HEMODYNAMIC MANAGEMENT

Monitoring

most-care Up

up to the beat

VYGON

Value Life

MostCare^{Up} is the only monitor able to follow, in real time and from beat to beat, even the slightest hemodynamic variations in the patient.

The patented algorithm based on the **PRAM method** (Pressure Recording Analytical Method) evaluates the cardiac output and many other hemodynamic parameters without any prior calibration.

An immediate, customisable interface can display a broad set of information regarding the preload, afterload, cardiac contractility and efficiency, which have become vitally important elements in optimising the treatment of high-risk patients and in defining the best hemodynamic settings for patients with alterations in their cardiovascular systems.

Advantages

Simple

- No calibration needed.
- Intuitive, customisable interface.
- No change in protocols in use.

Innovative

- Exclusive variables (CCE, dicrotic pressure, Ea).
- Patented dynamic filter to manage the quality of the pressure signal.
- Modern connectivity and data transfer systems.

Quick

- Constant monitoring with immediate results.
- Rapid connection and set up.

Reliable

- Patented and validated algorithm.
- Immediate response to even the smallest hemodynamic variations.
- A wide range of clinical papers available.

Versatile

- Any peripheral or femoral artery.
- Applicable to the widest range of patients.
- Easily transferred from one patient to another.

Convenient

- Can be used on numerous patients without disposable nor added elements.
- *On Demand* system adaptable to all uses.

MostCare^{Up} is a reliable and efficient system that adapts to a wide range of patient types and clinical conditions.

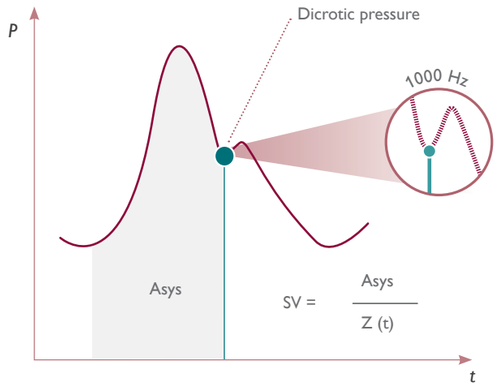
Thanks to its rapid set-up, information can be obtained in real time and saved, reviewed and transferred for subsequent analysis.

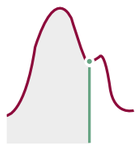
The *Endless* and *On Demand* versions allow the operator to choose the method of use which best suits the specific needs, thereby guaranteeing an effective control on costs.

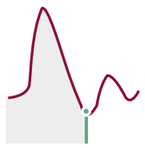
PRAM method
A patented algorithm

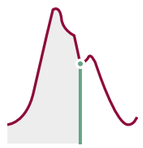
PRAM (Pressure Recording Analytical Method) is an innovative method to analyse the pressure wave used in Most-Care^{Up} [1]. It allows for constant and sensitive monitoring in real time of the slightest hemodynamic variations because it is based, heart beat by heart beat, only on the morphology of the arterial pressure wave.

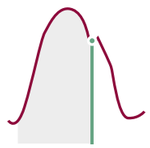
- Sampling at 1000 Hz
- Beat by beat analysis of the wave form
- Does not depend on pre-estimates
- No external calibration required




Normal


Vasodilatation and/or low systolic function


Arterial stiffness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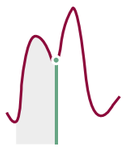
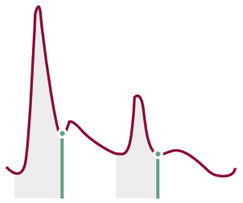
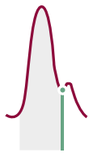
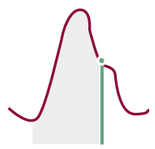

IABP
(Intra-aortic ballon pump)


