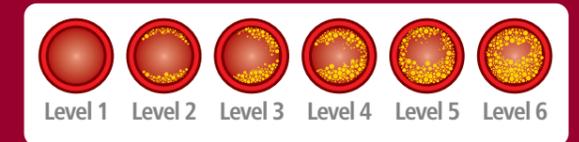


WORLD'S FIRST  
CHECK OF  
**ARTERY CONDITION**  
WITH SpO<sub>2</sub> & PULSE RATE  
PULSE OXIMETER

# ACT

## ARTERY CHECK TECHNOLOGY



### PULSE OXIMETER with ACT detects

- **ARTERY CONDITION**
- **SpO<sub>2</sub>**
- **PULSE RATE**

### AT YOUR FINGERTIP

- **STATE OF THE ART**  
Artery Check Technology (ACT) inside
- **EFFORTLESS**  
Detection at your fingertip
- **FAST**  
Instant readings of SpO<sub>2</sub>, pulse rate and artery condition
- **EASY TO UNDERSTAND**  
Comprehensive 6-level graphical indicator

#### SWITZERLAND

Rossmax Swiss GmbH  
Widnauerstrasse 1, CH-9435 Heerbrugg  
Switzerland

Tel: +41 71 544 43 25  
emea@rossmax.com

#### USA

Rossmax USA  
11545 Sorrento Valley Rd, Suite 308,  
San Diego, CA. 92121

Tel: +1 858 755 7081  
america@rossmax.com

#### TAIWAN

Rossmax International Ltd  
12F, No. 189, Kang Chien Road  
Taipei, 114, Taiwan

Tel: +886 2 2659 7888  
Fax: +886 2 2659 7666  
info@rossmax.com

#### JAPAN

Rossmax Japan  
962-7 Shimoyasumatsu,  
Tokorozawa, Saitama  
359-0024 Japan

Tel: +81 042 9444 756  
japan@rossmax.com

#### INDIA

Rossmax India Sub Continent  
74, Lord Buddha Society-2nd Floor, Sector 21-C  
Opp-Gymkhana Club-Faridabad 121003  
NCR of Delhi, Haryana, India

Tel: +91 129 2437 712  
india@rossmax.com

#### CHINA

Rossmax (Shanghai) Incorporation Ltd.  
No. 6018, Huiyi Rd., Waigang, Jiading District,  
Shanghai, China

Tel: +86 21 6957 5888  
Fax: +86 21 6957 5889  
info@rossmax.com



# ACT

## ARTERY CHECK TECHNOLOGY

Level 1 Level 2 Level 3 Level 4 Level 5 Level 6

**ACT (Artery Check Technology)** analysis the pulse and SpO2 signals and determines the actually prevailing stiffness of the artery (Artery Condition). ACT further comprehensively classifies the arterial condition into 6 levels and presents the result by an intuitive graphical visualisation. Pulse rate, SpO2 and the artery condition are available at your fingertip! Artery condition is associated with the potential presence of the following diseases:

- Arteriosclerosis
- Peripheral circulation disorder
- A wide range of cardiovascular diseases

Monitoring your arterial constriction condition with Rossmax ACT-embedded Pulse Oximeter allows an early risk assessment for wide-spread clinical cardiovascular disorders. By this non-invasive technique both, the progression as well as the actual status of pathological arterial perfusion is recognized. In addition, Rossmax offers the PARR Technology for Blood Pressure Monitors, which is a world unique stroke screening technology by distinction of pulse arrhythmia. Together with ACT Rossmax offers the total solution to monitor your health and evaluate most severe risk factors. Learn more at [www.rossmax.com](http://www.rossmax.com).



