





## All the features and options you need to configure a system to your exact requirements

- 1 15/12.1" TFT touchscreen display with intuitive user interface, electronic gas mixer and digital flowmeters
- 2 Eight ventilation modes
- 3 Versatile top shelf with secure GCX™ mounting system for patient monitors
- 4 Electrical outlet options
- 5 Selectatec® compatible backbar (two station)
- 6 Up to three cylinders
- 7 Illuminated work space with pull-out writing surface
- 8 GCX™ compatible aluminium uprights for additional accessory mounting
- 9 Large capacity drawer units
- 10 Integrated CO<sub>2</sub> absorber and bellows unit with ventilator interface
- 11 Backlit Auxiliary Common Gas Outlet (ACGO)
- 12 Oxygen therapy flowmeter

## Physical Specifications

| Dimensions                |  |
|---------------------------|--|
| Size (H × W × D)          | 1410 × 1010 × 700 mm   |
| Weight                    | 125 kg   |
| Top Shelf                 |  |
| Size (W × D)              | 650 × 350 mm   |
| Loading                   | 30 kg - evenly distributed   |
| Work Surface              |  |
| Height                    | 860 mm   |
| Size (W × D)              | 660 × 350 mm   |
| Loading                   | 30 kg - evenly distributed   |
| Illumination              | LED  |
| Writing Tablet (Optional) |  |
| Size (W × D)              | 430 × 195 mm   |
| Loading                   | 10 kg - evenly distributed   |
| Rail                      |  |
| Top Rail                  | Top shelf with GCX™ mounting system for patient monitors           |
| Side Rail                 | GCX™ compatible aluminium uprights for accessory mounting          |
| Medical Rail              | 200 mm on the machine side   |
| Drawers                   |  |
| Size (H × W × D)          | Top drawer: 45 × 495 × 350 mm<br>Other drawers: 120 × 495 × 350 mm |
| Number of Drawers         | 3  |
| Loading                   | 10 kg - evenly distributed   |
| Castors                   |  |
| Diameter                  | 125 mm   |
| Brakes                    | Individually braked  |
| Display                   |  |
| Type                      | Colour TFT touchscreen   |
| Size                      | 15" / 381 mm or<br>12.1" / 307 mm                                  |
| Resolution                | 1024 × 768 pixels (15") or<br>800 × 600 pixels (12.1")             |
| Construction              |  |
| Material                  | Frame: Aluminium and plastic<br>Base: Aluminium                    |

## Ventilator Specifications

| Ventilator Specification           |   |
|------------------------------------|---|
| Type                               | Fully integrated, electronically controlled and pneumatically driven  |
| Modes                              | <ul style="list-style-type: none"> <li>• Volume Control Ventilation (VCV)</li> <li>• Pressure Control Ventilation (PCV)</li> <li>• Pressure Regulated Volume Control (PRVC (PCV-VG))</li> <li>• Synchronised Intermittent Mandatory Ventilation - Volume Control Ventilation (SIMV-VCV)</li> <li>• Synchronised Intermittent Mandatory Ventilation - Pressure Control Ventilation (SIMV-PCV)</li> <li>• Synchronised Intermittent Mandatory Ventilation - Pressure Regulated Volume Control (SIMV-PRVC)</li> <li>• SPONT/Pressure Support Ventilation (PSV) with apnea backup (VCV or PCV)</li> <li>• Manual</li> </ul> |
| Bellows                            | Universal (adult and paediatric) ascending bellows  |
| Drive Gas                          | Type: O <sub>2</sub> /Air – Automatic changeover<br>Inlet pressure: 290 to 600 kPa<br>Max flow: ≤ 120 L/min   |
| Compensation                       | Compliance, Fresh Gas, Barometric   |
| Flow Sensors                       | Inspiratory and expiratory (reusable)   |
| Data Interface                     | 1 × Serial port (for service only),<br>1 × RS232, 1 × VGA   |
| Ventilator Settings                |   |
| Tidal Volume                       | Range: 10 to 1600 mL<br>(0 to 1600 mL measured in PCV)<br>Increments: 10 to 100 mL (5 mL);<br>100 to 1600 mL (10 mL)  |
| Fresh Gas Flow of O <sub>2</sub>   | Range: 0.2 to 15 L/m<br>Resolution: 0 to 1 L/m: 0.01 L/m<br>1 to 15 L/m: 0.1 L/m  |
| Fresh Gas Flow of N <sub>2</sub> O | Range: 0 to 12 L/m<br>Resolution: 0 to 1 L/m: 0.01 L/m<br>1 to 12 L/m: 0.1 L/m  |
| Fresh Gas Flow Rate of AIR         | Range: 0 to 15 L/m<br>Resolution: 0 to 1 L/m: 0.01 L/m<br>1 to 15 L/m: 0.1 L/m  |
| Respiratory Rate                   | Range: 1 to 100 bpm<br>Increments: 1 bpm  |
| Inspiratory Time                   | Range: 0.1 to 10.0 seconds<br>Increments: 0.1 seconds   |
| Respiratory Ratio (I:E)            | Range: 4:1 to 1:10<br>Resolution: 0.1. Error of ±20%  |