Arrhythmia

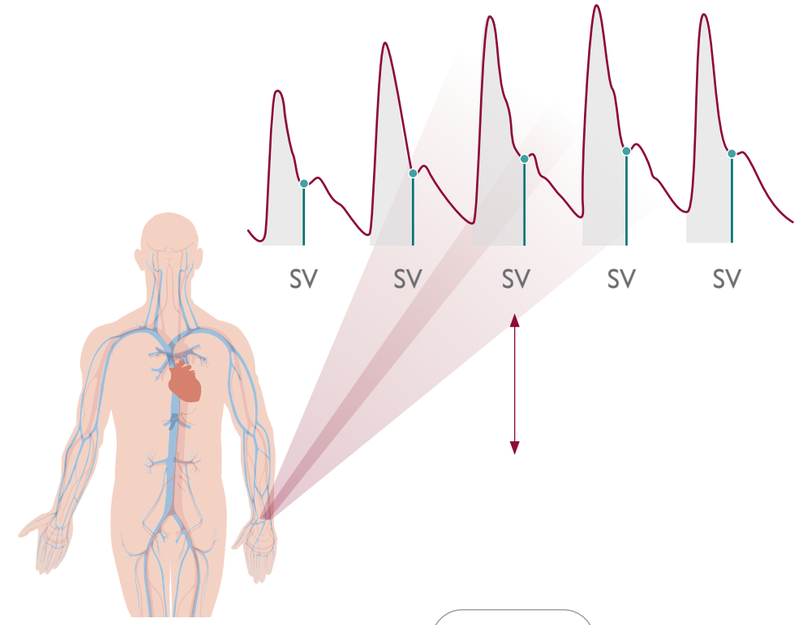

Hypovolemia and/or tachycardia

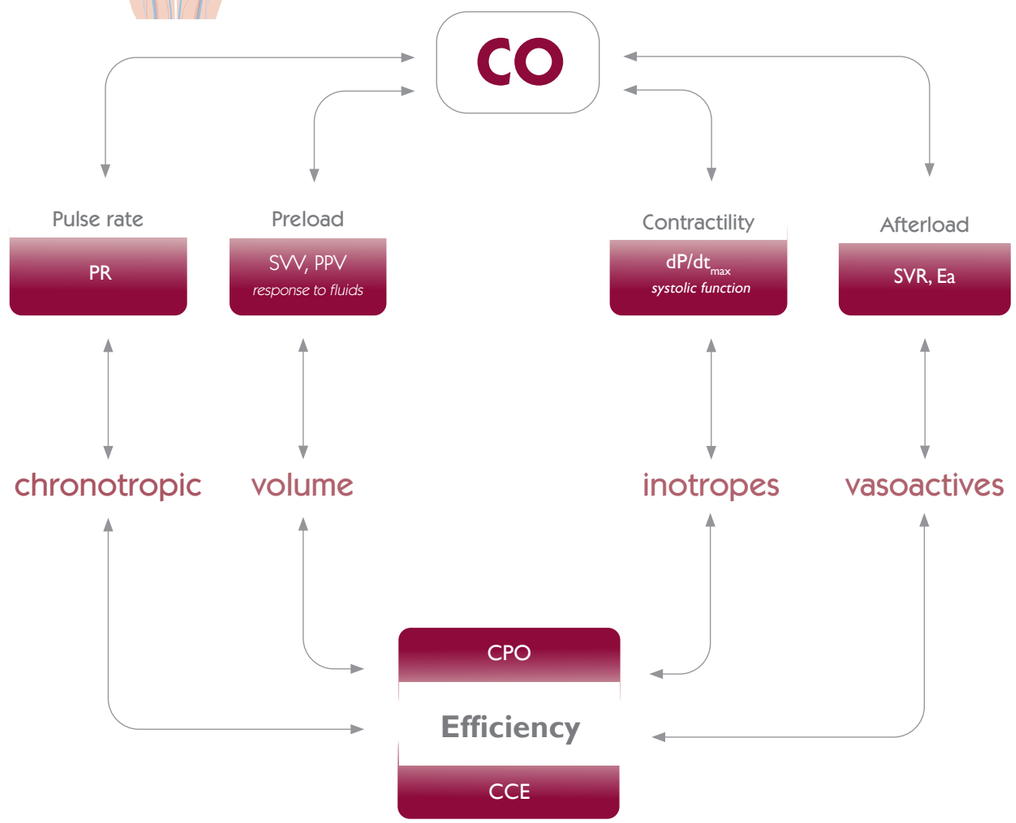

Aortic stenosis

Each patient is unique and his hemodynamic condition can evolve rapidly. The shape of the arterial pressure wave is the result of a complex balance which depends on both the coupling of the cardiac function with the vascular system and their interaction with the respiratory system.