**SA310**  
Handheld Pulse Oximeter

- %SpO<sub>2</sub> & Pulse Rate
- 2.4" TFT Color Display
- Shielded Design blocks Ambient Light
- Biocompatibility & Anti-Allergic Design
- Bluetooth® Transmission
- High/Low SpO<sub>2</sub> & PR Setting
- Alarm & Sound Off
- Up to 999 Memories

**SA300**  
Handheld Pulse Oximeter

- Artery Check Technology
- %SpO<sub>2</sub> & Pulse Rate
- 2.4" TFT Color Display
- Shielded Design blocks Ambient Light
- Biocompatibility & Anti-Allergic Design
- Bluetooth® Transmission
- High/Low SpO<sub>2</sub> & PR Setting
- Alarm & Sound Off
- Up to 999 Memories
- PPG / ACT Waveform

**SA210**  
Handheld Pulse Oximeter

- %SpO<sub>2</sub> & Pulse Rate
- Shielded Design blocks Ambient Light
- Biocompatibility & Anti-Allergic Design
- High/Low SpO<sub>2</sub> & PR Setting
- Alarm & Sound Off
- Up to 288 Memories
- Backlight

**SB200**  
Fingertip Pulse Oximeter

- Artery Check Technology
- %SpO<sub>2</sub> & Pulse Rate
- Shielded Design blocks Ambient Light
- Biocompatibility & Anti-Allergic Design
- Visible/Audible Alarm
- OLED Two-Color Two-Way Display
- Cord attached
- Bluetooth® (optional)

**SB100**  
Fingertip Pulse Oximeter

- %SpO<sub>2</sub> & Pulse Rate
- Shielded Design blocks Ambient Light
- Biocompatibility & Anti-Allergic Design
- Pulse Strength Indication
- Cord attached

## Medical Background and Clinical Relevance of the Rossmax Artery Check Technology (ACT)

The Rossmax Artery Check Technology adds a clinically relevant information to the conventional pulse oximetry parameters, which are:

Arterial oxygen saturation (SaO<sub>2</sub>)

Pulse frequency

The additional parameter describes the degree of the prevailing arterial contraction at the time of the measurement. This arterial contraction state is visualized by both, the ACT marker icon as well as a numerical index value, ranging from level 1 to 6. Low values are associated with a normal arterial state of contraction, while high numbers point on the clinically important fact that an arterial flow impairment is detected (Figure 1).



Figure 1: Arterial Status Judgement ACT Index

The arterial pulse is detected at the digital arteries by means of a photo-plethysmographic detection technology. This means LED light is emitted from one side of the finger (the nail side) into the small arteries of the fingertips. The light will be absorbed in the tissue, - like skin layers, bone and muscles. This light is particularly absorbed once it is passing through the pulsating arteries. The arteries are changing their diameters by various degrees of filling during the pulse cycle.

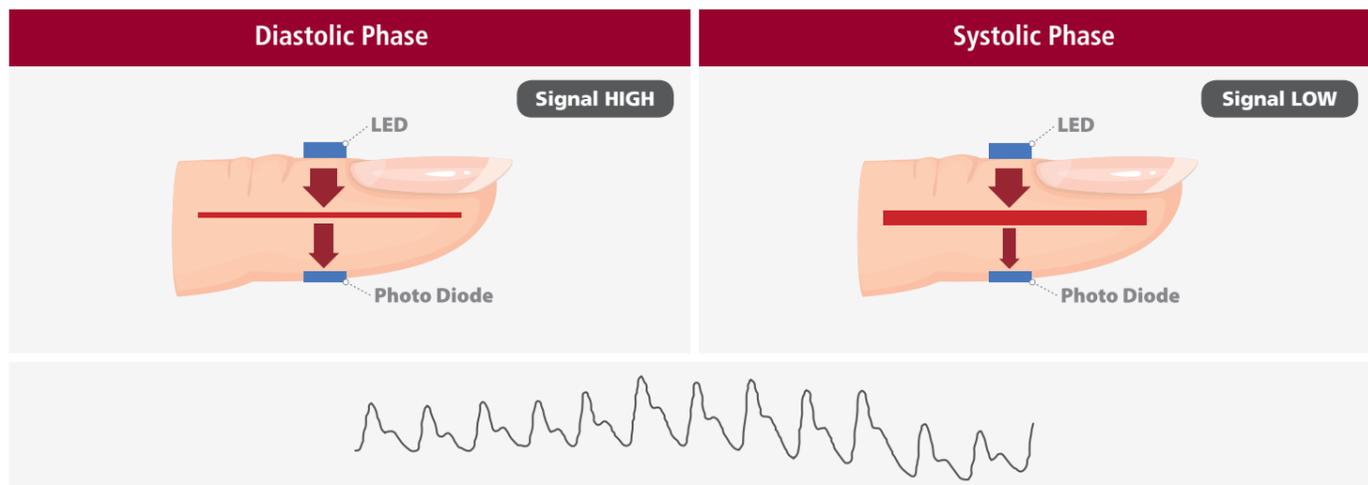
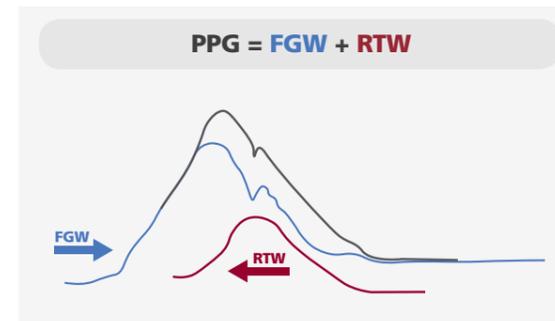


