GE Healthcare

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

Zero P8	Zeros invasive blood pressure P8

Flow
Cardiac output

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.

Continuous cardiac output (CCO)

Measurement range	0.25-25 l/min (Pulse contour cardiac output)
Measurement accuracy	Mean error ≤ ±3% or 0.25l/min (standard deviation 0.3l/min or ≤10%)

Transpulmonary cardiac output (CO)

Measurement range	0.25-25 l/min
Measurement accuracy	Mean error ≤ ±3% or ≤ 0,15l/min (reference repeatability ≤3% or 0,1l/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 ≤ 4ml or ≤10%

Cardiac index (CI)

Measurement range	0.10 – 15.0 l/min/m^2

Continuous cardiac output index (CCI)

Measurement range	0.1-15.0 l/min/m^2 (Pulse contour cardiac output index)

Stroke volume index (SVI)

Measurement range	1-125 ml/m^2

Preload
Global end-diastolic volume (GEDV)

Measurement range	40-4800 ml
Measurement Accuracy	Mean error ≤± 5% or 20ml, repeatability ≤±5% or standard deviation ≤ 20ml

Global end-diastolic volume index (GEDI)

Measurement range	80-2400 ml/m^2

Intrathoracic blood volume (ITBV)

Measurement range	50-6000 ml

Intrathoracic blood volume index (ITBI)

Measurement range	100-3000 ml/m^2

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 1/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^{-5}*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/m^2

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

Pulse rate

Measurement range	30 to 240 bpm
Resolution	1 bpm
Measurement Accuracy	±3 bpm

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)

About GE Healthcare

GE Healthcare provides transformational medical technologies and services that are shaping a new age of patient care. Our broad expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, drug discovery, biopharmaceutical manufacturing technologies, performance improvement and performance solutions services help our customers to deliver better care to more people around the world at a lower cost. In addition, we partner with healthcare leaders, striving to leverage the global policy change necessary to implement a successful shift to sustainable healthcare systems.

Our "healthymagination" vision for the future invites the world to join us on our journey as we continuously develop innovations focused on reducing costs, increasing access and improving quality around the world. Headquartered in the United Kingdom, GE Healthcare is a unit of General Electric Company (NYSE: GE). Worldwide, GE Healthcare employees are committed to serving healthcare professionals and their patients in more than 100 countries. For more information about GE Healthcare, visit our website at www.gehealthcare.com.

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