The precise analysis of the shape of the wave obviates the need for calibration and preestimated data about the patient. It also identifies the dicrotic pressure and the Z(t) impedance of the cardiovascular system, even in cases of unusual pressure wave forms.

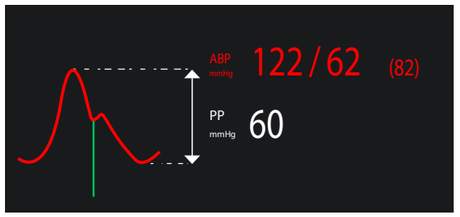
[1] Romano SM, Pistolesi M, Crit Care Med, 2002





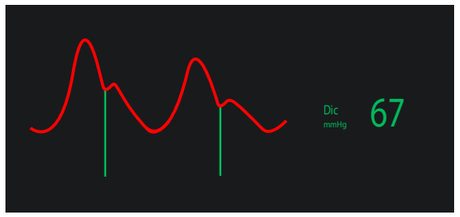
Hemodynamic variables

Pressure



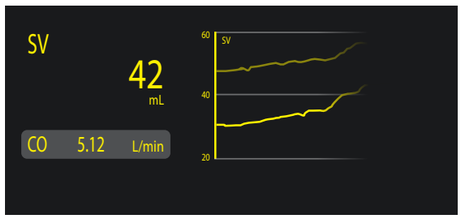
Systolic, diastolic, mean and pulse pressure (PP) are measured with every heartbeat.

Dicrotic pressure



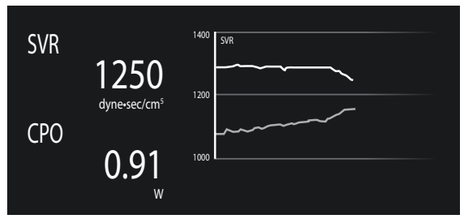
The value of the dicrotic pressure, gauged with precision at 1000Hz, provides information about the vascular condition and the ventricle-arterial coupling.

Cardiac output



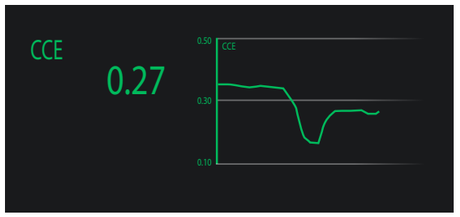
The stroke volume (SV) is measured beat-by-beat and allows for the cardiac output (CO) to be calculated.

Derived variables



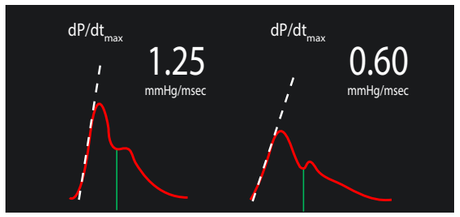
Systemic vascular resistance (SVR), cardiac power output (CPO) and oxygen delivery (DO_2) are examples of the derived variables provided by MostCare^{Up}.

