

BeneView T9/T8/T6/T5

Patient monitor



Physical Specifications

| | |
|------------------|--|
| Weight | T9: <12kg(26.4lbs) T8/T6: <9.9kg(21.8lbs) T5: <6.6kg(14.6lbs) (Standard configuration, excluding modules, recorder, batteries and accessories.) |
| Size | T9: 435×404×202.5 mm (17.1" x 15.9" x 8") T8/T6: 400 x 370 x 193 mm (15.7" x 14.6" x 7.6") T5: 297 x 336 x 186 mm (11.7" x 13.2" x 7.3") |
| Display screen | Medical-grade color TFT LCD, touch screen T9: 19-inch, 1280 x 1024 pixels T8: 17-inch, 1280 x 1024 pixels T6: 15-inch, 1024 x 768 pixels T5: 12.1-inch, 800 x 600 pixels |
| Display traces | T9/T8: Up to 12 waveforms T6: Up to 10 waveforms T5: Up to 8 waveforms |
| External display | 1 display through DVI-D connector 2 display through RDD |

ECG

Meet standards of IEC 60601-2-27 and IEC 60601-2-25.

| | |
|---|--|
| Lead set | 3-lead: I, II, III 5-lead: I, II, III, aVR, aVL, aVF, V 12-lead: I, II, III, aVR, aVL, aVF, V1 to V6 Automatic 3/5/12 - lead recognition. |
| Input signal range | ± 8 mV (p-p) |
| Electrode offset potential tolerance | ± 500 mV |
| Gain | x 0.125, x 0.25, x 0.5, x 1, x 2, x 4, auto |
| Sweep speed | 6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s |
| Waveform format | Standard, Cabrera |
| Bandwidth | Diagnostic mode: 0.05 to 150 Hz Monitor mode: 0.5 to 40 Hz Surgical mode: 1 to 20 Hz ST mode: 0.05 to 40 Hz |
| CMRR | Diagnostic: > 90 dB Monitor, Surgical, ST mode: > 105 dB |
| Pace detection | Amplitude: ± 2 mV to ± 700 mV Width: 0.1 to 2 ms Rise time: 10 to 100 µs (without overshoot) |
| Defib. protection | Withstand 5000V (360J) defibrillation |
| Defib. recovery time | ≤5 s |
| ESU recovery time | ≤10 s |
| Provides Glasgow resting 12-lead ECG algorithm. | |

Heart Rate

| | |
|---------------|--|
| HR range | Adult: 15 to 300 bpm Pediatric/Neonate: 15 to 350 bpm |
| HR accuracy | ± 1 bpm or ± 1%, whichever is greater. |
| HR resolution | 1 bpm |

Arrhythmia Analysis

Intended use for adult, pediatric.

Multi-lead, 24 classifications. Asystole, VFib/VTac, Vtac, Vent. Brady, Extreme Tachy, Extreme Brady, Vrrhythm, PVCs/min, Couplet, Bigeminy, Trigeminy, R on T, Run PVCs, PVC, Tachy, Brady, Missed Beats, PNP, PNC, Multif. PVC, Nonsus. Vtac, Pause, Irr. Rhythm., Afib.

ST Segment Analysis

Intended use for adult, and pediatric.

| | |
|----------|-------------------|
| ST range | - 2.0 to + 2.0 mV |
|----------|-------------------|

| | |
|---------------|---|
| ST range | - 2.0 to + 2.0 mV |
| ST accuracy | ± 0.02 mV or ± 10%, whichever is greater (- 0.8 to + 0.8 mV) |
| ST resolution | 0.01 mV |

QT Analysis

Intended use for adult, pediatric, and neonate.

| | |
|----------------|--|
| Parameters | QT, QTc, ΔQTc |
| QTc formula | Bazett, Fridericia, Framingham, or Hodges |
| QT/QTc range | 200 to 800 ms |
| QT accuracy | ± 30 ms |
| QT resolution | 4 ms |
| QTc resolution | 1 ms |
| QT-HR range | Adult: 15 to 150 bpm Pediatric/Neonate: 15 to 180 bpm |

Respiration

| | |
|---------------|--|
| Lead | I or II, auto |
| RR range | 0 to 200 rpm |
| RR Accuracy | ± 1 rpm (0 to 120 rpm), ± 2 rpm (121 to 200 rpm) |
| RR Resolution | 1 rpm |
| Apnea time | 10, 15, 20, 25, 30, 35, 40 s |
| Sweep speed | 3mm/s, 6.25mm/s, 12.5mm/s, 25mm/s, 50 mm/s |

SpO₂

Meet standards of ISO 80601-2-61.