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| Inspiratory Pause                      | Range: 0 to 60%<br>Increments: 5%  |
| PEEP                                   | Range: 3 to 30 cmH <sub>2</sub> O<br>Resolution: 1 cmH <sub>2</sub> O. Error of ±(2% + 4% of full scale actual reading)  |
| Pressure Support                       | Range: 0 to 70 cmH <sub>2</sub> O<br>Increments: 1 cmH <sub>2</sub> O  |
| Pressure Control                       | Range: 5 to 70 cmH <sub>2</sub> O<br>Increments: 1 cmH <sub>2</sub> O  |
| Flow Trigger                           | Range: 0.5 to 20 L/min<br>Increments: 0.1 L/min  |
| Pressure Trigger                       | Range: 1 to 20 cmH <sub>2</sub> O<br>Increments: 1 cmH <sub>2</sub> O  |
| PSV Insp Termination Level             | 4 Range: 5 to 80%<br>Increments: 5% hours  |
| <b>Ventilator Monitoring</b>           |  |
| Standard Parameters                    | PEEP, Pmean, Pplat, Pmin, Ppeak, VTi, Vte, Fspn, MV, MVspn, Rst, Cdyn, I:E, FiO <sub>2</sub>   |
| Optional Parameters                    | Multi-Gas: MAC, Fi N <sub>2</sub> O, EtN <sub>2</sub> O, Fi CO <sub>2</sub> , EtCO <sub>2</sub> , Fi AA, EtAA<br>SpO <sub>2</sub> : SpO <sub>2</sub> , Pulse, PI |
| Standard Waveforms                     | Flow, Volume, PAW, P-V (Loop), V-F (loop), P-F (loop)  |
| Optional Waveforms                     | Multi-Gas: AA, CO <sub>2</sub> , N <sub>2</sub> O<br>SpO <sub>2</sub> : Pleth, PI  |
| Inspiratory Tidal Volume (VTI)         | Range: 0 to 2500 mL<br>Resolution: 1 mL. Error of ±20 mL or actual value ±15%, whichever is greater  |
| Expiratory Tidal Volume (VTE)          | Range: 0 to 2500 mL<br>Resolution: 1 mL. Error of ±20 mL or actual value ±15%, whichever is greater  |
| Minute Ventilation (MV)                | Range: 0 to 60 L / min<br>Resolution: 0.1 L / min. Error of ±1 L/min or actual value ±15%, whichever is greater  |
| Spontaneous Minute Ventilation (MVspn) | Range: 0 to 60 L / min<br>Resolution: 0.1 L / min. Error of ±1 L/min or actual value ±15%, whichever is greater  |
| Respiratory Rate (ftotal)              | Range: 0 to 100 bpm<br>Resolution: 1 bpm. Error of ±2 bpm or actual value ±10%, whichever is greater   |
| Spontaneous Breathing Frequency (fspn) | Range: 0 to 100 bpm<br>Resolution: 1 bpm. Error of ±2 bpm or actual value ±10%, whichever is greater   |

