Your Cardiac Monitor – And Everything You Should Know About It

Information from BIOTRONIK
for patients and their relatives

BIOTRONIK
excellence for life

Contents

1 Welcome

Your heart is the center of your health, and it deserves special attention. If a BIOTRONIK cardiac monitor has been recommended to you or has already been inserted, you are receiving state-of-the-art medical care.

This brochure will help you to better understand your device and familiarize yourself with its function and benefits. Here you can find out why your cardiac monitor plays an important role in your health: how it works, why your doctor has recommended it, how the implantation process works, and what you should bear in mind in everyday life. Our aim is to make the use of this innovative diagnostic device as simple and easy to understand as possible – so that you feel safe and well informed.

Please keep this in mind: Each person is unique. For personal questions about your health or your cardiac monitor, always contact your attending physician directly. Your feedback is crucial in order to better understand your symptoms and find the right treatment.

This brochure is primarily aimed at you. However, it can also be helpful if you share the information with relatives or friends. So they too can understand why regular and reliable monitoring of your heart rhythm is so important.

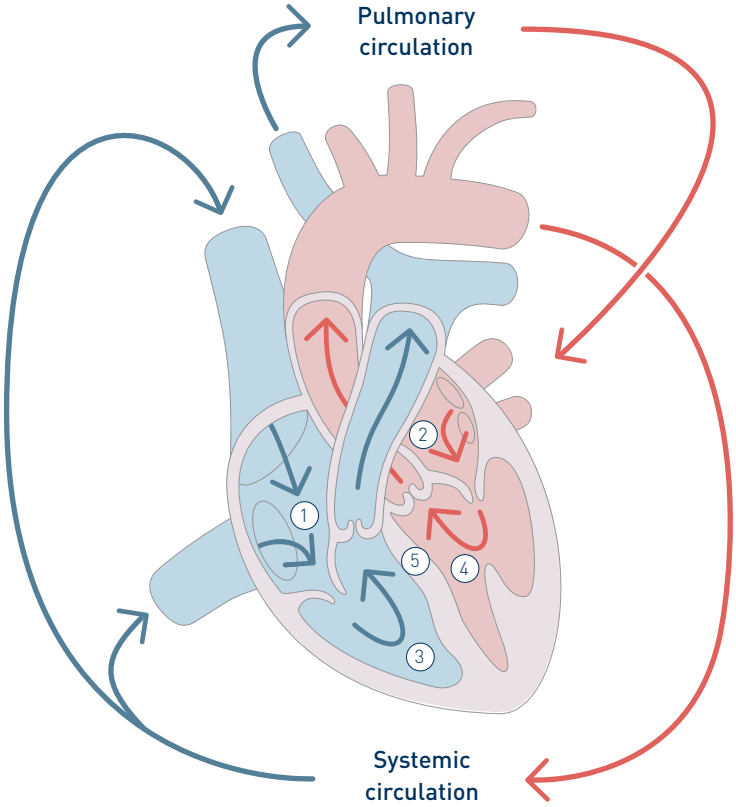
In addition to the general information in this brochure, you can read the story of Alexander, who had a cardiac monitor fitted. He shares his stories and talks about how he experienced this time and how he feels today.

Alexander, an experienced laser technician and longtime BIOTRONIK employee, has spent his life developing medical technology. The married father of two almost grown-up children spends his free time restoring old bicycles and cars. Despite his active lifestyle, one day he noticed unusual symptoms in his heart.

2 The Heart – Interesting Facts about Its Structure and Function

Do you know anyone who works 24 hours a day without a break or vacation? Then put your hand on your heart!

The heart is the central organ of our body, tirelessly pumping blood through our circulatory system. It supplies your body's organs with oxygen and vital nutrients around the clock, while removing waste products and maintaining the natural blood flow. It is worth taking a closer look at the structure and connections between the heart and the body. We have summarized the most important facts for you in the following chapters in a simple and understandable way. Let's start with an illustration of the heart and look at its structure:



The heart is a fist-sized hollow muscle consisting of four chambers, the heart valves and the cardiac septum. The two upper chambers are called the atria, the two lower chambers the ventricles. A wall, the so-called septum, divides the heart into a right and a left side. The heart muscle contracts and relaxes regularly, pumping blood through the body. This ensures that the various tissues and organs are supplied with sufficient oxygen and nutrients.

The heart valves play an important role in this by directing the blood flow in the right direction and preventing the blood from flowing backwards. These valves open and close in rhythm with the heartbeat to ensure an orderly blood flow.

The flow of blood in our heart

With every heartbeat, the deoxygenated blood is first pumped from the atria into the ventricles. The ventricles then contract and push the blood into the vessels. The deoxygenated blood then travels from the right side of the heart to the lungs (pulmonary circulation), where it absorbs oxygen and becomes oxygen-rich blood. The oxygen-rich blood is then distributed from the left side of the heart to the other organs of the body (systemic circulation). The two circuits are interdependent and function synchronously in a healthy heart.