CCE



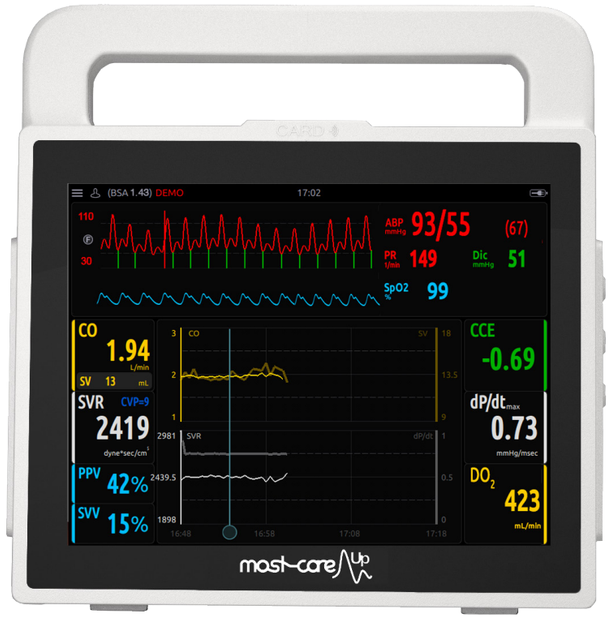
Cardiac cycle efficiency (CCE) is an exclusive variable which describes hemodynamic performance in terms of energy expenditure in the patient being monitored[2].

dP/dt_{max}

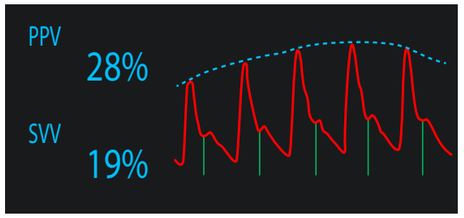


The maximum pressure variation compared to time (dP/dt_{max}) is linked to the heart's contractility and also to the condition of the vascular system.

[2] Romano SM, Int J Cardiol, 2012
[3] Romagnoli S et al., Crit Care, 2014

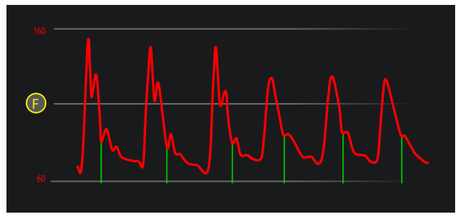


Dynamic variables



Pulse pressure variation (PPV) and stroke volume variation (SVV) during the respiratory cycle can be viewed simultaneously.