|  |  |
|--|--|
| Peak Airway Pressure (Ppeak)   | Range: 0 to 100 cmH <sub>2</sub> O<br>Resolution: 1 cmH <sub>2</sub> O. Error of ±(2% + 4% of full scale actual reading)   |
| Mean Airway Pressure (Pmean)   | Range: 0 to 100 cmH <sub>2</sub> O<br>Resolution: 1 cmH <sub>2</sub> O. Error of ±(2% + 4% of full scale actual reading)   |
| Inspiratory Plateau Pressure (Pplat)   | Range: 0 to 100 cmH <sub>2</sub> O<br>Resolution: 1 cmH <sub>2</sub> O. Error of ±(2% + 4% of full scale actual reading)   |
| Minimum Airway Pressure (Pmin)   | Range: -20 to 100 cmH <sub>2</sub> O<br>Resolution: 1 cmH <sub>2</sub> O. Error of ±(2% + 4% of full scale actual reading)   |
| Compliance (Cdyn)  | Range: 0 to 300 mL/cmH <sub>2</sub> O<br>Resolution: 1 mL/cmH <sub>2</sub> O.<br>Error of ±20% or ± 5 mL/cmH <sub>2</sub> O, whichever is greater  |
| Airway Resistance (Rst)  | Range: 0 to 600 cmH <sub>2</sub> O / (L / S)<br>Resolution: 1 cmH <sub>2</sub> O / (L / S). Error of ±20% or ±5 cmH <sub>2</sub> O, whichever is greater   |
| FiO <sub>2</sub>   | Range: 15 to 100%<br>Resolution: 1%. Error is ±(2.5% + 2.5% of full scale actual reading)  |
| <b>Anaesthetic Gas Monitoring</b>  |  |
| Type   | Dräger Sidestream  |
| Sampling Rate  | 200 ± 20 mL/min  |
| Automated Cyclical Zeroing and Duration  | Zeroing: Once per day (first zeroing 35 minutes after power on, then once every 24 hours)<br>Duration: ≤20 s   |
| O <sub>2</sub> (Paramagnetic) if fitted (FiO <sub>2</sub> and EtO <sub>2</sub> ) | Range: 0 to 100 Vol.%<br>Accuracy: ±(2.5 Vol.% + 2.5 % rel.)<br>Rise time (t10 ... 90): <500 ms  |
| CO <sub>2</sub>  | Range: 0 to 13.6 Vol.%<br>Accuracy: ±(0.43 Vol.% + 8 % rel.)<br>Rise time (t10 ... 90): <300 ms  |
| N <sub>2</sub> O   | Range: 0 to 100 Vol.%<br>Accuracy: ±(2 Vol.% + 8 % rel.)<br>Rise time (t10 ... 90): <300 ms  |
| Anaesthetic Gases (Range) (Manual and Automatic Identification Options)          | Halothane: 0 to 8.5 Vol.%<br>Isoflurane: 0 to 8.5 Vol.%<br>Enflurane: 0 to 10 Vol.%<br>Sevoflurane: 0 to 10 Vol.%<br>Desflurane: 0 to 20 Vol.%<br>Accuracy: ±(0.20 Vol.% + 15 % rel.)<br>Rise time (t10 ... 90): <450 ms |
| MAC Values (Optional)  | Range: 0 to 10<br>Resolution: 0.01   |

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| Operational Characteristics |  |
|-----------------------------|--|
| Voltage Input Range         | 12.0 V to 32.0 V -5 % +10 %  |
| Power Consumption           | Steady state ≤6 W (depending on variant)<br>Warm up ≤18 W (depending on variant) |
| Data Sample Rate            | 20 ms (depending on setting)   |
| Data Transfer Rate          | 19,200 kB/s (configurable)   |
| Agent Consumption           |  |
| Range                       | 0 to 3000 mL   |
| Resolution                  | 0.1 mL   |
| Anaesthetic Agents          | Sev, Iso, Des, Enf and Hal   |
| Accuracy                    | ±25% of the displayed value  |

