

Monitoring & Critical Care

Midmark Animal Health Products



Cardell®...the name you trust for veterinary monitoring.

A family of monitoring solutions that deliver unmatched performance in exam, treatment and surgery.



The Cardell® Family of Monitors



From diagnostic to multiparameter monitoring, Cardell® BP technology quickly provides the most accurate and consistent readings. Advanced motion artifact suppression technology eliminates errors caused by shivering, panting or other movement common with animals. Readings are displayed in 15-20 seconds providing critical information needed to get ahead of potential issues with your patient's health.

Trusted...

- Used at every U.S. veterinary school and others around the world
- Most recommended BP monitor on VIN
- Thousands of practices worldwide including major emergency/referral centers
- Validated in published, peer-reviewed studies on cats, dogs and more
- Preferred by top teaching hospitals
- Used at world's leading referral/emergency practices

Supported...

- Full-time clinical support team you can call for help
- Leading provider to monitoring wet labs at national/regional conferences
- RACE certified provider of monitoring education
- Special programs for teaching institutions
- Free demo equipment available

Recommended...

"The Cardell® Monitor has proven to be an effective tool because it is easy to use and delivers reliable readings, even on cats, kittens and puppies."

Lorraine K. Jarboe, DVM, DABVP

2010 President, American Association of Feline Practitioners

"I have tried many of the monitors on the market today, and I went with Cardell® because it accomplished the goals that we needed. It is accurate, simple to use, and our technicians really love it."

Fred Metzger, DVM, DABVP

Owner Metzger Animal Hospital, State College, PA

"We need patient monitors that are reliable workhorses that we can count on at all times, in all situations. Cardell® Monitors pull all of the best technologies together in a family of monitors that are used throughout our hospitals."

Neil Shaw, DVM, DACVIM

Medical Director, Blue Pearl Vet

Check out midmark.com/cardell
for more testimonials and
published studies!



From minor dental treatments to complex invasive surgeries, Cardell® multiparameter monitors reduce the clutter created by one parameter diagnostic devices and collect vital sign metrics for a consolidated record of patient health during procedures.



Cardell® MAX-12 HD

Start with the solid foundation of Cardell® veterinary blood pressure, Nellcor SpO₂, ECG and YSI temperature, and upgrade to CO₂ at any time with your choice of Philips/Respironics mainstream or sidestream modules. The 12" high-definition color screen is the brightest and most vivid display you can find. You can even download cases to a USB drive for easy transfer to your PC.

Popular uses:

- Best all around high-performance monitor
- Dedicated surgical/anesthesia monitor
- Pre-anesthesia diagnostic work up
- Preferred by top teaching hospitals
- Used at world's leading referral/emergency practices

Distinctive features:

- Upgrade to CO₂ anytime; mainstream or sidestream
- Simple download to USB drive for transfer to a PC
- High-definition 12" color screen with ultra-wide viewing angle
- Up to 8 waveform channels, fully customizable
- Default veterinary alarm limits (dog, cat, horse)
- 12 minute full memory of ECG waveform
- Diagnostic ECG tools and 3-channel, 50 mm/sec printing
- Optional invasive BP, anesthetic agent monitoring
- Serial, ethernet, VGA and USB outputs
- Free esophageal ECG/Temp probe
- 2-year warranty; 1-year on battery pack



Cardell® Max-12 HD
on a Matrix VMS Plus™



High-definition 12" color screen with ultra-wide viewing angle and up to 8 waveform channels, fully customizable

Download case history, including 12 minute ECG, to USB for transfer to PC

Intuitive menu navigation for simple patient set-up

Integrated 3-channel printer comes standard, prints waveforms or tabular readings, with manual, alarm-triggered and timed printing options

Add CO₂ anytime.

This "anesthesia distaster early warning system" will alert you of trouble within 2 breaths – head off trouble early for a safer, less stressful case.