Dynamic filter

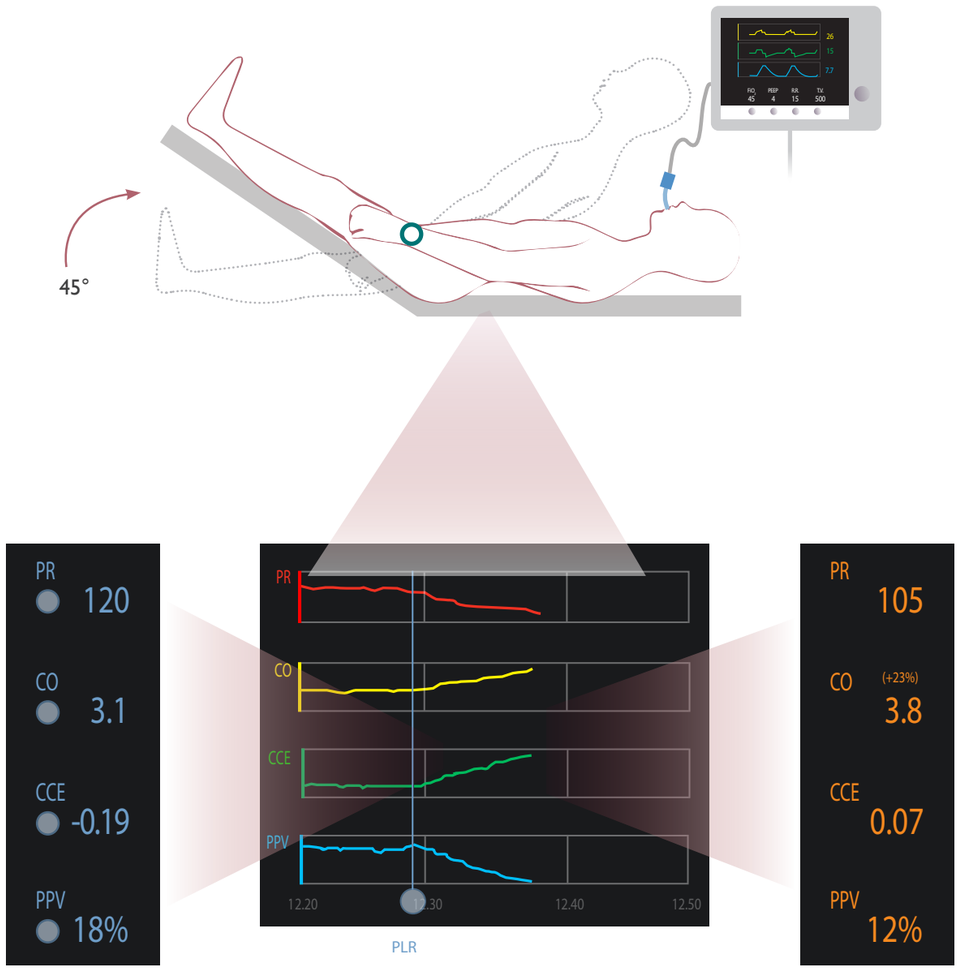


The shape of the pressure curve can be affected by resonance phenomena (overdamping, underdamping). The exclusive, dynamic filter in MostCare^{Up} has been designed to automatically optimise the quality of the wave and to reduce these phenomena[3].

Markers and trends
Do & check function

MostCare^Up can display trends for many hemodynamic variables simultaneously. It is also possible to insert personalised markers during specific events (e.g. start treatment).

The do&check function was designed specifically to help the clinician when monitoring hemodynamic variations following specific treatments (e.g. fluid challenge).



Connectivity and data management

MostCare^Up supports the most advanced communication and data transmission standards. The patient's parameters and freezer-frames can be saved to the machine's memory or exported via the USB port.

The data can also be transferred to the hospital's Patient Management System using the HL7 protocol. The image on the display can be shared for monitoring or educational purposes via HDMI.

Flexibility of use
Endless – On Demand

MostCare^Up guarantees the maximum flexibility and cost efficiency thanks to the various ways in which it can be used.

The *On Demand* version of the monitor can be activated for a single use or for periods of time to meet specific application needs.

The *Endless* version allows an unlimited use of the system without additional cost.

Applications

The PRAM method requires no external calibration or anthropometric normalisation.

MostCare^{Up} can therefore be easily used on any patient who requires constant or occasional hemodynamic monitoring. More specifically, during hemodynamic instability or in the presence of acute clinical variations in high risk patients.

Perioperative Goal Directed Therapy

Fluid optimisation in high-risk surgical patients has significantly reduced postoperative complications and length of hospital stay, resulting in substantially lower costs.

4 Chong MA et al., Eur J Anaesthesiol, 2018
5 Michard F et al., Br J Anaesth, 2017
6 Pearse RM et al., JAMA, 2014

Critical Care

PRAM method has been demonstrated to be accurate in critically ill patients, tracking hemodynamic changes resulting from the administration of vasoactive drugs and fluids including in septic patients.

COVID-19 patients may require ExtraCorporeal Membrane Oxygenation (VV-ECMO). MostCare^{Up} can be a reliable support to continuously monitor tissue oxygen delivery in such extreme conditions.

8 Scolletta S et al., Crit Care Med, 2016
9 Franchi F et al., BJA, 2011
10 Persona P et al., J Clin Med, 2021
11 Morelli A et al., Intensive Care Med, 2014
12 Bond O et al., Perfusion, 2020

Pediatric patients

Advanced hemodynamic monitoring is essential for diagnosing and evaluating circulatory shock in pediatric patients, a major cause of child morbidity and mortality. Early diagnosis and treatment are vital for restoring adequate tissue perfusion and oxygenation.

PRAM method has shown good correlation with Fick method and Echo-Doppler for determining cardiac index in pediatric cardiac patients.