Figure 2: Photoplethysmogram Finger (PPG)

During the systolic pulse phase, the arterial vessels are wide and absorb more light energy than during the diastolic pulse phase. During the latter the arteries are small and less light absorption happens to be. This is how a photo – plethysmogram unfolds (Figure 2).



**The photo-plethysmogram (PPG) is combined of two parts**  
One part is the forward going wave (FGW) coming from the heart. This is determined by the stroke efficiency of the pumping ventricles.

The second and in this context important part is the returning wave (RTW). The returning wave comes from the fact that the narrowing of the arteries leads to a rising reflectance of blood, which then is send back in the opposite direction of the blood flow.

Figure 3: Forward-going Wave and Returning Wave combine to Pulse Plethysmogram Wave



The contour of the RTW depends on the degree of arterial narrowing and the arterial stiffness, thus on the degree of the arterial constriction, which depends on a variety of possible medical conditions.

In most clinical cases, the arterial narrowing is caused by the muscular contraction of the arteria wall. Contracted muscles lead to an inelastic, stiff wall. Thus, in most clinical cases, constricted arteries are associated with inelastic artery walls.

Figure 4: Arterial Diameter Change and Muscular Wall Stiffness Increase.

A high degree of vasoconstriction leads to a narrow and high RTW maximum, which is travelling back FAST (Figure 5B). Low degree of vasoconstriction leads to a wide and low RTW peak, which is in turn travelling back slowly (Figure 5A). That means that in a state of arterial constriction, which might be associated to actual medical impairments, the PPG is altered by the high and narrow RTW pulse, which appears EARLY in the PPG pattern (Figure 5B). On the other hand, a normal or low state of arterial constriction means that the PPG is combined by a low and wide RTW pulse, which occurs late in the PPG pattern (Figure 5A).