| | |
|-----------------------|--|
| Range | 0 to 100% |
| Resolution | 1% |
| Mindray accuracy | ±2% (70-100%, Adu/Ped, non-motion) ±3% (70-100%, Neo, non-motion) ±3% (70-100%, motion) Unspecified (0-69%) |
| Masimo accuracy | ±2% (70-100%, Adu/Ped, non-motion) ±3% (70-100%, Neo, non-motion) ±3% (70-100%, motion) Unspecified (0-69%) |
| Nellcor accuracy | Actual accuracy depends on probe. Refer to the operator's manual. |
| Refreshing rate | 1 s |
| Dual SpO ₂ | SpO ₂ , SpO ₂ b, Δ SpO ₂ |

PR

| | |
|-----------------|---|
| PR range | 20 to 300 bpm (SpO ₂) 25 to 350 bpm (IBP) 30 to 300 bpm (NIBP) |
| PR accuracy | ± 3 bpm (20 to 300 bpm, Mindray SpO ₂) ± 3 bpm (20 to 250 bpm, Nellcor SpO ₂) ±1 bpm or ± 1 %, whichever is greater (IBP) ± 3 bpm or ± 3 %, whichever is greater(NIBP) |
| Refreshing rate | 1 s |

Temperature

Meet standard of ISO 80601-2-56.

| | |
|-----------------|--------------------------------------|
| Technique | Thermal resistance |
| Channels | Up to 4 channels |
| Temp range | 0 to 50 °C (32 to 122 °F) |
| Temp accuracy | ± 0.1 °C or ± 0.2 °F (without probe) |
| Temp resolution | 0.1 °C |
| Refreshing rate | 1 s |

NIBP

Meet standards of ISO 80601-2-30.

| | |
|---------------------------|---|
| Technique | Oscillometry |
| Operation mode | Manual, Auto, STAT, Sequence |
| Parameters | Systolic, Diastolic, Mean |
| Max Measurement time | Adult/Pediatric: 180 s, Neonate: 90 s |
| Systolic range | Adult: 25 to 290 mmHg Pediatric: 25 to 240 mmHg Neonate: 25 to 140 mmHg |
| Diastolic range | Adult: 10 to 250 mmHg Pediatric: 10 to 200 mmHg Neonate: 10 to 115 mmHg |
| Mean range | Adult: 15 to 260 mmHg Pediatric: 15 to 215 mmHg Neonate: 15 to 125 mmHg |
| NIBP accuracy | Max mean error: ± 5 mmHg Max standard deviation: 8 mmHg |
| NIBP resolution | 1 mmHg |
| Assisting Venous Puncture | Yes |

IBP

Meet standard of IEC 60601-2-34.

| | |
|--------------------------------|---|
| Channels | Up to 8 channels |
| Sensitivity | 5 $\mu\text{V/V/mmHg}$ |
| Impedance range | 300 to 3000 Ω |
| IBP range | -50 to 360 mmHg |
| IBP accuracy | ± 1 mmHg or ± 2 %, whichever is greater |
| IBP resolution | 1 mmHg |
| PPV range | 0 to 50 % |
| PAWP | Yes |
| ICP measurement | Support |
| Support waveforms overlapping. | |

C.O.

| | |
|-------------------|--|
| Technique | Thermodilution |
| C.O. range | 0.1 to 20 L/min |
| C.O. accuracy | ± 0.1 L/min or ± 5 %, whichever is greater |
| C.O. resolution | 0.1 L/min |
| TB range | 23 to 43 °C (73.4 to 109.4 °F) |
| TI range | 0 to 27 °C (32 to 80.6 °F) |
| TB, TI accuracy | ± 0.1 °C (without sensor) |
| TB, TI resolution | 0.1 °C |

PiCCO

| Parameters | Measurement range | Coefficient of variation |
|------------|--------------------|--------------------------|
| CCO | 0.25 to 25.0 L/min | ≤ 2 % |
| C.O. | 0.25 to 25.0 L/min | ≤ 2 % |
| GEDV | 40 to 4800 ml | ≤ 3 % |
| SV | 1 to 250 ml | ≤ 2 % |
| EVLW | 10 to 5000 ml | ≤ 6 % |
| ITBV | 50 to 6000 ml | ≤ 3 % |

(Coefficient of variation is measured using synthetic and/or database wave forms (laboratory testing.) Coefficient of variation= SD/mean error.)