14 Calamandrei M et al., Pediatr Crit Care Med, 2008
15 Alonso-Iñigo JM et al., Pediatr Anaesth, 2016
16 Favia I et al., Interact Cardiovasc Thorac Surg, 2016
17 Han D et al., Br J Anaesth, 2020

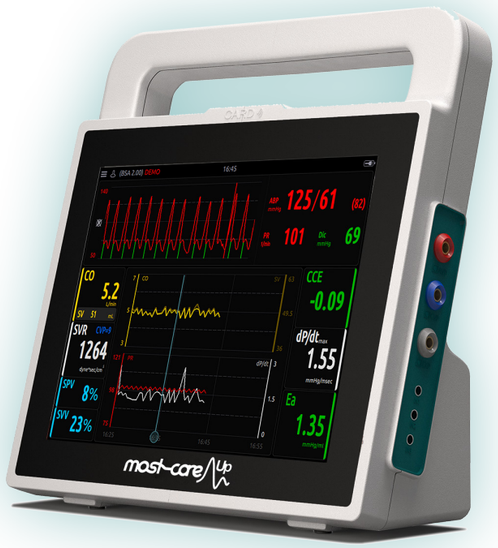
Cardiac patients

Intra-aortic balloon pump (IABP) causes important changes in the arterial waveform. MostCare^{Up} is the only pulse contour method validated for use with IABP.

18 Zangrillo A et al., J Cardiothorac Vasc Anesth, 2010
19 Gelsomino S et al., Eur J Cardiothorac Surg, 2012
20 Onorati F et al., J Thorac Cardovasc Surg, 2012

Trans-catheter Aortic Valve Implantation (TAVI) is increasingly used as an alternative to surgical valve replacement. Hemodynamic monitoring with MostCareUp during TAVI is easy and fast to obtain, helping to support clinical decision-making.

22 Ristalli F et al., Cardiovasc Revasc Med, 2019
23 Romagnoli S et al., J Cardiothorac Vasc Anesth, 2010



Hemodynamic variables		Formulas	Physiological range ***	Units
Pressures				
Sys	Systolic pressure			mmHg
Dia	Diastolic pressure			mmHg
MAP	Mean arterial pressure			mmHg
Dic	Dicrotic pressure		70 - 105	mmHg
PP	Pulse pressure	Psys-Pdia	30 - 50	mmHg
MAP-Dic	Mean and dicrotic pressure difference	MAP-Dic	-10 - +10	mmHg
CVP*	Central venous pressure			mmHg
Cardiac output				
SV	Stroke volume		60 - 100	mL
SVI	Stroke volume index		35 - 45	mL/m²
SV_{kg}	Weighted stroke volume	SV/weight		mL/kg
CO	Cardiac output		4.0 - 8.0	L/min
CI	Cardiac output index		2.6 - 3.8	L (min · m²)
SVR	Systemic vascular resistance	(MAP-CVP)/CO · 80	800 - 1400	dyne · sec/cm⁵
SVRI	Systemic vascular resistance index	(MAP-CVP)/CI · 80	1600 - 2400	dyne · sec · m²/cm⁵
Oxygen delivery				
SpO_2*	Arterial oxygen saturation		96 - 100	%
DO_2*	Oxygen delivery	$DO_2 = CO \cdot CaO_2$ con $CaO_2 = Hb \cdot 1{,}34 \cdot SaO_2$	900 - 1000	mL/min
DO_2I *	Oxygen delivery index	$DO_2I = DO_2/BSA$	500 - 600	mL/min/m²
Efficiency and cardiac function				
dP/dt_{max}	Maximal slope of the systolic upstroke		0.9 - 1.3	mmHg/msec
CCE	Cardiac cycle efficiency		-0.2 - 0.3	units
CPO	Cardiac power	MAP · CO/451	0.80 - 1.20	W
CPI	Cardiac power index	MAP · CI/451	0.50 - 0.70	W/m²
Vascular function				
Ea	Arterial elastance	Dic/SV	1.10 - 1.40	mmHg/mL
PPV/SVV	Dynamic elastance	PPV/SVV		units
Z_{tot}	Cardiovascular impedance			mmHg · sec/mL
Dynamic variables				
PPV	Pulse pressure variation		< 15**	%
SVV	Stroke volume variation		< 15**	%
SPV	Systolic pressure variation			%
DPV	Dicrotic pressure variation			%
Other specific variables				
PR	Pulse rate			1/min
Dia_{pk}	Diastolic peak			mmHg