C-Stat
Solid-state, durable mainstream CO₂ probe for intubated patients



LoFlo
Sidestream CO₂ module sampling at <50 mm/sec. Perfect for your smallest patients or horses with large ET tubes

Multiparameter Monitoring in a compact size.

Cardell® 9500 and 9400 compact series monitors come in a variety of parameter combinations that allow you to choose the ones that are most relevant to you without giving up the convenience of a consolidated patient record.

Cardell® 9500 HD

Our most popular monitor, the 9500 HD, is extremely versatile and can be used as your primary anesthetic monitor or moved with your patients from exam room, to treatment, to surgery. Portable, simple to use and a solid performer, the 9500 HD is the model with all the performance you need, yet designed to fit where you need it most.

Popular uses:

- All-around practice monitor
- Portable monitor that can be moved around the hospital
- Dental suites
- Where space-saving design & all the performance is a plus
- Mobile practices

Distinctive features:

- Bright 7" HD color screen with ultra-wide viewing angle
- Upgrade to CO₂ anytime; mainstream or sidestream
- Built-in printer (waveforms/data) with auto/timed options
- Simple menu is easy for staff to learn
- Large-number mode can be seen from across the room
- Preset veterinary alarm limits; fully customizable
- 24 hours of tabular data recall
- BP, SpO₂, ECG, Temp (2), CO₂ + Respiration
- Free Esophageal ECG/Temp probe
- 2-year warranty; 1-year on battery pack



Cardell® 9500 HD

Cardell® 9400 Series

A compact, durable workhorse for the space conscious practice, the 9400 series monitors are lightweight and fit on the palm of your hand. Their no-nonsense interface makes them easy to use, and they're designed to fit anywhere you need them: on a narrow shelf, hanging on a cage or IV stand, or in a carry bag for ultimate mobility.

Popular uses:

- Anesthesia and surgical monitoring
- All areas including exam, treatment, surgery, recovery
- Transport and mobile environments – monitoring patients that are moving around your hospital
- Anywhere space is limited
- Mobile practices and field monitoring purposes

Distinctive features:

- Under 5 lbs. fully loaded with 5 parameters plus temp
- Powered by AC, or up to 4 hours on battery
- Serial port to download data to PC
- 24 hours of data and alarm event history
- Simple menu and button operation – easy for staff to learn
- Preset veterinary alarm limits; fully customizable
- 4 different parameter combinations
- 2-year warranty; 1-year on battery pack

9405 BP: CO₂, SpO₂, ECG, Temp

9404 BP: ECG, Temp

9403 BP: SpO₂, ECG, Temp

9454: SpO₂, ECG, Temp



Cardell® 9405 BP



No other blood pressure monitor manufactured today has as many peer-reviewed, published studies comparing its accuracy and reliability to direct invasive blood pressure, the gold standard. Following are two studies that have validated the Cardell® non-invasive blood pressure for reliability and accuracy for use on animals versus direct pressure.

Sawyer DC, Guikema AH, Siegel EM. Evaluation of a new oscillometric blood pressure monitor in isoflurane-anesthetized dogs. *Vet Anaesth Analg*. 2004 Jan;31(1):27-39.

Pedersen KM, Butler MA, Ersboll AK, Pedersen HD. Evaluation of an oscillometric blood pressure monitor for use in anesthetized cats. *J Am Vet Med Assoc*. 2002 Sep 1;221(5):546-50.

Diagnostic Monitoring

Guaranteed blood pressure readings, even in cats.

Cardell® 9401

- The 9401 provides systolic, diastolic, mean arterial pressure and heart rate in seconds
- Screening mode automatically calculates average of last five readings
- Pulse rate range from 20 to 300 beats/minute
- Set auto measurement from 1-90 minutes
- AC or rechargeable battery (4 hours). Works on 100 volt to 240 volt
- Stores 99 minutes of readings or last 5 hours
- High and low alarm setting for all parameters
- 13 cuffs in 7 different sizes included
- 3-year warranty; 1-year on battery pack

Cardell® 9402 Diagnostic Monitor

- Same as 9401 plus Nellcor SpO₂
- Gold standard technology is excellent even with poorly perfused patients that are moving, shivering or panting



Cardell® 9401



"We are so pleased...cats that usually put up a fight when getting a BP are relaxed, and we have found that the results are more accurate. And the cats and staff are much happier. We have even used it on the cats we sedate for exam, prior to sedation, and they don't even notice."

