



engineering

## Conception of safety solutions

### Pressure and force limiting analysis

#### Measurement tests according to ISO 10218 and ANSI A3 R15.06

Within collaborative applications where there exists direct interaction between a human operator and a **Class I** robot, collisions between the two cannot be overlooked, but rather expected as a reasonable foreseeable event. Current robot safety standards state that ***operator(s) performing a collaborative task within a safeguarded space shall be protected from injury due to contact from moving parts of the robot application.***

One means of protection is the implementation of power and force limiting or **PFL**. In a PFL collaborative application, contact between moving parts of the robot application and operator(s) can occur. As such, collaborative applications designed to rely upon power and force limiting shall use robots that conform with the requirements of ISO 10218-1 and ANSI A3 R15.06.



Current robot safety standards allow verification and validation of PFL collaborative application pressure and force values to be performed by measurements using Pressure and/or Force Measuring Devices (PFMDs). These measurements take into account robot contact described as **Transient** and **Quasi-Static**

**Transient Contact:** brief contact to an operator from moving part(s) of a robot application where the body part is not clamped and can recoil or retract from the moving part of the robot application

**Quasi-Static Contact:** contact to an operator from moving part(s) of a robot application, where the body part can be clamped between a moving part of the robot application and another fixed or moving part of the application

Let the TÜV Functional Safety Engineers from tec.nicum perform a PFL analysis per ISO 10218 and ANSI A3 R15.06 to help ensure you are utilizing your collaborative robot application 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:

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