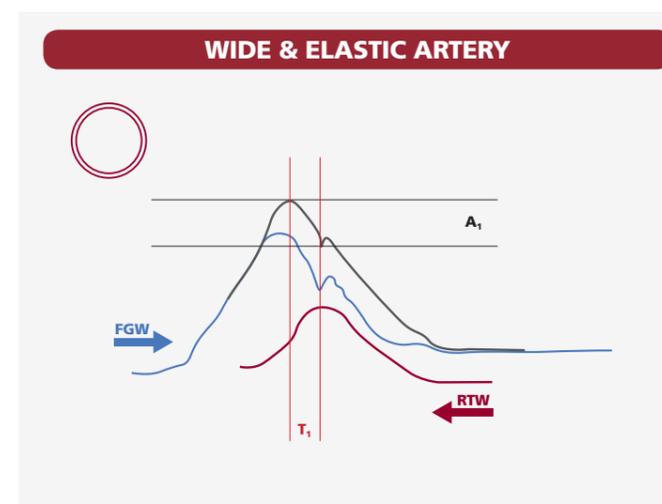


Figure 5A: Normal Artery

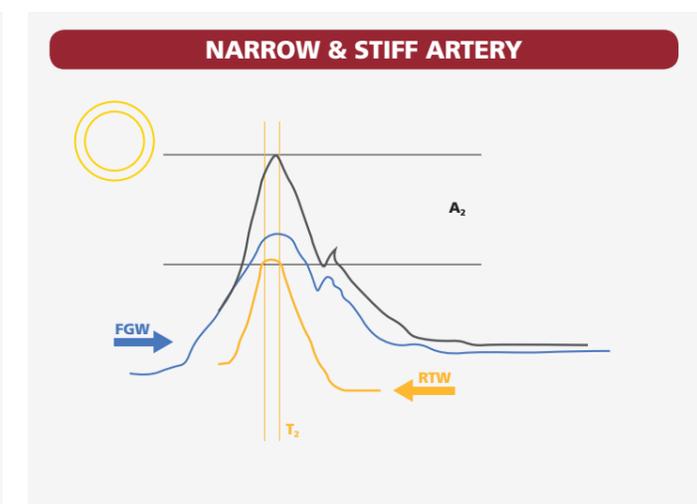


Figure 5B: Arterial Constriction

The Rossmax pulse oximetry technology includes a proprietary high-sophisticated pulse contour analysis of the PPG, which is enabled by a specific SW algorithm and a wide pulse filter setting. This makes a difference to other available pulse oximeters. For this reason, the ACT pulse oximetry technique is able to analyse the PPG pulse pattern and determines the characteristics of the returning wave dynamics. A narrow, high and early RTW peak can be distinguished from a wide, low and late RTW peak.

This is how the prevailing degree of vasoconstriction can be determined. The paramount benefit for the clinician comes with the fact that a vasoconstriction can be early detected and quantified. The specific underlying medical cause for a detected vasoconstriction can only be determined from the knowledge about the particular patient condition. A clinician who is aware of possible underlying disorders, the patient history and actual newly found symptoms recognizes the root cause of the blood flow impairment and will be taking action if needed.

Certain medical causes (Table 1) can lead to arterial constriction, such as acute febrile infections, cardiac failure, pulmonary disorders, serious blood loss, shock or sepsis. The effect of particular medications and drugs may also change the degree of constriction in patients.

Examples	Diameter	Stiffness
Primary Arterial Hypertension	↓	↑
Secondary Arterial Hypertension	↓ ↑	↑
Medication Effect	↓ ↑	↓ ↑
Cardiac Shock	↓	↑
Bleeding Shock	↓	↑
Fever	↓ ↑	↓ ↑
Sepsis	↓ ↑	↓ ↑
Coldness	↓	↑
Arteriosclerosis	↓ ↑	↑

Table 1: Exemplary arterial constriction changes.

The degree of the constriction can be mild, moderate or strong. That is why the Rossmax ACT displays a comprehensive icon in addition to a constriction index.

**In a nutshell, the ACT technology adds a new parameter, - the arterial constriction state -, to the pulse oximetry diagnosis. This parameter is of paramount value in order to detect the effect of underlying disorders, leading to a flow impairment in arteries. Thus, clinicians are being empowered to early take action if needed.**

Copyright FIMT (Asperg)

		SPECIFICATION				
Model						
		SA310	SA300	SA210	SB200	SB100
Features	Measurement Range	SpO <sub>2</sub> : 35%~100%, PR: 30~250 bpm			SpO <sub>2</sub> : 35%~99%, PR: 30~250 bpm	
	Precision	SpO <sub>2</sub> : 70%~100%; ±2%, 35%~69%(unspecified) Pulse rate: 30~250 bpm; ±3			SpO <sub>2</sub> : 70%~99%; ±2%, 35%~69%(unspecified), Pulse rate: 30~250 bpm; ±3	
	SpO <sub>2</sub>	✓	✓	✓	✓	✓
	Pulse Rate	✓	✓	✓	✓	✓
	Artery Check	----	✓	----	✓	----
	Display	TFT		LCD with Backlight	OLED	LED
	Data Link	Bluetooth		Wired	Bluetooth (optional)	----
	Memory	Up to 999 Memories		Up to 288 Memories	----	----
	Alarm	Programmable (SpO <sub>2</sub> /PR)			Default Value (SpO <sub>2</sub> )	----
	Date/Time	✓	✓	✓	----	----
	For Adult	✓	✓	✓	✓	✓
	For Child	Optional Probe			✓	✓
	For Infant	Optional Probe			----	----
	Power Supply	4 "AA" Alkaline / AC Adaptor		4 "AA" Alkaline	2 "AAA" Alkaline	

SpO <sub>2</sub> Accessory for SA310/SA300/SA210	Adult probe PA100	Neonatal probe PB100	Pediatric probe PC100	Tube probe PF100	Disposable probe PD100
					