- Oxygen-depleted blood
- Oxygen-enriched blood

1. Right atrium
2. Left atrium
3. Right ventricle
4. Left ventricle
5. Cardiac septum

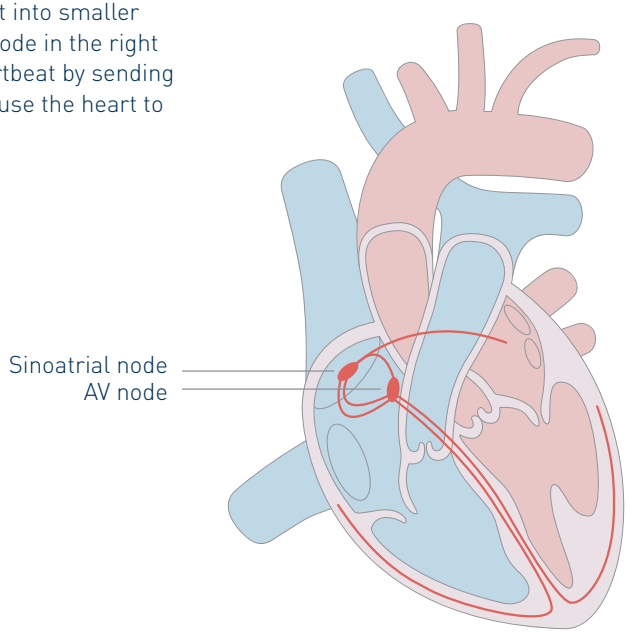
Blood vessels: Transportation routes of life

Our body has three main types of blood vessels: Arteries, veins and capillaries. Arteries transport bright red, oxygen-rich blood away from the heart. One exception is the pulmonary artery, which carries deoxygenated blood. The arteries branch out throughout the body to form a fine network of capillaries. These capillaries enable the shipping of oxygen and nutrients to the body's cells. The capillaries then condense back into veins. Veins carry the dark red, deoxygenated blood back to the heart. The pulmonary veins, which transport oxygen-rich blood, are an exception.

In order for the heart to work properly, it is supplied with blood, oxygen and nutrients by the coronary arteries. These vessels run along the surface of the heart and branch out into smaller vessels. The sinoatrial node in the right atrium controls the heartbeat by sending electrical pulses that cause the heart to beat regularly.

The heart and its rhythm: how the sinoatrial node controls our heartbeat

Our heart beats more than 100,000 times a day to maintain the bloodstream. A special system ensures that the heart beats in the right rhythm – the so-called sinus rhythm – around the clock, day after day. The sinoatrial node in the right atrium is the "pacemaker" and sends out electrical pulses that cause the heart to beat. These pulses are transmitted via the atrioventricular node (AV node) and other conduits to the ventricles, which then contract and pump blood. A healthy heart beats about 50 to 80 times per minute at rest, but the rate can increase to over 100 beats per minute during exertion or excitement.



During physical activities, the heart rate increases to 120-160 beats per minute depending on the intensity – sometimes even more. Regular training can permanently lower the resting heart rate – a sign of a well-trained heart.

3 Cardiac Arrhythmias

Our heart is not an engine that always runs smoothly. Sometimes it beats too fast or too slow, and sometimes it gets out of rhythm. These irregularities are completely normal, especially in situations that are accompanied by excitement, fright, fever or physical exertion.

Doctors only speak of an arrhythmia when the heart is out of rhythm for no apparent reason. If such irregularities occur frequently, last for a long time or cause discomfort, it is advisable to consult a doctor and have the causes clarified.

Cardiac arrhythmias can be harmless in many cases, but there are also forms that can be life-threatening. They are often caused by diseases such as coronary artery disease, in which deposits form in the coronary arteries, or heart failure, in which the heart no longer pumps sufficiently. A heart attack caused by the sudden blockage of a coronary artery can also trigger cardiac arrhythmias. Other underlying diseases, such as problems with the thyroid gland, can also lead to an irregular heartbeat.

Since you want to find out more about a cardiac monitor, we have compiled some of the most important cardiac arrhythmias for you:

Bradycardia – when the heart beats too slowly

Bradycardia is a cardiac arrhythmia in which the heart beats slower than normal, typically at significantly less than 60 beats per minute. This can be normal in healthy, active people or during sleep. However, if bradycardia interferes with everyday life and causes symptoms such as dizziness, fatigue, shortness of breath or fainting, it may be a sign of a more serious problem and should therefore be investigated medically. Causes of bradycardia can be heart problems, certain medications, infections or metabolic disorders. In severe cases, treatment such as the implantation of a pacemaker may be necessary to regulate the heartbeat.

Ectopic beats – when the heart stumbles

Ectopic beats are additional heartbeats that occur outside the normal heart rhythm and are often described as "stumbling" or "skipping a beat". These are caused by a "misfire" in the heart, in which an additional electrical pulse can trigger another heartbeat. Ectopic beats can occur in healthy people as well as in people with cardiac disease. In most cases, ectopic beats are harmless and do not require treatment. They can be triggered by everyday factors such as

stress, fatigue, caffeine or alcohol. However, if they occur very frequently, the ectopic beats may be an indication for other cardiac diseases and should be examined more closely by a doctor.

Tachycardia – when a heart beats too rapidly

There are many moments in life that make our hearts beat faster: during exercise, under stress or when we unexpectedly meet a loved one. In such situations, a rapid heartbeat is completely normal and no cause for concern. This type of palpitations is called harmless tachycardia and is a natural reaction of the body. The situation is different if your heart rate exceeds 100 beats per minute for a long period of time for no apparent reason. This could indicate a pathological tachycardia.

The different types of tachycardia

There are different types of tachycardia, which are differentiated according to their origin in the heart. Let's take a closer look at them:

Tachycardias that originate in the atrium ("atrial tachycardia"):

Atrial flutter means that the heart beats too fast, but at a regular rhythm. As a rule, the heartbeat is faster than 150 beats per minute. When the heart beats so fast, the ventricles can no longer contract properly and blood can build up in the heart. This can lead to blood clots, which can cause a cerebrovascular stroke if they enter the bloodstream. Atrial flutter can also turn into atrial fibrillation.

