



consulting

## Technical services

# Collaborative robot risk analysis

Based on requirements from ISO/TS 15066 & ISO 10218

Risk assessments are the starting point to any machine safeguarding initiative, even when the application involves inherently safe by design equipment such as a collaborative robot. It is important to note that the use of an inherently safe collaborative robot does not automatically equate to a safe application. This is because the application as a whole must be evaluated which includes the environment, scope of work defined for the robot and human operator, material being handled, etc. Let TÜV Functional Safety Engineers from **tec.nicum** perform a collaborative robot risk analysis, based on the requirements referenced in ISO/TS 15066:2016 and ISO 10218:2012 to help ensure you are utilizing your collaborative robot safely.



### Report Details

Any hazard that is found during the analysis will be assigned a Hazard Rating Number (HRN). This number is based on four areas of selection:

- LO – Likelihood of Occurrence
- FE – Frequency of Exposure
- DPH – Degree of Possible Harm
- NP – Number of People

### Report Deliverable

Data from our risk analysis software will be extracted and provided as a PDF document containing details of each machine evaluated. This report will provide all hazards identified, an HRN according to the hazard, corresponding pictures, and control measures where applicable.

For more information regarding the collaborative robot risk analysis or our other Engineering Services, please contact:

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# Conception of safety solutions Pressure and force limiting analysis

## Measurement tests according to ISO/TS 15066

Within collaborative robot applications where there exists direct interaction between a human operator and a robot, collisions between the two cannot be overlooked, but rather expected as a reasonable foreseeable event. ISO/TS 15066 specifies the safety requirements for collaborative robot systems and the work environment, and also provides further guidance on collaborative industrial robot requirements given in ISO 10218. Among these specifications are the permissible limits for force and pressure deriving from the collaborate robot and are described as transient and quasi-static forces.



### ISO/TS 15066 Definitions:

**Transient Contact:** Contact between an operator and part of a robot system, where the operator body part is not clamped and can recoil or retract from the moving part of the robot system.

**Quasi-Static Contact:** contact between an operator and part of a robot system, where the operator body part can be clamped between a moving part of a robot system and another fixed or moving part of the robot cell.

Let the TÜV Functional Safety Engineers from tec.nicum perform a pressure and force limiting measurement test, based on the requirements referenced in ISO/TS 15066 to help ensure you are utilizing your collaborative robot safely.

### Report Deliverable

Data from our pressure and force limiting measurement software will be extracted and provided as a pdf. document containing details of the evaluation. This report will provide visuals of the force curves measured, pressure images and calculations for the transient and quasi-static forces.

For more information regarding the pressure and force limit measurement analysis or our other Engineering Services, please contact: