temp/pressure, saturated)                     | Nitrous Oxide (N2O)       |
| STP20 (20 °C temp/pressure 760 mmHg, actual humidity)       | Carbon Dioxide (CO2)      |
| STP21 (21 °C temp/pressure 760 mmHg, actual humidity)       | Oxygen (O2)               |
| STPD0 (0 °C temp/pressure 760 mmHg, dry)                    | Argon                     |
| STPD20 (20 °C temp/pressure 760 mmHg, dry)                  | Heliox (21 % O2, 79% He)  |
| STP or STPD21 (21 °C temp/pressure 760 mmHg, dry)           | Oxygen/Nitrogen           |
| BTPS (body temp 37 °C/ambient pressure 760 mmHg, saturated) | Oxygen/Nitrous Oxide      |
| BTPD (body temp 37 °C/ambient pressure 760 mmHg, dry)       | Oxygen/Helium             |

## Ordering information

### Includes:

- Bacterial filter (1)
- 1.2 m (4 ft) silicon tubing (2)
- 22 mm ID x 22 mm ID tubing adapters (2)
- 22 mm OD x 22 mm OD tubing adapters (2)
- Tapered 15 mm OD x 33 mm OD tubing adapters (2)
- Flexible 15 mm ID x 22 mm ID tubing adapters (2)
- DISS hand tight nut/nipple to 6.4 mm (1/4 in ) ID hose barb adapter (1)
- USB serial cable
- AC power adapter
- Detachable carrying handle
- Detachable shoulder strap
- Certificate of Calibration with test data
- VAPOR Anesthesia Tester

### Optional accessories

- ACCU LUNG Test Lung
- ACCU LUNG II Test Lung
- VESA Mounting system/test arm



## About Fluke Biomedical

Fluke Biomedical is the world's leading manufacturer of quality biomedical test and simulation products. In addition, Fluke Biomedical provides the latest medical imaging and oncology quality-assurance solutions for regulatory compliance. Highly credentialed and equipped with a NVLAP Lab Code 200566-0 accredited laboratory, Fluke Biomedical also offers the best in quality and customer service for all your equipment calibration needs.

Today, biomedical personnel must meet the increasing regulatory pressures, higher quality standards, and rapid technological growth, while performing their work faster and more efficiently than ever. Fluke Biomedical provides a diverse range of software and hardware tools to meet today's challenges.

## Fluke Biomedical regulatory commitment

As a medical test device manufacturer, we recognize and follow certain quality standards and certifications when developing our products. We are ISO 9001 and ISO 13485 medical device certified and our products are:

- CE Certified, where required
- NIST Traceable and Calibrated
- UL, CSA, ETL Certified, where required
- NRC Compliant, where required

## Fluke Biomedical.

*Trusted for the measurements that matter.*

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