Atrial fibrillation is when the heart beats too quickly and irregularly. As with atrial flutter, this can lead to the heart chambers no longer contracting properly, which can cause blood clots that could potentially lead to a cerebrovascular stroke. Normally, neither atrial flutter nor atrial fibrillation are life-threatening in themselves, but they can increase the risk of a cerebrovascular stroke.

Tachycardia originating from the ventricle ("ventricular tachycardia"):

We have already learned that the heart has different chambers. When the impulse for the heart to beat too fast originates in the lower chambers (ventricles), this is called ventricular fibrillation. In this case, the heart can no longer pump blood, which leads to cardiac arrest within a few minutes. If ventricular fibrillation cannot be stopped, sudden cardiac death occurs. The main difference between an atrial and a ventricular arrhythmia is therefore that a ventricular arrhythmia is immediately life-threatening.

4 BIOMONITOR – the BIOTRONIK Cardiac Monitor

4.1 Why do I need a cardiac monitor?

If you suffer from recurrent fainting spells, palpitations, dizziness or unexplained cerebrovascular strokes, a cardiac arrhythmia may be the cause. Symptoms such as palpitations, shortness of breath, fatigue, chest pain, difficulty concentrating or a general feeling of weakness can also indicate such a disorder. They often occur only occasionally and are therefore difficult to detect using conventional examination methods.

A normal ECG (electrocardiogram) is usually not sufficient in such cases, as it only measures for a short time and can only show small sections. Long-term monitoring is necessary to reliably detect rare or irregular cardiac arrhythmias.

4.2 What is a cardiac monitor?

Insertable cardiac monitors, sometimes called implantable loop recorders or event recorders, help your doctor monitor your heart rhythm for months or even years. They provide the necessary timeframe to diagnose difficult-to-detect cardiac arrhythmias that could be behind, for example, recurring and unexplained fainting spells (syncope), rapid heartbeat, palpitations, dizziness, or unexplained strokes. In order to detect or rule out cardiac arrhythmia as the cause of these symptoms, an ECG is necessary. Since cardiac arrhythmias can occur very rarely under certain circumstances, they would remain undetected during a temporary ECG.

Insertable cardiac monitors, such as the BIOTRONIK BIOMONITOR, are modern, very small electrocardiogram diagnostic devices that are implanted directly under the skin in the left thoracic area. They continuously monitor the heart rhythm and automatically detect any irregularities. Clinically relevant data is stored on the device and transmitted daily via the telemedical remote monitoring system (BIOTRONIK Home Monitoring) or can be retrieved during follow-up care. This allows your doctor to see whether and what type of cardiac arrhythmia is occurring and whether it is related to your symptoms. This information is vital in determining the cause of your symptoms, making a diagnosis and choosing the best treatment option for you.

We have summarized the main advantages of a cardiac monitor for you here:

- Safety through constant monitoring: The cardiac monitor monitors your heart activity around the clock. Cardiac arrhythmias are detected and recorded.
- Long-term observation: Cardiac monitors can be used for several years, allowing long-term monitoring and control of your heart.
- Early detection of problems: Continuous monitoring allows heart problems to be detected and treated at an early stage – before they lead to serious complications.
- Telemedical transmission: Cardiac monitors can automatically transmit data to your clinic or doctor's office, allowing for quick and effective evaluation.
- Nearly no restrictions on your lifestyle: Cardiac monitors are small and so light that you can continue your everyday life at home as usual.

Your doctor will discuss with you whether a cardiac monitor makes sense for you. He or she will explain the advantages, answer your questions and accompany you through the entire course of treatment.

Alexander is also familiar with this uncertainty: Again and again he feels an unusual buzzing in his chest, occasionally his heart races – and once he even suddenly blacked out without any physical exertion. Despite several examinations, including a 24-hour ECG and an exercise test, no clear cause could be determined. To monitor Alexander's heart rhythm in the long term, his doctor recommended a cardiac monitor. This small device helps to detect even rare or irregular events that often go undetected using conventional methods.

4.3 Your BIOTRONIK cardiac monitor system with optional accessories

The BIOMONITOR cardiac monitor was developed by the German medical technology company BIOTRONIK to continuously monitor your cardiac health. Depending on the doctor's recommendation, you will receive the BIOMONITOR together with supplementary devices as a comprehensive system – tailored to your individual needs.

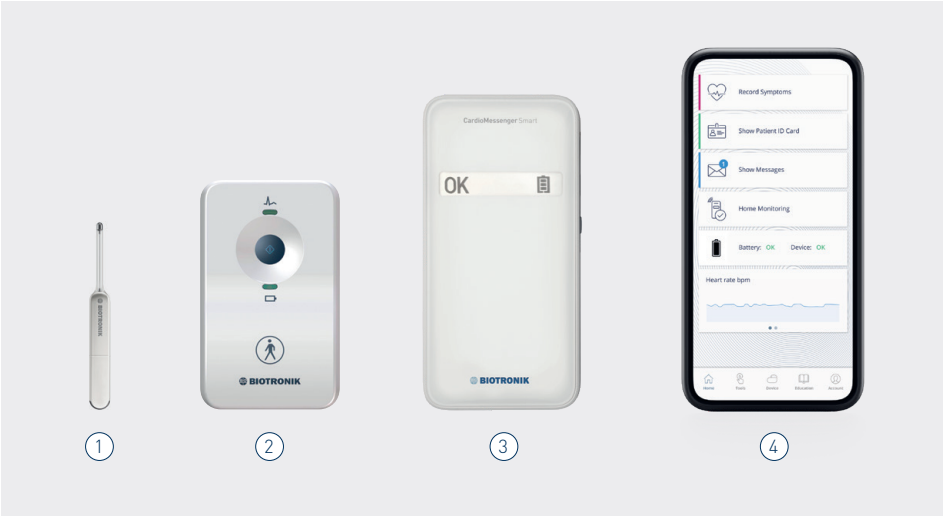
The BIOTRONIK system at a glance:

① **BIOMONITOR – cardiac monitor**
The central element: The cardiac monitor senses your heart activity, detects and analyzes abnormalities, records cardiac arrhythmias, and provides important information for assessing your cardiac health.