| | |
|--------------------|---|
| TB range | 25 to 45 °C |
| TB accuracy | ± 0.1 °C (without sensor) |
| TI range | 0 to 30 °C |
| TI accuracy | ± 0.1 °C (without sensor) |
| pArt/pCVP range | -50 to 300 mmHg |
| pArt/pCVP accuracy | ± 1 mmHg or ± 2 %, whichever is greater |

ScvO₂

| | |
|----------------------------|------------------------|
| ScvO ₂ range | 0 to 99 % |
| ScvO ₂ accuracy | ± 3 % (50 to 80 %) |

ICG

| | |
|--------------------------------|---|
| Technique | Thoracic electrical bioimpedance (TEB) |
| Provides monitoring parameters | ACI, VI, PEP, LVET, TFI, TFC, HR, C.O., C.I., SV, SVI, SVR, SVRI, PVR, PVRI, LCW, LCWI, LVSW, LVSWI, STR, VEPT. |
| HR range | 44 to 200 bpm (ICG), accuracy ± 2 bpm |
| C.O. range | 1.0 to 15 L/min |
| SV range | 5 to 250 ml |

CCO/SvO₂

Interfaces with Edwards Vigilance II, Vigileo, or EV1000 monitor.

Vigilance II: CCO, CCI, C.O., C.I., SV, SVI, SVR, SVRI, RVEF, EDV, EDVI, ESV, ESVI, TB, SaO₂, VO₂, O₂El, DO₂, ScvO₂, SvO₂, SQL.

Vigileo: CCO, CCI, SV, SVI, SVR, SVRI, ScvO₂, SvO₂.

EV1000: CCO, CCI, C.O., C.I., SV, SVI, GEF, CFI, GEDV, GEDI, ITBV, ITBI, SVV, CVP, SVR, SVRI, MAP, EVLW, EVWI, PVPI, TB., SvO₂, ScvO₂, DO₂, DO₂I, VO₂, VO₂e, VO₂le, SpO₂.

Artema Sidestream CO₂

Meet standard of ISO 80601-2-55.

CO₂ sample flow rate (PN: 115-037385-00)

120 ml/min (DRYLINE II™ watertrap for adult/pediatric)

90 ml/min (DRYLINE II™ watertrap for neonate)

CO₂ sample flow rate (PN: 115-020189-00)

Adult: 70, 100, 120, 150 ml/min

Pediatric/neonate: 70, 100 ml/min

CO₂ sample flow rate accuracy

± 15 ml/min or ± 15 %, whichever is greater.

Sweep speed 3 mm/s, 6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s

CO₂ range 0 to 99 mmHg

CO₂ accuracy ± 2 mmHg (0 to 40 mmHg)
 ± 5 % of the reading (41 to 76 mmHg)
 ± 10 % of the reading (77 to 99 mmHg)

CO₂ resolution 1 mmHg

O₂ range 0 to 100 %

O₂ accuracy ± 1 % (0 to 25 %)
 ± 2 % (25.1 to 80 %)
 ± 3 % (80.1 to 100 %)

O₂ resolution 0.1 %

awRR range 0 to 150 rpm

awRR accuracy ± 1 rpm (0 to 59 rpm)

± 2 rpm (60 to 150 rpm)

Apnea time 10, 15, 20, 25, 30, 35, 40 s

Oridion Microstream CO₂

Meet standard of ISO 80601-2-55.

Sample flow rate 50^{-7.5}₊₁₅ ml/min

Sweep speed 3 mm/s, 6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s

CO₂ range 0 to 99 mmHg

CO₂ accuracy ± 2 mmHg (0 to 38 mmHg)
 ± 5 % of the reading (0.08 % increased in error for every 1 mmHg if the reading is more than 38) (39 to 99 mmHg)

awRR range 0 to 150 rpm

awRR accuracy ± 1 rpm (0 to 70 rpm)

± 2 rpm (71 to 120 rpm)

± 3 rpm (121 to 150 rpm)

Apnea time 10, 15, 20, 25, 30, 35, 40 s

Capnostat Mainstream CO₂

Meet standard of ISO 80601-2-55.

