

Robotics

Industrial robots represent an integral part of our modern working world. They increase productivity and product quality while relieving employees of monotonous and hard physical work at the same time.

Which safety regulations apply to industrial robots?

The relevant harmonized European standards for industrial robots are EN ISO 10218-1 and EN ISO 10218-2. They apply worldwide and may be obtained from Beuth Verlag (publishing house). The DGUV Information 209-074, which has been prepared by the Berufsgenossenschaft Holz und Metall, provides an initial overview on the safety requirements. It can be ordered from the BGHM free of charge and is also available in English.

The experts of the BGHM will be pleased to answer all questions concerning occupational safety and health: including the planning and design stage to the operation of industrial robots and industrial robot systems.

Collaborative robots

On conventional industrial robot systems, safeguards such as e. g. protective fences and light curtains, prevent the access of people to hazardous areas. Collaborative robot systems, however, represent a link between fully automated systems and manual workplaces. The fact that Smart Manufacturing tends towards smaller batch sizes, is one reason why collaborative robots are taking on greater significance. In an almost fenceless operation which is dependent on the type of collaboration, the robot can thus support workers on manual tasks. This relieves the worker which is of benefit to the company managers in the medium to long-term, since it results in less downtimes and an enhanced health situation of employees.

In particular, for non-ergonomic tasks, "colleague robot" is increasingly applied, e.g. for monotonous tasks, on frequent stooping down or with stooped body postures.

Among the four collaborative types that are currently known, the Power and Force Limitation offers particular potential. Forces and pressures of the robot (including those of the relevant tool) are limited on contact with a person such that no injuries can occur. The so-called biomechanical limit values for such kind of contact have been largely unknown until recently. Extensive studies have been carried out in research projects conducted by DGUV and BGHM with the assistance of IFA. The biomechanical limit values that have been determined as a result must not be exceeded in case of contact between the robot system and the human. The results have attracted great attention among experts and have been included in the specification ISO TS 15066 by the International Standardization Institute ISO.

Due to the absence of reliable simulation tools up to now, a measurement of the actual biomechanical limit values at the possible contact points of the real system is absolutely essential. This is primarily the task of the system integrator. But also for the future users of the system,

biomechanical limit values will be an issue, since forces and pressures can change due to re-programming, parts change, wear etc.

The Berufsgenossenschaft provides the information "Collaborative robot systems – Design of systems with “Power and Force Limiting” function for free download. This information is intended to give an initial overview on the procedures when planning safe collaborative robot systems. The experts of the Berufsgenossenschaft will be pleased to give advice regarding the operation of collaborative robot systems or their certification.

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Downloads:

- [GUV Information No. 080: Collaborative robot systems - Design of systems with the function "Power and Force Limiting" \(PDF, 687 kB\)](#)
- [DGUV Information 209-074 "Industrial robots"](#)
- [Checklist Collaborative robot systems, 02/2018 \(PDF, 240 kB\)](#)