② **Remote Assistant – trigger device for the patient**
You can use the trigger device to start a recording in the cardiac monitor yourself – e.g., in the event of sudden symptoms such as palpitations or dizziness.

③ **CardioMessenger Smart – data transmitter for patients**
This device automatically sends the recorded data to your doctor. This makes telemedical care via the "Home Monitoring" function possible.

BIOTRONIK Patient App
④ The app offers you additional digital support. It helps you to keep an eye on your cardiac health.



4.4 What is the medical procedure for the cardiac monitor?

You have probably already had several examinations and discussions with your attending physician and decided together that a cardiac monitor could be useful for you. If your doctor does not specialize in inserting the device, he or she will refer you to an appropriately equipped facility – e.g., a hospital. You will then make an appointment for the procedure there. After a detailed consultation and discussion with the attending physician and your consent for use, an appointment will be made for the insertion of the cardiac monitor.

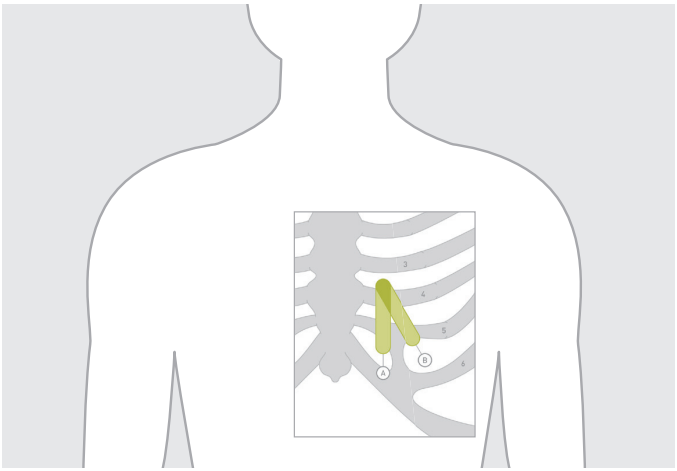
Alexander's experiences:
"After fainting briefly and experiencing palpitations, I underwent several examinations – including a stress MRI (magnetic resonance imaging) scan and a 24-hour ECG. Coincidentally, an unusual chest hum occurred during the ECG, followed by a brief episode of dizziness. This event was recorded and I was subsequently referred to the cardiology department of a hospital. I made an appointment immediately and went to the consultation. The following resting ECG was unremarkable, but due to the rare and difficult-to-detect symptoms, I was suggested to have a cardiac monitor implanted. The probability of detecting such events with a short-term ECG was simply too low. After a detailed consultation and my consent, a date for the procedure was set three weeks later."

On the day of the procedure

Cardiac monitor insertion is a small, routine procedure in which the cardiac monitor is inserted just under the skin of the chest. The procedure is usually performed in a hospital or doctor's office under local anesthesia and only lasts a few minutes. You are awake and able to communicate with the medical team performing the procedure. To insert the cardiac monitor, your doctor will make a very small incision in the upper thoracic area and insert the cardiac monitor using a specially designed tool. Once the cardiac monitor has been successfully placed, the doctor removes the insertion tool and closes the wound with a sterile patch or a few stitches.

Immediately after the procedure, the doctor will explain to you what you should pay attention to over the next few days and weeks. Listen carefully, ask questions and follow the recommendations. You may receive the following accessories for your cardiac monitor directly after implantation or a little later:

- Trigger device – Remote Assistant
- "CardioMessenger Smart" transmitter
- Patient ID card and information material – please keep these documents in a safe place and always carry the patient ID card with you if possible.



Possible positions of the cardiac monitor

Alexander tells us:
"I took the bus to the hospital in the morning. Before I was taken to the operating theater, there was a short preliminary talk with the doctor who was to perform the procedure. I was conscious during the entire procedure and was able to talk to the doctor and the team present. Inserting and placing the cardiac monitor and removing the insertion tool took less than ten seconds. The small incision was then stitched up – and that was it."

"After the procedure, I walked back to the waiting room where I was handed a "CardioMessenger Smart" and explained how the transmitter works and how to use it. I was also informed how I should behave in the near future and who will be monitoring my heart activity in the coming years. I was able to leave the hospital just one hour after the procedure, accompanied by my wife."

5 What Is the "Remote Assistant" Trigger Device and How Is It Used?

Usually, the cardiac monitor records each measured irregularity in your heart rhythm independently and automatically. If your doctor deems it necessary, he or she will provide you with a trigger device that you can carry with you at all times. Together with the cardiac monitor and the trigger device, you then have the option of triggering additional ECG recordings if required, e.g., directly following a fainting spell or if you experience acute symptoms such as dizziness or palpitations.

Important notes:

- If you receive a Remote Assistant, always carry it with you if possible.
- Only use the device after you have received detailed instructions from trained medical personnel.
- If necessary, instruct your relatives or partner on how to operate the Remote Assistant.