Sweep speed 3 mm/s, 6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s

CO₂ range 0 to 150 mmHg

CO₂ accuracy ± 2 mmHg (0 to 40 mmHg)

| | |
|---------------|--|
| | ±5 % of the reading (41 to 70 mmHg) |
| | ±8 % of the reading (71 to 100 mmHg) |
| | ±10 % of the reading (101 to 150 mmHg) |
| awRR range | 0 to 150 rpm |
| awRR accuracy | ±1 rpm |
| Apnea time | 10, 15, 20, 25, 30, 35, 40 s |

Multi-gas

Meet standard of ISO 80601-2-55.

| | |
|--|--|
| Gas | CO ₂ , O ₂ , N ₂ O, Des, Iso, Enf, Hal, Sev |
| Warm-up time | ISO accuracy mode: 45 s Full accuracy mode: 10 min |
| Sample flow rate | Adult/pediatric: 120, 150, 200 ml/min Neonate watertrap: 70, 90, 120 ml/min |
| Sample flow rate accuracy | ±10 ml/min or ±10%, whichever is greater. |
| CO ₂ range | 0 to 30 % |
| O ₂ range | 0 to 100 % |
| N ₂ O range | 0 to 100 % |
| Enf/Iso/Hal/Sev/Des range | 0 to 30 % |
| awRR range | 2 to 100 rpm |
| awRR accuracy | ±1 rpm (2 to 60 rpm) |
| Apnea time | 10,15,20,25,30,35,40 s |
| Provide MAC value (support calibrated by age). | |
| Support two mixed gas identify and monitoring. | |

BISx/BISx4

Meet standard of IEC 60601-2-26.

| | |
|-----------------|--------------------------------|
| Technique | Bispectral Index |
| Impedance range | 0 to 999 kΩ |
| EEG bandwidth | 0.25 to 100 Hz |
| BIS range | 0 to 100 (BIS, BIS L, BIS R) |
| SQL range | 0 to 100 % (SQL, SQL L, SQL R) |
| ASYM | 0 to 100% |
| DSA trend | Yes |

NMT

Meet the standard of IEC 60601-2-10.

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|----------------------------------|--|
| Sensor type | Acceleromyography sensor |
| Stimulation modes | ST, TOF, PTC, DBS3.2, DBS3.3 |
| Stimulation current range | 0 to 60 mA |
| Stimulation current accuracy | ± 5% or ±2 mA, whichever is greater. |
| Stimulation pulse width | 100, 200 or 300 μs, monophasic rectangle pulse |
| Stimulation pulse width accuracy | ± 10 % |
| Max. output voltage | 300 V |

EEG

Meet standard of IEC 60601-2-26.

| | |
|----------------------|---|
| EEG channels | Up to 4 channels |
| Montage mode | Biopolar mode, referential mode |
| Max. Input DC offset | ± 500 mV DC |
| CMRR | ≥ 100 dB @ 50Hz |
| Sampling Frequency | 1024 Hz |
| Analog bandwidth | 0.5 to 110 Hz |
| Measurement range | 0.5 to 30 Hz |
| Low filter | 0.16 Hz, 0.5 Hz, 1.0 Hz, 2.0 Hz. |
| High filter | 15 Hz, 30 Hz, 50 Hz, 70 Hz. |
| Spectrum analysis | SEF, MF, PPF, TF, Delta, Theta, Alpha, and Beta |
| DSA trend | Yes |
| CSA trend | Yes |

RM

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|--|--------------------|
| Technique | Diff-Pressure flow |
| Monitoring parameters include PEEP, Pmean, PIP, Pplat, PEF, PIF, MVe, MVi, TVe, TVi, RR, I:E, FEV1.0, Compl, RSBI, NIF, WOB, RAW, and loops. | |

| | |
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| Flow range | Adult/Pediatric: ± (2 to 120) L/min Neonate: ± (0.5 to 30) L/min |
| Flow accuracy | Adult/Pediatric: ± 1.2 L/min or ± 10% of the reading, whichever is greater. Neonate: ± 0.5 L/min or ± 10% of the reading, whichever is greater. |
| Flow resolution | 0.1 L/min |
| Paw range | -20 to 120 cmH ₂ O |
| Paw accuracy | ± 3% x reading |
| Paw resolution | 0.1 cmH ₂ O |
| MVe/MVi range | Adult/Pediatric: 2 to 60 L/min Infant: 0.5 to 15 L/min |
| MVe/MVi accuracy | ± 10% x reading |
| MVe/MVi resolution | 0.01 L/min (MVe/MVi < 10 L/min) 0.1 L/min (MVe/MVi ≥ 10 L/min) |
| TVe/TVi range | Adult/Pediatric: 100 to 1500 ml Infant: 20 to 500 ml |
| TVe/TVi accuracy | Adult/Pediatric: ±10% or ±15 ml, whichever is greater. Infant: ±10% or ±6 ml, whichever is greater. |
| TVe/TVi resolution | 1 ml |
| awRR range | 4 to 120 rpm |
| awRR accuracy | ±1 rpm (4 to 99 rpm) ±2 rpm (100 to 120 rpm) |
| awRR resolution | 1 rpm |
| Provide VCO ₂ , VO ₂ , MVCO ₂ , MVO ₂ , EE, RQ parameters, when monitoring with Sidestream CO ₂ or AG module configured with the paramagnetic O ₂ sensor. | |

tcGas

Interfaces with TCM CombiM, TCM TOSCA or SenTec SDM monitor.

