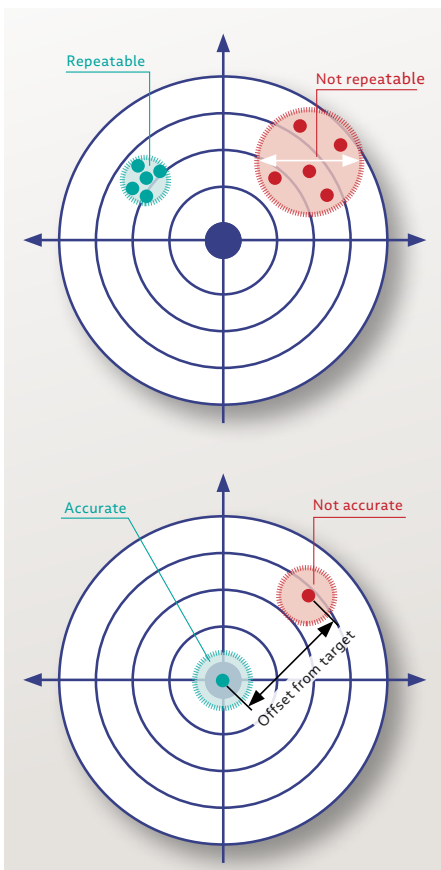




# Accuracy versus Repeatability



***It's up to you to make the right choice – for your patients' sake!***

**A robot has different metrology or measurable characteristics, that will have a direct impact on the effectiveness of the robot during the execution of its foreseen tasks. The main measurable characteristics are repeatability and accuracy.**

Depending on the application, it is of highest importance to clearly understand the meaning and especially the difference of these characteristics. Repeatability is doing the same task over and over again, while accuracy is hitting your target each time. Especially when it comes to tumor treatment and patient health it is significant to understand which criteria of a robot really matter. With our explanations below you will be able to learn about the differences and judge the perfect fit of a patient positioning system. Misidentifying those terms leads to misinterpretation when reviewing a product specification and could lead to unsatisfying results in the operating system during treatment.

With a correct understanding you can be sure to make the right choice for a patient positioning system and last but not least to secure treatment success for your patients.

### Pose repeatability >

The pose repeatability represents the ability of the robot to always return to the same programmed position from the same direction, or in simple words, the robot is starting at the programmed point A and going to the programmed point B and those points are never changing. The pose repeatability criteria is important when it comes to mass production with recurring movements and trajectories of robots with the same tool, e.g. when welding cars. There is no variation on the payload, i.e. the car body part and/or the tool are always the same. The robot is starting at the very same position every time it is welding and the welding target point is also not changing. You will find this criteria, commonly named as „repeatability“ on every datasheet of industrial robots.

The BizLink ORION robot offers an outstanding performance with a pose repeatability of 0.05 mm.

### Multidirectional pose accuracy (pose = combination of position and orientation with the robot's end-effector) >

The multidirectional pose accuracy represents the ability of the robot to move to different programmed positions from the same direction, or in simple words, the robot is starting at point A and going to the programmed points B, C, D, E, etc. The multidirectional pose repeatability is important in industrial applications like bin picking where the robot grips the parts from different places but carries it in always the same position. There is no variation on the payload. E.g., the gripped part is always the same, like a door frame of a car. The BizLink ORION robot offers an outstanding performance with a multidirectional pose repeatability < 0.2mm.

When it comes to treatment with patient positioning systems, the most important performance criteria is the absolute accuracy with payload variation. In order to perform the most accurate treatment you either need camera supported tracking systems which come with disadvantages such as additional space requirements and both difficult and time-consuming installations and calibrations. Moreover, they are sensitive to any minimal vibration (e.g. when being installed on the ground) and are consequently not delivering the desired accuracy and therefore treatment results. The better choice is a system delivering highest possible absolute accuracy itself – BizLink ORION.

### Absolute accuracy without payload variation >

The absolute accuracy without payload variation represents the ability of the robot to move to a not pre-programmed position from any starting point and measures how close the achieved position is to the desired target position while the payload is always the same. The absolute accuracy without payload variation is important in specialized laboratory applications.

The BizLink ORION robot offers an outstanding performance with an absolute accuracy without payload variation of 0.2 mm.

### Absolute accuracy with payload variation >

The absolute accuracy with payload variation represents the ability of the robot to move to a not pre-programmed position from any starting point and measures how close the achieved position is to the desired target position while the payload is always different. This criteria is of major importance for medical applications like tumor treatments with the use of patient positioning systems. Lots of variations in patients and payloads (size, weight, shape) and tumors (locations, sizes) need to be considered and the treatment position adapted, accordingly.

Often, robot manufacturers do not even provide the absolute accuracy but this criteria is absolutely critical. The BizLink ORION robot offers an outstanding performance with an absolute accuracy of 0.5 mm with payload variations. The payload can differ from 0–375 kg.

**Selected performance criteria mentioned above are defined in the International Standard ISO 9283.**

It is the preferred choice of many integrators and treatment centers, worldwide. On top, it saves the treatment center and the patient time, costs and excess radiation caused by more x-ray images than really needed.

Trust and rely on BizLink ORION! With an absolute accuracy of 0.5 mm. It is the most accurate patient positioning system available in the market, worldwide. It is accurate from 0 to 375 kg in the total treatment volume and delivers reliable and precise treatment results.