Further information and operating instructions can be found in the enclosed manual in the package or on the BIOTRONIK website at: manuals.biotronik.com

6 The "CardioMessenger Smart" Transmitter

To enable the transmission of your data with the BIOTRONIK Home Monitoring remote monitoring system, you need an additional transmitter, the CardioMessenger Smart. As soon as you have been provided with the transmitter, ask your doctor or a trained member of the nursing staff to explain how the CardioMessenger Smart works. If possible, find out how and when you can reach your practice or clinic if you need to.

6.1 How do I operate the CardioMessenger Smart at home?

To ensure that your device data can be reliably transmitted to your doctor every day, place your CardioMessenger Smart on your bedside table before bedtime and charge it via the power cord.
Your CardioMessenger Smart is already pre-installed and delivered ready to use. You can put it into operation immediately by plugging the power plug into the socket. Every night while you sleep, your cardiac monitor automatically collects the data from the last 24 hours and transmits it to the CardioMessenger Smart. You don't need to do anything else, the data is read out and transferred automatically.

Note:
Avoid wearing the transmitter directly over the cardiac monitor, e.g., in your breast pocket.

Further information and operating instructions can be found in the enclosed manual or on the BIOTRONIK website at: manuals.biotronik.com

7 Back at Home – Your Follow-Up

Immediately after the procedure

Recovery time after the routine procedure is usually minimal, and you can usually leave the hospital or doctor's office the same day. In some cases you will stay in hospital overnight.

Observe at home how the wound heals. Slight discomfort near the incision site is completely normal. The cardiac monitor is a very small implanted device and will hardly be sensed once the incision has healed. Most patients get used to it quickly and soon no longer notice it. We have briefly summarized the most important notes for the first few weeks after implantation for you here:

- Do not touch the freshly sutured wound.
- Avoid lunging arm movements and lifting heavy objects in the coming weeks.
- Avoid any manipulation at the site of the procedure.
- Please consult a doctor if the following very rare abnormalities occur:
  - Blood or liquid is secreted from your post-operative scar.
  - The post-operative scar swells up and becomes warm.
  - Fever, chills or fatigue occur.

Regular follow-ups

The intervals for a follow-up examination are determined individually and in consultation with your attending physician. The first follow-up appointment usually takes place six to twelve weeks after the procedure, then every three to six months, and will probably include the following examinations:

- Control of wound healing/scar formation
- Interrogation and checking of the cardiac monitor with a programmer (e.g., battery status, service time, function)
- Adapting the cardiac monitor to current needs (if necessary, the doctor will carry out reprogramming)
- Evaluation of the recorded data
- Possible adjustment of treatment based on the data already collected, e.g., by changing the choice of medication

The doctor will also ask you how you have been. Prepare for the interview and ask any questions that are important to you. Based on the follow-up examination, he or she can decide on further treatment, make diagnoses and discuss the further course of treatment with you.

Alexander reports on how he fared after his procedure:
"Immediately after the procedure, the tissue was still a little tight for a few days, so that I felt a slight pressure when bending over or lying on my side. That has completely subsided. I got used to the device very quickly and sometimes forget for many hours, sometimes even for a day, that I am wearing an implanted device at all. Of course, I do feel it when I touch my chest."

"As no dramatic events were detected in the first few weeks apart from an explainable heart rate of 180 beats per minute during exercise, I am not due back in hospital for a check-up for another year, unless unusual heart activity is reported by the CardioMessenger Smart. If it stays that way, it means for me that I don't have a serious cardiologic problem. If there is anything in the meantime, the medical team will contact me again by e-mail. What else comes to mind: I should let them know in advance if I don't take the CardioMessenger Smart with me on vacation, as there will be no transmission during this period and they will then assume the worst and try to reach me."

8 Follow-up Care via Remote Monitoring with BIOTRONIK Home Monitoring

A personal visit to the doctor is not required for every follow-up. With the BIOTRONIK remote monitoring system "Home Monitoring", the health of your heart and the condition of your cardiac monitor can also be monitored remotely. Please talk to your doctor, as he or she will decide whether remote monitoring is appropriate in your case. If so, he or she will brief you on the process and explain how you can work with him or her remotely to find the best way forward for you together.

BIOTRONIK Home Monitoring is easy to use. Every night while you sleep, your BIOTRONIK implanted device automatically collects the data from the last 24 hours and transmits it to the CardioMessenger Smart (see chapter 6 "Transmitter"). The CardioMessenger Smart sends data to a secure server.

This data includes:

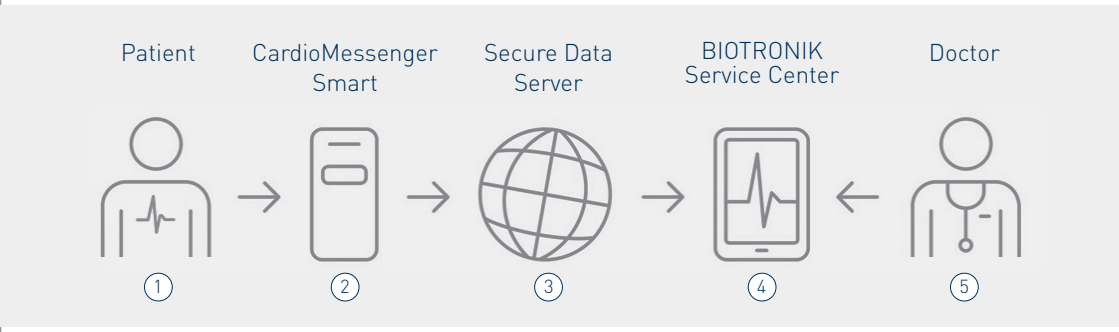
- Functional status of the implanted device
- Battery status
- Status of the pacing or defibrillation therapies performed
- Current heart rhythm and previous cardiac activity including all detected abnormalities
- General changes in heart function

The data is transmitted to the BIOTRONIK Home Monitoring Service Center (HMSC) using mobile phone technology. This is possible from anywhere in the world where the CardioMessenger Smart has mobile phone reception. Your doctors can access and check the data around the clock via a safe web portal. In addition, they can be notified of urgent patient events by text message or e-mail. Your doctor will check your data and take action if necessary.