Jamie Bohn, CVT & Practice Mgr.,
The Cat Doctors, Tampa, FL

Affordable wellness programs that add value to patients and your clinic.

Adding blood pressure screening to your exam room protocol can help create a profile for your patient that provides historical information that is valuable in an emergency situation. And, this will allow you to detect the early signs of underlying diseases that emerge as pets age. By nominally increasing your exam fee, you will earn a handsome return on your investment while providing a diagnostic service that many pet owners expect is a standard of care.

Earn a handsome return by screening 5 patients per day.

5 screenings/day x \$10 = \$1,000/month
 = \$12,000/year
 = \$120,000/lifetime

Indications for blood pressure screening:

- Mature (7-9 yrs) – baseline at annual exam
- Senior (10-14 yrs) – semi-annual exam
- Geriatric (14+ yrs) – semi-annual exam
- Pre-anesthesia workup
- Marked obesity
- Acute or chronic kidney disease
- Hyperthyroidism
- Hyperadrenocorticism
- Diabetes mellitus
- Hyperaldosteronism
- Pheochromocytoma



Criteria	Doppler	Cardell
Measures systolic blood pressure	✓	✓
Measures diastolic blood pressure		✓
Measures MAP		✓
Measures pulse rate		✓
Has automated cycle		✓
Has user-selectable alarms		✓
Detects artifacts		✓
Efficient and user-friendly		✓
Noise will NOT interfere		✓
Patient acceptance		✓
Simple measurement process		✓
Mode of operation	Measures individual pulse wave, momentary situation	Average all pulse waves over 10-15 seconds
Prep of measurement site	Shear & apply gel	NONE
Canine measurements	Can be learned with some practice	Easy to learn
Feline measurements	Can be learned with some practice	Can be learned with some practice

Diagnostic Monitoring

CardEX™ for simple, reliable and accurate veterinary ECG.



CardEX™ 300

- Complete digital design with veterinary specific algorithms
- Simultaneous 5-lead acquisition
- Supports all 7 vectors (Leads I, II, III, aVR, aVL, aVF, V)
- High-resolution built-in 3-channel thermal printing
- Four print modes (auto, manual, rhythm, USB)
- Print speeds (mm/sec) 5, 6.25, 10, 12.5, 25, 50
- LCD waveform display; configurable
- Multiple digital filters avoid baseline drift, AC, EMG interference
- Automatic baseline adjustment for optimal recording
- Lead-off detection/alarm; paper-out, low-battery alerts
- 120 patient data storage
- Transfer to PC via USB drive, ethernet or serial port
- ECG data can be reviewed and managed on Windows® software (optional)
- Built-in high capacity rechargeable Li-ion battery (>3 hrs); AC/DC supply
- Well-designed touch panel for easy operation
- Auto or manual operation
- Light (5.5 lbs) and compact; optional carry bag



CardEX™ 300

CardEX™ 100

- Similar to CardEx™ 300 without PC connectivity
- 3-lead acquisition, single channel

Why diagnostic ECG?

Dedicating this specialized tool to your exam room will allow your practice to enhance the medical treatment and diagnosis offered. It will also handsomely reward your bottom line. Running only one ECG per day can add over \$100,000 to the value of your practice over the life of the equipment and pay back your investment in a few weeks.

Accessories

Each of our monitors come with the accessories needed for full monitoring capability, including cuffs, probes, sensors and connecting cables appropriate for the parameters chosen. They have been carefully selected to allow optimum performance on animals. Several optional accessories are available. Consider stocking spares of key accessories should they require replacement due to accident or normal wear-and-tear.



