Continuous Cardiac Output Module, E-PiCCO
For less invasive continuous cardiac output monitoring

The E-PiCCO module provides continuous cardiac output (CCO) measurement based on pulse contour calculation, transpulmonary thermodilution cardiac output (C.O.) and blood pressure (P). When combined with a CARESCAPE* modular monitor, the E-module enables a graphical view for quick hemodynamic status assessment.

Features
• Direct key on the module for zeroing invasive pressure channels
• Easy insertion/removal of module without interrupting other monitoring
• Uses Pulsion’s PiCCO catheters

When used with a CARESCAPE modular monitor the display can show:
• Up to six C.O. measurements, which can be edited for an averaged C.O.
• Hemodynamic calculation display view
• Graphical view from three to seven user-selectable parameters, including flow, volume and contractility
• Editing of calculation input data
• Trending of calculations
### Technical specifications

| Patient range | 2 – 250 kg |
| Indexed values are calculated for patients above 15 kg. |

### Direct function keys

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
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<tbody>
<tr>
<td>Zero P8</td>
<td>Zeros invasive blood pressure P8</td>
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### Measurement methods

#### Continuous cardiac output (CCO)
- **Measurement method**: C.O. is the amount of blood ejected by the heart to the peripheral circulation every minute. Continuous cardiac output uses the pulse contour method, and it is calibrated by using the thermodilution technique. Continuous cardiac output calculation also uses the CVP value, which is obtained automatically or can be set manually. If the algorithm does not get the CVP value automatically or manually, a default value of 5 mmHg is used.
- **Measurement range**: 0.25-25 l/min (Pulse contour cardiac output)
- **Measurement accuracy**: Mean error ≤ ±3% or 0.25 l/min (standard deviation 0.3 l/min or ≤10%)

#### Transpulmonary cardiac output (CO)
- **Measurement range**: 0.25-25 l/min
- **Measurement accuracy**: Mean error ≤ ±3% or 0.15 l/min (reference repeatability ≤3% or 0.1 l/min), accuracy ± 3% or ≤0.2 l/min, max 10% variation (discrete value)

#### Stroke volume (SV)
- **Measurement range**: 1 – 250 ml
- **Measurement accuracy**: Mean error: ≤ ±3% or 1.5 ml, standard deviation ≤ 4 ml or ≤10%

#### Cardiac index (CI)
- **Measurement range**: 0.10 – 15.0 l/min/m²

#### Continuous cardiac output index (CCI)
- **Measurement range**: 0.1-15.0 l/min/m² (Pulse contour cardiac output index)

### Stroke volume index (SVI)
- **Measurement range**: 1-125 ml/m²

### Preload

#### Global end-diastolic volume (GEDV)
- **Measurement range**: 40-4800 ml
- **Measurement accuracy**: Mean error ≤ ±5% or 20 ml, repeatability ≤ ±5% or standard deviation ≤ 20 ml

#### Global end-diastolic volume index (GEDI)
- **Measurement range**: 80-2400 ml/m²

### Intrathoracic blood volume (ITBV)
- **Measurement range**: 50-6000 ml

#### Intrathoracic blood volume index (ITBI)
- **Measurement range**: 100-3000 ml/m²

### Stroke volume variation (SVV)
- **Measurement range**: 0-50%
- **Measurement accuracy**: Mean error ≤ ±2% (abs) or ≤ ±6% (rel), SD ≤15% rel. or ≤3% absolute

### Pulse pressure variation (PPV)
- **Measurement range**: 0-50%
- **Measurement accuracy**: Mean error ≤ ±2% (abs) or ≤ ±6% (rel), standard deviation ≤15% rel. or ≤3% absolute

### Contractility

#### Global ejection fraction (GEF)
- **Measurement range**: 1-99%

#### Cardiac function index (CFI)
- **Measurement range**: 1-15 l/min

#### Index of left ventricular contractility (dPmx)
- **Measurement range**: 200-5000 mmHg/s

### Afterload

#### Systemic vascular resistance (SVR)
- **Measurement range**: 1-30000 dyn*s*cm⁻⁵, (when CVP is available)
- **Measurement accuracy**: Mean (absolute error) SD ≤ 80 dyn*s*cm⁻⁵ or mean (relative error) ≤ 6% and standard deviation (absolute error) ≤ 80 dyn*s*cm⁻⁵ or SD (relative error) ≤10%
### Systemic vascular resistance index (SVRI)

**Measurement range**  1-30000 dyn*s*cm⁻³*m⁻²

### Organ function

#### Extravascular lung water (EVLW)

**Measurement range**  10-5000 ml

**Measurement accuracy**  Error ≤ ± 5% or 10ml, repeatability ≤ 6% (coeff of variation) or standard deviation ≤ 10ml

#### Extravascular lung water index (ELWI)

**Measurement range**  0-50 ml/kg

### Cardiac power output (CPO)

**Measurement range**  0.1-9.9 W

### Cardiac power output (CPI)

**Measurement range**  0.1-9.9 W/m²

### Pulmonary vascular permeability index (PVPI)

**Measurement range**  0.1-9.9

### Invasive blood pressure (IBP)

- **Measurement method**: IBP is converted to an electrical signal by a pressure transducer. The signal is continuously displayed as a waveform and numeric value. The IBP setup consisting of connecting tubing, pressure transducer, an intravenous bag of normal saline all connected together by stopcocks, is attached to the catheter. The pressure transducer is placed at the same level with the heart and electrically zeroed.

- **Physiological measurement range**: -25 to +320 mmHg

- **Measurement accuracy**: ±4% or ±4 mmHg

- **Resolution**: 1 mmHg; averaging over 5 seconds updated every 5 seconds or end-expiratory filtering

### Temperature

- **Injectate temperature range**: 0° to 22°C/32° to 71.6°F

- **Blood temperature range**: 30° to 41°C (86° to 105.8°F)

### System compatibility

- **CARESCAPE Monitor B850/650/450 software v2.0**

### Environmental specifications

#### Operating conditions

- **Temperature**: 10 to 40°C (50 to 104°F)

- **Relative humidity**: 10 to 90% non-condensing

- **Ambient pressure**: 700 to 1060 mbar

#### Storage conditions

- **Temperature**: -20 to 60°C (-4 to 140°F)

- **Relative humidity**: 10 to 90% non-condensing

### Physical specifications

- **Dimensions (H x W x D)**: 112 x 37 x 188 mm (4.4 x 1.5 x 7.4 in)

- **Weight**: <0.5 kg (1.1 lb)
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GE Healthcare Finland Oy
Kuortaneenkatu 2
00510 Helsinki
Finland

GE Healthcare
3/F Building # 1,
GE Technology Park
1 Hua Tuo Road
Shanghai 201203
China