Note:
If you have a cardiac monitor, information can be sent at times other than the daily transmission time. Your doctor will instruct you on how and when to use this function.

Do you want to help us with the further development of devices and therapies?
Then visit our website under:
www.biotronik.com/CMP/Global/de

The path of data transmission:



① The data is sent from the cardiac monitor to the transmitter.

② The transmitter collects the data.

③ The data is transmitted to the Secure Data Server via the mobile phone network.

④ The BIOTRONIK Service Center receives the data and evaluates it.

⑤ The results of the evaluation are made available to the doctor as findings on the protected BIOTRONIK Home Monitoring Service Center internet platform.

The remote monitoring system is not an emergency system!
Always contact your doctor or the emergency services first if your symptoms suddenly worsen or experience new acute symptoms, even if you are supplied with the Home Monitoring remote monitoring system.

The "on-demand transmission" function:
Your doctor will inform you whether the "on-demand transmission" function has been activated for your implanted device. If this is the case, stay near the transmitter for the next three hours after triggering a recording with the Remote Assistant. This ensures that the data is sent as quickly as possible.

Further information on remote monitoring with the BIOTRONIK Home Monitoring system can be found on our website: www.biotronik.com/en-int/patients/heart-monitoring/home-monitoring

9 The Cardiac Monitor in Everyday Life

After a rest period agreed with your doctor, you can quickly return to your usual lifestyle, do your housework, pursue your hobbies and go back to work. Showering, bathing and activities that you enjoy are possible without major restrictions. The cardiac monitor should not restrict your lifestyle. Use this time to familiarize yourself with the cardiac monitor and any accessories. Set up at home and place your transmitter (if available) next to your bed.

Find out what you need to consider in everyday life. Here you will find an overview of the most important rules of conduct to be observed in general:

- Have regular follow-up examinations.
- The cardiac monitor and its accessories are not an emergency system! Always contact your doctor if your symptoms suddenly worsen or if you notice any abnormalities in connection with your cardiac monitor.
- If you need additional medication, take it exactly as instructed by your doctor. He or she will explain to you which medicines you can take and which you should seek medical advice about beforehand.
- Do not move or turn the cardiac monitor intentionally. Movement can cause the implanted device to come out of its intended position, which affects the quality of the data.
- Try to avoid areas marked with the following warning symbol:

- Always carry your implant card with you – both when traveling and in everyday life.
- Magnetic fields can interfere with your cardiac monitor. Please avoid areas with strong magnetic fields and do not place magnets in the direct vicinity of the cardiac monitor.
- If possible, do not use devices for which the manufacturer notes in the operator manual that they are unsuitable for pacemaker patients, even if you are wearing a cardiac monitor.

In the following section, we have compiled some information on specific everyday situations and answers to any questions you may have.

9.1 Sports and fitness

Sports

After the wound has healed, you can resume sports activities depending on your state of health and in consultation with your doctor. Endurance training such as running, hiking, cycling or other moderate sports are beneficial to your health and are generally not a problem in conjunction with your cardiac monitor. Nevertheless, you should talk to your doctor if you engage in extreme or competitive sports. You may be advised against participating in certain sports, or it may be accepted that some disruptions in the quality of the recordings may occur during this time. You should generally avoid contact sports where your chest can take a hard hit, such as boxing. Cardiac monitors are designed to withstand even heavy loads. However, if you have a serious accident while playing sports that affects the area of your monitor, have your doctor check that the device is still working properly.

Fitness

If you work out in the gym, you can use most of the equipment. Strength training is an effective supplement to endurance training. However, you should give preference to equipment and exercises with low to medium intensity, such as the exercise bike, cross trainer or strength exercises that do not have a direct or very strong effect on the cardiac monitor. Seek advice from an experienced trainer at the gym and talk to your doctor about the use of certain equipment. Avoid devices with a body fat measurement function, unless this function can be disabled.

Sauna

Your cardiac monitor can withstand a high temperature. Although your body is heated by the sauna, it cannot reach temperatures that would damage your device.

9.2 Driving a car

With a cardiac monitor, you can drive independently without any restrictions, but driving a car in any case always depends heavily on your individual state of health. Therefore, ask yourself why you have been given the cardiac monitor and seek advice from your doctor as to whether it is safe for you to drive a car and participate actively in road traffic. This is especially important if you have symptoms that may affect your ability to drive.

9.3 Travel and vacation

With the cardiac monitor, you can plan a great vacation without any worries. Your heart rhythm is continuously monitored during this time. As with driving, your travel activities also depend on your general state of health. If there is no medical reason not to, nothing stands in the way of your vacation: Whether flying, sailing, taking the train or traveling by car – travel remains simple and uncomplicated. BIOTRONIK cardiac monitors are used worldwide. Under the appropriate technical conditions, data can also be transmitted to your medical team abroad. We or your medical care team can help you find addresses in your vacation destination, just in case you need help.