Our Cardell® BP kit includes 7 different cuff sizes ranging from 2-10cm in width, for the widest range of patients. Our cuffs are made from a soft, hypoallergenic material for a gentle fit, and the complimentary Cardell® Cuff Selector will help you choose the right one.



CO₂ kits include sampling tubes and adapters in two sizes to help minimize dead space for safer, more accurate readings. Sidestream sample lines have built-in filters for moisture management without messy water traps.



Nellcor V-SAT pulse ox sensors include durable non-slip clips in two sizes, and we include a 10 ft. extension cable. Most frequently applied to the tongue, they can also be used on the lip, ear, toe-webbing, prepuce or vulva.



ECG cables and leadwires have been paired with copper clips, chosen for maleability and ultra-conductivity to produce gentle, accurate readings. Includes electrode gel to help sustain readings after the alcohol evaporates.



YSI temp probes are durable and deliver accurate readings from either end of the patient. A large probe is included with the 9500 HD and MAX-12 models, and is free with the 9403/4/5 online warranty registration. Small probe also available.



Clean up your work space - an esophageal ECG probe combines 3-lead ECG, temperature and respiration into one probe for the 9500 HD/MAX-12. It comes in 3 sizes (XS, S, L). Receive a small probe for free with your online warranty registration.



A low cost alternative to the V-SAT pulse ox lingual sensor, the MAXFAST-1 reflectance sensor can be applied to the tail (wrap included), and is perfect during head and neck surgery or during dental procedures.



Compact & lightweight, the 9400 series monitors travel well. This custom-designed nylon bag has access flaps for all connections and the buttons can be pressed through the viewing window for self-contained monitoring, protected from the elements.



Rolling stands are available for each of the Cardell® monitors to help protect your investment and allow for easy movement around the room or between hospital locations. All stands also feature a storage basket for accessories and user manuals.

Specifications

	9401/9402	9403/9404/9405	9500HD	MAX-12HD
Non-invasive Blood Pressure (NIBP)	Cardell® NIBP	Cardell® NIBP	Cardell® NIBP	Cardell® NIBP
Pulse Oximetry (SpO ₂)	Nellcor Oximax® 9402	Nellcor Oximax® 9403/9405	Nellcor Oximax®	Nellcor Oximax®
End Tidal Carbon Dioxide (EtCO ₂)	No	Oridion Microstream® sidestream 9405	Optional (add anytime) CAPNOSTAT® mainstream or LoFlo sidestream	Optional (add anytime) CAPNOSTAT® mainstream or LoFlo sidestream
ECG	SpO ₂ Pulse Rate (9402)	3 Lead Standard, 5 Lead Optional	3 Lead Standard, 5 Lead Optional	5 Lead Standard
HR/PR	9402 (PR)	9403 & 9405 (HR/PR) 9404 (HR)	HR/PR	HR/PR
Temperature	No	1-Channel YSI	2-Channel YSI	2-Channel YSI
Respiration/Method	No	Indirect: Impedance Direct: EtCO ₂ (9405)	Indirect: Impedance Direct: EtCO ₂ (optional)	Indirect: Impedance Direct: EtCO ₂ (optional)
Invasive Blood Pressure	No	No	No	2-Channel (optional) MAX-12 DUO HDi MAX-12 HDim
Anesthetic Agents	No	No	No	Draeger 5-Agent (optional) N ₂ O, CO ₂ , Iso, Sevo, Des, Enfl, Halo MAX-12 HDm MAX-12 HDim
Display	LED Numeric	5.7" B&W	7" HD Color	12.1" HD Color
Printer	Optional (external)	Optional (external)	Standard (built-in)	Standard (built-in)
Waveform Display	N/A	3 Channel (user defined)	4 Channel (static)	6-8 Channel (user defined)
ECG Vector Waveform Display	N/A	2 Channel	1 Channel	7 Channel
ECG Recall	N/A	N/A	N/A	12 Minutes
ECG Gain	N/A	Auto, X1, X2, X4, X8, X16	Auto, X1, X2, X4	Auto, X1, X2, X4
HR Range	N/A	20-300 bpm	15-300 bpm	15-300 bpm
NIBP Modes	Manual, Auto, Screening	Manual, Auto, Stat	Manual, Auto, Stat	Manual, Auto, Stat
Graphical Trends	N/A	N/A	24 Hours	120 Hours
Tabular Trends	480	480	600	600
Parameter Alarms	User defined high/low	User defined high/low with 2 settings	User defined high/low	User defined high/low with 4 defaults (cat, dog, horse, other)
Download to PC	No	Serial Port	No	USB stick
Interface with Practice Management Software	No	Vital Record™ PDF Report	No	Outputs in Excel
Video Output	No	No	No	Yes
Weight	3 lbs	4.1 lbs	8.4 lbs	16 lbs
Battery Life	4 Hours	4 Hours	1.5 Hours	3 Hours
Voltage	100-240V	100-240V	100-240V	100-240V
Warranty on Monitor (years)	3	2	2	2