## Alarms

| Settings  |  |
|---|--|
| Tidal Volume  | High: 10 to 2000 ml, OFF<br>Low: OFF, 10 to 1600 ml  |
| Minute Ventilation                                  | High: 1 to 99 l<br>Low: 0 to 98 l  |
| Respiratory Rate                                    | High: 1 to 100 bpm<br>Low: 0 to 99 bpm   |
| Airway Pressure                                     | High: 10 to 99 cmH <sub>2</sub> O<br>Low: 1 to 98 cmH <sub>2</sub> O   |
| Apnea Alarm   | Range: 10 to 60 seconds<br>Increments: 1 second  |
| FiO <sub>2</sub> (Optional)                         | High: 19 to 100%, OFF<br>Low: 18 to 99%  |
| EtCO <sub>2</sub> (Optional)                        | High: 0.1 to 13.3%<br>Low: 0 to 13.3%  |
| FiCO <sub>2</sub> (Optional)                        | High: 0.1 to 13.3%   |
| Inhalation Anaesthetic Gas (Optional) - Upper Limit | Sevoflurane: 0.1 to 9.9%, OFF<br>Isoflurane: 0.1 to 7.9%, OFF<br>Halothane: 0.1 to 7.9%, OFF<br>Enflurane: 0.1 to 7.9%, OFF<br>Desflurane: 0.1 to 19.9%, OFF |
| Inhalation Anaesthetic Gas (Optional) - Lower Limit | Sevoflurane: 0 to 9.8%<br>Isoflurane: 0 to 7.8%<br>Halothane: 0 to 7.8%<br>Enflurane: 0 to 7.8%<br>Desflurane: 0.1 to 19.8%                                  |
| End Tidal Anaesthetic Gas (Optional) - Upper Limit  | Sevoflurane: 0.1 to 9.9%, OFF<br>Isoflurane: 0.1 to 7.9%, OFF<br>Halothane: 0.1 to 7.9%, OFF<br>Enflurane: 0.1 to 7.9%, OFF<br>Desflurane: 0.1 to 19.9%, OFF |

|  |   |
|--|---|
| End Tidal Anaesthetic Gas (Optional) - Lower Limit | Sevoflurane: 0 to 9.8%<br>Isoflurane: 0 to 7.8%<br>Halothane: 0 to 7.8%<br>Enflurane: 0 to 7.8%<br>Desflurane: 0.1 to 19.8% |
| Pulse (Optional)                                   | Upper limit: 31 to 250 bpm<br>Lower limit: 30 to 249 bpm  |
| SpO <sub>2</sub> (Optional)                        | Upper limit: 50 to 99%, OFF<br>Lower limit: 49 to 99%   |
| PI (Optional)                                      | Upper limit: 0.1 to 20%<br>Lower limit: 0 to 19.9%  |

## Anaesthetic Agent Delivery

| Vaporizer Mounting  |  |
|---------------------|--|
| Vaporizers          | Sigma Delta and Sigma EVA (Sev, Iso, Hal, and Des) |
| Number of Positions | Two  |
| Type                | Selectatec® compatible backbar                     |

## Sigma Delta Vaporizer

| Dimensions                       |   |
|----------------------------------|---|
| Cagemount                        | 219 × 133 × 158 mm (H x W X D)  |
| Selectatec compatible            | 242 × 120 × 190 mm (H x W X D)  |
| Dräger compatible                | 242 × 100 × 190 mm (H x W X D)  |
| Physical Specification           |   |
| Weight                           | 4.8 kgs   |
| Volume                           | Min: 35 ml<br>Max: 250 ml   |
| Anaesthetic Agents               | Sevoflurane, Isoflurane, Halothane  |
| Filling Systems                  | Key fill, Quik-Fil or Pour fill   |
| Concentration Control Dial Scale | 0 to 2% vol, increments of 0.2%<br>≥2%+, increments of 0.5%                                   |
| Environmental                    |   |
| Operating Temperature            | Sev: 15 to 40°C (58 to 104°F)<br>Iso: 15 to 35°C (58 to 95°F)<br>Hal: 15 to 35°C (58 to 95°F) |
| Operating Temperature            | -5 to 40°C (23 to 104°F)  |
| Transport Temperature            | -5 to 40°C (23 to 104°F)  |
| Atmospheric Pressure             | 11.5 to 110 kPa   |