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|-----------------------------|---|
| tcpCO ₂ range | 5 to 200 mmHg |
| tcpCO ₂ accuracy | TOSCA Sensor 92, tc Sensor 54: Better than 1 mmHg (1 % or 10 % CO ₂) Better than 3 mmHg (33 % CO ₂) tc Sensor 84: Better than 1 mmHg (1 % or 10 % CO ₂) Better than 5 mmHg (33 % CO ₂) |
| tcpO ₂ range | 0 to 800 mmHg |
| tcpO ₂ accuracy | tc Sensor 84: Better than 1 mmHg (0 % O ₂) Better than 3 mmHg (21 % O ₂) Better than 5 mmHg (50 % O ₂) Better than 25 mmHg (90 % O ₂) |
| SpO ₂ range | 0 to 100 % |
| SpO ₂ accuracy | ±3 % (70 to 100 %) |
| PR range | 25 to 240 bpm |
| PR accuracy | ±3 bpm |
| Power range | 0 to 1000 mW |
| Power accuracy | ±20 % of reading |

EWS (Early Warning Score)

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|----------------|---|
| Scoring System | NEWS, MEWS, IPS with customization Support sending EWS results to CMS. |
|----------------|---|

Data Review

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|---------------------------|---|
| Trends data | 120 hours with resolution no less than 1min. 4 hours with resolution @ 5 sec |
| Alarm events | 100 events and associated waveforms |
| Arrhythmia events | 100 events and associated waveforms |
| OxyCRG events | 100 events and associated trends |
| NIBP | 1000 sets |
| Interpretation of resting | 12-lead ECG results 20 sets |
| Full disclosure | 48 hours at maximum. The specific storage |

| | | | |
|------------------------|---|------------|--|
| Minitrend | time depends on the waveforms stored and the number of stored waveforms. Yes | Humidity | Operating: 15 to 95 % (non condensing) Storage: 10 to 95 % (non condensing) |
| | | Barometric | Operating: 427.5 to 805.5 mmHg(57.0 to 107.4 kPa) |
| Alarms | | | kPa) |
| Audible indicator tone | Yes, 3 different alarm tones, and prompt tone | | Storage: 120 to 805.5 mmHg (16.0 to 107.4 kPa) |
| Visible indicator | Red/yellow/cyan LED, and alarm message | | |

iView

T9 and T8 support iView.

| | |
|-----------|-----------------------------------|
| CPU | Intel atom N2600 dualcore, 1.6GHz |
| Memory | 2 GB DDR3 800MHz |
| Hard-disk | SSD 128GB |
| OS | Windows 7 |

Wi-Fi Communications

| | |
|-----------------|--|
| Protocol | IEEE 802.11a/b/g/n |
| Frequency range | 2.4 to 2.483 GHz 5.15 to 5.35 GHz 5.47 to 5.725 GHz 5.725 to 5.82 GHz |

Interfacing and I/O devices

| | |
|------------------|---|
| Main unit | AC power connector (1) DVI-D port (1) Network connector (T9/T8/T6: 2, T5: 1), 100 Base-TX, IEEE 802.3 USB 1.1 connector (10) SMR connector (1) CF card connector Nurse call connector (1) Micro-D port analog output and defibrillator synchronization signals (1) Integrated Module slots: 5 slots |
| Barcode scanner | Support 1D barcode, standard USB |
| Keyboard & Mouse | Support wire and wireless type, standard USB |
| Thermal Recorder | 3 traces (paper 50 mm width, 20 m length) 25mm/s, 50 mm/s speed |
| Network printer | Support |

Power

| | |
|--------------|--|
| Line voltage | 100 to 240 VAC (±10 %) T9/T8/T6: 2.8 to 1.6 A T5: 2.5 to 1.4 A |
| Frequency | 50/60 Hz |
| Battery | Two rechargeable lithium-ion battery, 4500mAh, 11.1 VDC T9/T8/T6: > 2 hours run time (typical) T5: > 5.5 hours run time (typical) |
| Charge time | 5 hours to 90%, 6 hours to 100% |

Environmental requirements

| | |
|-------------|---|
| Temperature | Operating: 0 to 40 °C (32 to 104 °F) Storage: -20 to 60 °C (-4 to 140 °F) |
|-------------|---|

Some of functions marked with an asterisk may not be available. Please contact your local Mindray sales representative for the most current information.

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