Blood Pressure - Cardell®	Pulse Oximetry (SpO ₂) - Nellcor	EtCO ₂ - Mainstream	EtCO ₂ - Sidestream
<p>Technique: Oscillometric</p> <p>Parameters: Systolic, diastolic, mean</p> <p>Automatic Cycle Times: 1,2,3,4,5,10,15,30,60 min.</p> <p>Determination Time:</p> <ul style="list-style-type: none"> - Small cuff: 18 seconds typical @ 160 BPM 120/80 - Large cuff: 26 seconds typical @75 BPM 120/80 <p>Max time allowed: 150 sec.</p> <p>Initial Inflation: 150 mmHg</p> <p>Range: 20-265 mmHg</p> <p>Motion Artifact Suppression: Yes</p>	<p>Oxygen Sat. Range: 0-100%</p> <p>SpO₂ Accuracy: 70-100% = ±2%</p> <p>Pulse Rate Range: 20-300 BPM</p> <p>Probe: Digital lingual sensor w/ small and large clips</p> <p>Optional Probe: Max-Fast™ reflectance</p> <p style="text-align: center;">ECG</p> <p>Heart Rate Range: 20-300 BPM</p> <p>Lead Selection: I, II, III, aVR, aVL, aVF, V</p> <p>Lead Fault Alarm: Audible, Visual</p> <p>ECG Cable/Leadwire: 3 or 5 lead</p> <p>Sweep Speed: 12.5/25/50 mm/sec.</p> <p>ECG Calibration: 1mV</p>	<p>Brand: Respirationics CStat probe</p> <p>Principle of Operation: Non-dispersive infrared (NDIR) single beam optics, dual wavelength, no moving parts</p> <p>Initialization: <15 sec. – full 2 min.</p> <p>Range: 0-150 mmHg, 0-20 kPa</p> <p>Respiration Rate Range: 0-150 BrPM</p> <p>Routine Calibration: None</p> <p>Durability: 100x6ft drop test</p> <p>Airway adapters/dead space: Regular (7mL), Small (<1mL)</p>	<p>Sample rate: 50 mL/min</p> <p>Routine Calibration: None</p> <p>Model 9405</p> <p>Brand: Microstream® Oridion, built-in</p> <p>Range: 0-99 mmHg, 0-13.2 kPa</p> <p>Initialization: <30 sec. – full 20 min.</p> <p>Airway adapters/dead space: Reg. (7mL), Small (<1mL)</p> <p>Models 9500HD & MAX-12 DUO</p> <p>Brand: Respirationics modular</p> <p>Range: 0-150 mmHg, 0-20 kPa</p> <p>Initialization: <15 sec. – full 2 min.</p> <p>Airway adapters/dead space: Reg. (7mL), Small (<1mL), Optional Leuer-lock line for large ET tubes</p>



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Because we care.