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| Flow range                |                           |
|---------------------------|---------------------------|
| Operating flow            | 0.2 to 15 L/min           |
| Pressure Range            |                           |
| Operating Pressure Range  | 0 to 5 kPa (0 to 0.7 psi) |
| Maximum Manifold Pressure | 38 kPa (5.5 psi)          |
| Maximum Test Pressure     | 38 kPa (5.5 psi)          |

### Electrical Specification

| Power                         |  |
|-------------------------------|--|
| Input Voltage                 | 100 to 240 V   |
| Input Frequency               | 50/60 Hz   |
| Overload Protection           | 10A thermal circuit breaker  |
| Power Cable                   | 3 m permanently attached lead  |
| Power Outlets                 | 4 (3 × rear, 1 × front) 2A max. per outlet   |
| Fuses                         | T2AH 250 V ceramic (5 × 20 mm) high breaking capacity (on live and neutral on each outlet) |
| Electromagnetic Compatibility | Meets the requirements of EN 60601-1-2   |
| Battery Back Up               |  |
| Type                          | Ni-MH  |
| Back Up Power                 | Upto 120 minutes, approximate  |
| Charge Time                   | 4 hours  |
| Battery                       | GRPH-18670 8400P 12 V  |

### Pneumatic Specification

| Auxiliary Common Gas Outlet (ACGO)      |  |
|---|--|
| Connector                               | 22 mm male taper with coaxial 15 mm female taper connections                         |
| Gas Supply                              |  |
| Pipeline Supply Pressure                | 280 to 600 kPa (40.6 to 87.0 psig)   |
| Territory Specific Pipeline Connections | UK/Europe: NIST<br>USA: DISS<br>Australia: SIS                                       |
| Connections                             | 3 × Pipeline, with inlet filter<br>Up to 3 × Pin-indexed cylinder, with inlet filter |

| Regulator Diaphragm Bursting Pressure   | 2800 kPa (406 psig)  |
|---|--|
| Pipeline Flow Rate  | Air/O <sub>2</sub> : 40 to 100 L/min<br>N <sub>2</sub> O: ≤ 15 L/min                                 |
| Cylinder Supply Pressure  | 19,985 kPa (2900 psig)   |
| Fresh Gas Safety Valve  | 90 cmH <sub>2</sub> O  |
| Reduced pressure from regulator (at 5 L/min) - UK   | 310 kPa + 15 kPa / -35 kPa<br>(45 psig + 2 psig / -5 psig)   |
| Reduced pressure from regulator (at 5 L/min) - US/Canada/Japan                                | 380 kPa + 15 kPa / -35 kPa<br>(55 psig + 2 psig / -5 psig)   |
| Reduced pressure from secondary regulators (at 5 L/min) - O <sub>2</sub> and N <sub>2</sub> O | 152 to 241 kPa (22 to 35 psig)   |
| Reduced pressure from secondary regulators (at 5 L/min) - Air                                 | 207 to 283 kPa (30 to 41 psig)   |
| Auxiliary Gas Outlets   |  |
| Connections   | 2 × O <sub>2</sub> , self-sealing<br>2 × Air, self-sealing   |
| Supply Pressure   | Pipeline: Supply pressure<br>Cylinder: Reduced pressure from the cylinder supply secondary regulator |
| Flow Rate   | 60 L/min (maximum) per gas   |
| Auxiliary Oxygen Flowmeter  |  |
| Range   | 0 to 10 L/min  |
| O <sub>2</sub> Control  |  |
| O <sub>2</sub> Flush Range  | 25 to 75 L/min when button is fully depressed  |
| Gas Mixer   |  |
| Type  | Electronic   |
| Anti-Hypoxic Fresh Gas Mixture  |  |
| Type  | Electronic   |
| Minimum O <sub>2</sub> concentration  | 25% +5%/-4% (of total O <sub>2</sub> and N <sub>2</sub> O flow) minimum 21% O <sub>2</sub>           |