*When added probes are used. DO_2 and DO_2I calculated with fixed Hb value.
** Approximate values reported in the literature in the patient receiving controlled mechanical ventilation.
*** Normal values in the adult patient. The values depend on the patient in relation to the clinical conditions.
BSA = body surface area, calculated by the standard formulas of DuBois & DuBois, using the values of weight and height.

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Product codes

Monitors	
08MC0202E0V	MostCare^{Up} monitor – *On-Demand* version - Standard
08MC0255E0V	MostCare^{Up} monitor – *Endless* version - Standard
08MC0202E1V	MostCare^{Up} monitor – *On-Demand* version - Turkey
08MC0255E1V	MostCare^{Up} monitor – *Endless* version - Turkey
08MC0202E2V	MostCare^{Up} monitor – *On-Demand* version - UK
08MC0255E2V	MostCare^{Up} monitor – *Endless* version - UK
08MC0202E3V	MostCare^{Up} monitor – On-Demand version - AUS/NZ/VN
08MC0255E3V	MostCare^{Up} monitor – *Endless* version - AUS/NZ/VN
Cards	
04MCU1D02	MostCare^{Up} card – 24 hours (1 day)
04MCU1M02	MostCare^{Up} card – 30 days (1 month)
04MCU1Y02	MostCare^{Up} card – 365 days (1 year)
04MCU01U02	MostCare^{Up} card – 1 use
04MCU10U02	MostCare^{Up} card – 10 uses
04MCU50U02	MostCare^{Up} card – 50 uses
Cables	
Direct Cables	
03MUBBR	MostCare^{Up} direct BP cable – B.BRAUN type
03MUBD	MostCare^{Up} direct BP cable – BD type
03MUBIO	MostCare^{Up} direct BP cable – BIOSENSOR/UTAH type
03MUDPT	MostCare^{Up} direct BP cable – CODAN BDPT type
03MUEDW	MostCare^{Up} direct BP cable – EDWARDS type
03MUMED	MostCare^{Up} direct BP cable – MEDEX LOGICAL type
03MUMED2	MostCare^{Up} direct BP cable – MEDEX TRANSTAR type
Y cables	
03MUYBBR	MostCare^{Up} Y BP cable – B.BRAUN type
03MUYBBR1	MostCare^{Up} Y BP cable – B.BRAUN - 1 type
03MUYBD	MostCare^{Up} Y BP cable – BD type
03MUYBIO	MostCare^{Up} Y BP cable – BIOSENSOR/UTAH type
03MUYDPT	MostCare^{Up} Y BP cable – CODAN BDPT type
03MUYEDW	MostCare^{Up} Y BP cable – EDWARDS type
03MUYMED2	MostCare^{Up} Y BP cable – MEDEX TRANSTAR type
Analog Cables	
MUHEMO018	Input/Output Analog Cable Jack 3,5
MUHEMO024	Input/Output Analog Cable DS
MUHEMO031	Input/Output Analog Cable 7 Pin
MUHEMO033	Input/Output Analog Cable PDM
MUHEMO034	Input/Output Analog Cable NK
MUHEMO035	Input/Output Analog Cable Jack 6
Accessories	
DS-PMS01	MostCare^{Up} Pressure Monitoring Set
RS002505	MostCare^{Up} TROLLEY with basket
08MC-VYGU	MostCare^{Up} LUGGAGE

CRITICAL CARE

For further information, please contact: **marketingbenelux@vygon.com**

The specifications shown in this leaflet are for information only
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