Checklist before your trip

- Do you have your patient ID card with you?
- Take your medication with you (preferably in your hand luggage) and plan a supply for a few extra days to be on the safe side.
- If you use remote monitoring with BIOTRONIK Home Monitoring, remember your CardioMessenger Smart so that you can transmit your data to your doctor if you have mobile phone reception.
- If you are using the trigger device, take it with you so that you can continue to actively record data.
- Print a list of important telephone numbers, including that of your doctor at home.
- Consider whether you want to store important medical information (e.g., illnesses, emergency contacts) on your cell phone that first responders can access directly from the lock screen in an emergency.
- If you are traveling abroad, find out about the emergency number in your destination country.
- If necessary, find out about a hospital near your destination that can help you if you have any problems.

Security checks at the airport

Current studies show that modern security checks at airports are generally safe for people wearing cardiac monitors – especially with body scanners and portable detectors. Nevertheless, it is recommended to inform the security staff, as your device can trigger the alarm of the security system. You should therefore show your patient ID card to the security staff at the airport. They will instruct you what to do at the security checks. Metal detectors do not affect your cardiac monitor if you pass them at a normal pace. If you are scanned with a hand-held metal detector, please ask the security staff to avoid the thoracic area as far as possible. On an airplane or during a train journey, there are usually no sources of interference that affect your device.

Detailed information on "Travel and vacation" can be found on our BIOTRONIK website: www.biotronik.com/en-int/patients/patients-and-caregivers/everyday-life/carefree-holidays

9.4 What you should know about electromagnetic fields

Electromagnetic fields are all around us and are generated both in nature and by human activity. They play a crucial role in our daily lives, from wireless communication to medical imaging. Cardiac monitors are sensitive medical devices that record the electrical activity of the heart. Electromagnetic fields can theoretically influence the function of such devices, especially if they are strong enough. However, it is important to know that modern cardiac monitors are designed to be shielded against the usual electromagnetic fields. As the wearer of a cardiac monitor, you have no cause for concern in everyday life. However, sources of interference can impair the quality of the recordings or, in the worst case, limit the function of the cardiac monitor. Therefore, please always observe the special notes of the respective device manufacturer, which you can find in the operator manual.

To ensure that your cardiac monitor reliably detects the electrical signals of your heartbeat and does not record any extraneous signals (interference), please try to follow the recommendations in the following sections:

General information on anti-theft alarm systems and security checks

If you have to pass anti-theft alarm systems in department stores or other facilities, please do not stop, but pass through them rapidly. If necessary, you can indicate that you are wearing an implanted device and that this could trigger an alarm. In such cases, simply show your patient ID card.

In the home environment/everyday life/ hobbies

You can use these devices without hesitation at any time:

- Televisions, radios, wireless headphones, stereo systems, and similar audiovisual devices
- Hair dryers, electric razors, and other electronic bathroom appliances
- Common household and kitchen appliances such as washing machines, vacuum cleaners, dishwashers, hand blenders, and microwaves (exception: induction stoves, where a distance of half an arm's length is recommended)
- Blood pressure monitors and heart rate monitors
- Computers, copiers and printers
- Sauna, infrared cabin
- Electric blankets and heating pads

As a precaution, please keep a safe distance of approximately one hand length (approx. 15 cm/6 inches) from the following devices, both when using them and when storing them:

- Cellular phone/smartphone/mobile phone: It is best to use the cell phone on the side of the body facing away from the cardiac monitor
- Tablet, iPad
- Games consoles such as Playstation and Wii
- Inductive charging stations (charging station that wirelessly transmits electrical energy to charge another device – such as a smartphone or an electric car)
- Fan heater
- E-cigarette

To avoid possible interference with your implanted device, we recommend that you keep a minimum distance of around 30 cm/12 inches – roughly half an arm's length – from these devices:

- Induction stoves
- Petrol-powered tools (chainsaw, leaf and snow blower, brush cutter)
- Running motor (electric bicycle, car, electric scooter, Segway), 60 cm/24 inches to the running motor applies to cars

In order not to impair the proper function of your cardiac monitor, you should avoid or not use the following devices and environments as a precaution:

- Body fat scales
- Go-karts

Please contact your attending physician if you are unsure about your safety.

At the workplace

As the wearer of a medical implanted device, you should avoid activities where the device is subjected to strong mechanical stress (e.g., working with a jackhammer) or where you are exposed to intense electromagnetic fields. If you work in a large industrial plant or power station or have to deal with large generators, talk to your doctor and the safety officer of your company to identify possible risks for your implanted device and take appropriate protective measures.

You can find detailed information in the "Electromagnetic Compatibility Guide" on our BIOTRONIK website: www.biotronik.com/en-int/patients/electromagnetic-interference

9.5 Information on medical interventions and examinations

If you are planning to undergo a diagnostic examination, e.g., in an MRI (magnetic resonance imaging) scanner, or a medical procedure/surgery, please inform your doctor about your cardiac monitor. The use of certain procedures during medical diagnosis and treatment may affect the function of the device or pose a risk to you as a patient. Therefore, certain safety precautions should be observed and implemented. Medical specialist personal can also contact BIOTRONIK Support to obtain the conditions if required.

Show your patient ID card before undergoing any medical examination or treatment.

We have listed some important medical procedures for you here. But in principle: The healthcare professional can assess whether your cardiac monitor is suitable for the examination or treatment and whether safety measures need to be taken.

Special precautions should be taken for the following procedures:

- High-frequency surgical procedures such as electrocauterization (cauterization of blood vessels) and high-frequency (HF) ablation (cauterization of tissue)
- Short and microwave therapy
- Radiation therapy
- Lithotripsy (kidney stone fragmentation)

Magnetic Resonance Imaging (MRI)

The cardiac monitor is approved for use in magnetic resonance imaging (MRI) scanners, provided certain conditions are met. To confirm that you can undergo an MRI exam under certain conditions, please contact your specialist cardiology or radiology practice or the clinic where your implanted device was inserted. These contacts can answer your questions based on your complete medical history and the requirements for scanning procedures.