## ANAESTHESIA SOLUTIONS

### Environmental

| Operating Conditions             |  |
|----------------------------------|--|
| Temperature                      | +10 to 40°C (50 to 104°F)              |
| Atmospheric Pressure             | 70 to 106 kPa                          |
| Altitude                         | 2438 m (8000 feet) maximum             |
| Humidity                         | 10 to 95% R.H. non-condensing          |
| Transport and Storage Conditions |  |
| Temperature                      | -5 to 40°C (23 to 104°F)               |
| Atmospheric Pressure             | 50 to 106 kPa                          |
| Humidity                         | 10 to 85% R.H. non-condensing          |
| Electromagnetic Compatibility    |  |
| Immunity                         | Meets the requirements of EN 60601-1-2 |
| Emissions                        | CISPR 11 group 1 class A               |
| Approvals                        | EN 60601-1-2, 80601-2-13               |
| European Notified Body           | CE 1639                                |

### Breathing System/Absorber

| CO <sub>2</sub> Absorber   |  |
|--|--|
| Absorbent Volume   | 1.5 L  |
| Absorbent Type   | Loose fill   |
| Heater   | Yes, integrated  |
| APL Valve  |  |
| Range  | Yes, Min. to 70 cmH <sub>2</sub> O integrated  |
| Bag/Vent Switch  |  |
| Type   | Toggled bi-stable switch   |
| Breathing System   |  |
| Valves   | Visible inspiratory and expiratory check valves  |
| Pressure Gauge   |  |
| Range  | -2 to 10 kPa (-20 to 100 cmH <sub>2</sub> O)   |
| Cleaning and Disinfection  |  |
| O <sub>2</sub> Sensor (Cleaning)   | Wipe with mild detergent, dry with a lint-free cloth                                   |
| All parts of the breathing circuit except the O <sub>2</sub> sensor (Disinfecting) | Wash with mild detergent, soak for 30 minutes in 30 to 41°C detergent (pH 7.0 to 10.5) |

|  |  |
|--|--|
| All parts of the breathing circuit except the O <sub>2</sub> sensor, airway pressure gauge and relief valve assembly (Sterilisation) | Autoclave at a maximum temperature of 121°C for a minimum of 15 minutes and a maximum of 30 minutes. |
|--|--|

### Anaesthetic Gas Scavenging System (AGSS)

| Physical                |   |
|-------------------------|---|
| Type                    | Active  |
| Type of Disposal System | For use with a high flow rate disposal system   |
| Dimensions              | 420 × 77 × 99 mm (H × W × D)  |
| Mounting                | Side of the system  |
| Safety Indicator        | If the flow rate falls below 60 L/min, the float will fall below the bottom of the window |

## About Penlon ♦

Penlon was founded in 1943 by personnel from the Department of Anaesthesia at Oxford University. One of the first products was the Macintosh Laryngoscope, then a revolutionary design, and still the most widely used today, invented by the late Sir Robert Macintosh, Professor of Anaesthetics.

Today Penlon continues to design, engineer and build high quality anaesthesia products at its UK operations headquarters. The company is proud to have over 80 years' dedicated experience, many awards for product design, and an impressive four Queen's Awards for Enterprise, one for 'Innovation' and three for 'International Trade'.

Penlon devices feature intuitive user interfaces that require minimal operator training, putting clinicians in control, enabling them to focus on what is most important – patient safety and wellbeing.



 Global Headquarters     Local Office     Distribution Partner



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