Further information on MRI scans can be found on our BIOTRONIK website at:
www.biotronik.com/en-int/patients/mri-scans

How is Alexander doing with his cardiac monitor?
"I have not regretted my decision to have the cardiac monitor fitted. Before, I felt awkward. Now there is a data set that has been evaluated and identified as harmless in recent months. That gives me a feeling of safety. If a cardiac arrhythmia is detected, appropriate therapy can be initiated. When I draw a conclusion in perhaps three years' time and the doctors say: ‚There was nothing. Keep up the good work.', then I'm satisfied. Then wearing the cardiac monitor gave me comprehensive peace of mind."

10 The BIOTRONIK Patient App – How We Can Provide You with Additional Support

10.1 What is the Patient App?

The "BIOTRONIK Patient App" is a free application that patients with a BIOTRONIK cardiac monitor can use. It allows you to be actively involved in remote monitoring, document symptoms and gain additional access to important information about your cardiac monitor.

You can look up data about your cardiac monitor in the app at any time – at home or when traveling. You can easily document how you feel in the app's symptom diary. Your entered symptoms are automatically and securely forwarded to your doctor when you are connected to BIOTRONIK Home Monitoring. In addition to the functions mentioned here, the app has many other features that optimize the benefits of your BIOTRONIK cardiac monitor – and help you to better understand your heart health through systematic documentation. Because our app was developed to support you in your everyday life so that you can focus on what really matters: your well-being.

10.2 How can the app be used?

The app can be used in three ways:

- Keep an eye on your own health. Use the Patient App to document your symptoms quickly and conveniently for your consultation with your doctor.
- Get an overview of the data transfer. Determine the status of the last data transmission from your device to the BIOTRONIK Home Monitoring remote monitoring system. The app helps you to correct possible transmission errors.
- Simplify your everyday life with convenient app functions. Access your patient ID card quickly if required, e.g., at an airport security check.

Notes:

- The BIOTRONIK Patient App is a solution that the doctor must decide to use. Before using the app, talk to him or her.

- The app is not yet available in all regions of the world. Find out about the current status in your country on our website.

Are you interested in the BIOTRONIK Patient App? Ask your doctor and find out more on our BIOTRONIK website: www.biotronik.com/en-int/patients/patients-and-caregivers/heart-monitoring/biotronik-patient-app

11 Further Questions with Answers

What is the service time or what happens when the cardiac monitor is no longer needed?

It is not possible to determine the service time of the cardiac monitor in general. The exact service time of the implanted device depends on how many recordings are stored and transmitted by your implanted device. The battery status is regularly transmitted to your doctor via the "Home Monitoring" function or checked during follow-up examinations. Your doctor will initiate the necessary measures towards the end of the service time, which will be several years.

Once the diagnosis has been made, there are various options for further treatment. Some patients do not require an additional device, in which case the cardiac monitor can be removed. Others receive a pacemaker or implantable cardiac defibrillator, depending on the type of cardiac arrhythmia detected. Your doctor will advise you in detail about the additional procedure. In some patients, a replacement device is used to continue monitoring the heart rhythm.

The replacement and removal of the cardiac monitor is similar to the original insertion. The old cardiac monitor is removed and a new one inserted. If you are having a pacemaker or an implantable cardiac defibrillator implanted, the implantation will take a little longer and you will receive additional information from your doctor. This implantation is sometimes also performed under brief sedation.

Can the cardiac monitor trigger an allergic reaction?

An allergic reaction is extremely rare. Cardiac monitors are made from materials that are compatible with the body. The outer surfaces that come into contact with your body are made of titanium and silicone. Both materials are considered to be well tolerated by the body.

12 About BIOTRONIK

For over 60 years, BIOTRONIK has stood at the forefront of medical technology, pioneering breakthrough innovations that are transforming the lives of millions affected by heart disease and chronic pain. Rooted in a deep purpose to seamlessly harmonize technology with the human body, we engineer trusted, life-changing therapies through our advanced active implants in Cardiac Rhythm Management, Monitoring, and Neuromodulation, while providing cutting-edge solutions in Electrophysiology. From creating Germany's first pacemaker in 1963 to breaking new ground in digital technologies and Conduction System Pacing today, BIOTRONIK is continuously raising the bar for quality, performance, and innovation. Headquartered in Berlin, our global reach spans over 100 countries across the Americas, EMEA, and Asia—bringing bold, future-ready solutions that are shaping the next generation of medical technology.

We are always there for you.
You can find further information on our website:
www.biotronik.com

Do you have any further questions? Our patient support service will help you by telephone or in writing at:

+49 (0) 30 68905-0

patienten@biotronik.de

Picture credits

Title	© iStock
Page 1	© Martin Rundfeldt
Page 5	© Martin Rundfeldt
Page 9	© iStock
Page 13	© BIOTRONIK
Page 15	© Martin Rundfeldt
Page 17	© Martin Rundfeldt
Page 19	© BIOTRONIK
Page 20	© BIOTRONIK
Page 23	© Martin Rundfeldt
Page 26	© BIOTRONIK
Page 28	© iStock
Page 30	© iStock
Page 35	© Martin Rundfeldt
Page 36	© BIOTRONIK
Page 39	© BIOTRONIK

Revision: A (2026-02-02)

530463--A

BIOTRONIK SE & Co. KG
Woermannkehre 1
12359 Berlin/Germany
Tel +49 (0) 30 68905-0
homemonitoring@biotronik.com
www.biotronik.com

BIOTRONIK
excellence for life